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Contents

Foreword

Vietnam's economic and social achievements in the 1990s are nothing short of amazing, arguably placing it among the top two or three performers among all developing countries. This success demands serious study in order to draw lessons for other developing countries. Fortunately, there are high-quality data available to undertake such a study, and this book has made full use of those data, especially the 1992–93 and 1997–98 Vietnam Living Standards Surveys, to document and understand Vietnam's experience and to provide policy recommendations for other low-income countries.

This volume offers a very broad array of studies of Vietnam's economy and society in the 1990s. It begins with four chapters on Vietnam's economic performance, each focusing on a different topic: macroeconomic growth, wage labor markets, household enterprises, and agriculture. Of course, economic growth can take many forms, with widely differing consequences for poverty reduction. The next three chapters focus on poverty reduction in the 1990s, examining the impact (or lack thereof) of various poverty programs, the spatial distribution of poverty, and poverty among ethnic minorities. The next five chapters examine health and education outcomes. Three chapters on health consider child survival, child nutrition, and use of health care services, and two chapters on education cover basic trends in enrollment and financing and the factors that determine school progress and academic achievement. The last three chapters examine topics of particular interest in Vietnam: child labor, economic mobility, and interhousehold transfers. As a whole, this book constitutes a comprehensive study of economic and social development in Vietnam in the 1990s.

The research presented in this book involves the collaboration of numerous individuals and organizations. The two Vietnam Living Standards Surveys used in the book were implemented by Vietnam's General Statistical Office, with financing from the United Nations Development

Programme and the Swedish International Development Agency and technical support from the World Bank. Funding for the research was obtained from the World Bank's Research Committee. The results were first presented at a workshop in Hanoi in May 2001 that was attended by a wide range of government officials, international organizations, and individual researchers.

The extensive use made of household survey data in this study raises the question of what data will be collected in the future in Vietnam. Fortunately, Vietnam's General Statistical Office has developed, with assistance from the United Nations Development Programme and the World Bank, a plan for implementing similar household surveys every two years. The first survey, known as the Vietnam Household Living Standards Survey, was implemented in 2002 and preparations are now under way to implement another survey in 2004. This continued data collection will provide a sound foundation for study of Vietnam's social and economic progress in the first decade of the 21st century.

François J. Bourguignon
Chief Economist and Senior Vice President
The World Bank

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Many people in addition to the authors contributed to this book, and we appreciate their assistance. Funding for the two Vietnam Living Standards Surveys was provided by the United Nations Development Programme and the Swedish International Development Agency. The Social and Environmental Statistics Department of Vietnam's General Statistical Office implemented both surveys with a very high degree of enthusiasm and professionalism. Indeed, several of the authors of these chapters are from that department. Sarah Bales served as an outstanding consultant in the implementation of the second survey. Financial support to undertake much of the research was obtained from the World Bank's Research Committee. The British Department for International Development funded a workshop to disseminate first drafts of the papers, which was held in Hanoi in May 2001, and also funded several of the papers. Very able editing and manuscript processing were provided by Alison Peña, Emily Khine, and Lucie Albert-Drucker. The World Bank's Office of the Publisher managed editorial and print production, including book design. Numerous other people contributed in many ways, but if we attempt to name them all, we are likely to omit several of them.

Finally, we would like to thank all the households that participated in both surveys; by providing a large amount of information, they have helped us understand what has occurred in Vietnam in the 1990s. Hopefully, our research will lead to better policies that will improve their lives in the years to come.

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Abbreviations and Acronyms

2SLS	Two-stage least squares
2SLSFE	Two-stage least squares with fixed effects
ANOVA	Analysis of variance
ASEAN	Association of Southeast Asian Nations
BMI	Body mass index
CEMMA	Committee for Ethnic Minorities in Mountainous Areas
CHC	Commune health center
CPI	Consumer price index
CPRGS	Comprehensive Poverty Reduction and Growth Strategy
CSI	Comprehensive Student Insurance
D	Vietnamese dong (currency)
DHS	Demographic and Health Survey
FDI	Foreign direct investment
FEs	Fixed effects
GDP	Gross domestic product
GER	Gross enrollment rate
GNI	Gross national income
GNP	Gross national product
GSO	General Statistical Office
HEPR	Hunger Eradication and Poverty Reduction
ICDS	Inter-Censual Demographic Survey
ICRG	International Country Risk Guide
ILO	International Labour Organisation
IMR	Infant mortality rate
IUD	Intrauterine device
IV	Instrumental variable
MARS	Multiple adaptive regression spline
MCI	Multiple cropping index

MDGs	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MOLISA	Ministry of Labor, Invalids and Social Affairs
NERs	Net enrollment rates
NFHEs	Nonfarm household enterprises
NGO	Nongovernmental organization
NPK	Nitrogen-potassium-phosphate compound fertilizer
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary least squares
PCSI	Propensity to consume out of social income
PHF	Private health facility
plim	Probability limit
PROM	Test of policy's Promotion of the poor
PROT	Test of policy's Protection of the poor
PRSP	Poverty Reduction Strategy Paper
PTA	Parent-teacher association
ROC	Receiver operating characteristics
SCF U.K.	Save the Children Fund, United Kingdom
SIDA	Swedish International Development Authority
SMEs	Small and medium enterprises
SOEs	State-owned enterprises
TDY	Thousands of dong per year
U5MR	Under-five mortality rate
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
VHI	Vietnam Health Insurance
VHSR	*Vietnam Health Sector Review*
VLSSs	Vietnam Living Standards Surveys
WHO	World Health Organization
WTO	World Trade Organization

Map of Vietnam

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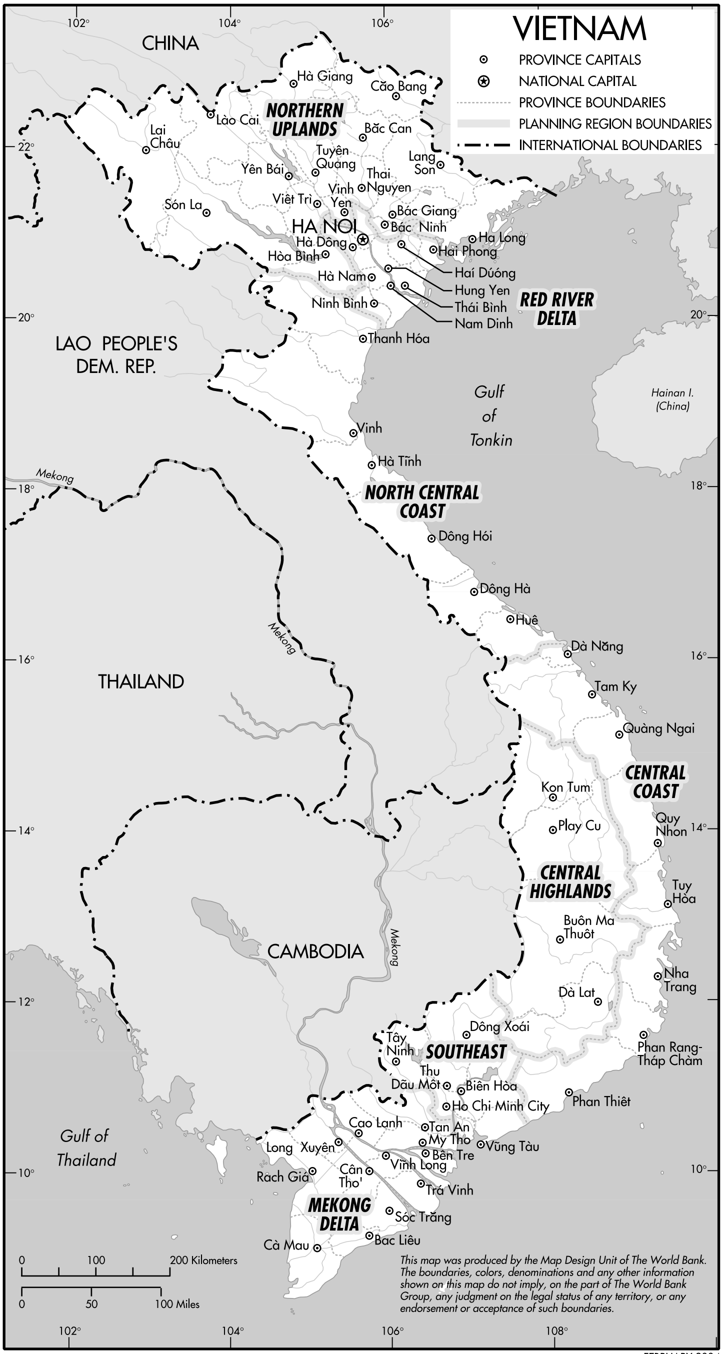

FEBRUARY 2004

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An Overview of Economic Growth and Household Welfare in Vietnam in the 1990s

Paul Glewwe

In the 1980s, Vietnam was one of the poorest countries in the world, and throughout most of that decade there was little indication that Vietnamese households had any hope of raising their level of welfare. Its gross domestic product (GDP) per capita in 1985 is estimated to have been US$130 per year, making it one of the world's five poorest countries. Although school enrollment rates were relatively high for such a poor country, they remained stagnant while school enrollment rates were increasing dramatically in nearby East Asian "miracle" countries. At the same time, while life expectancy was unusually high for such a poor country, exceptionally low incomes meant that the majority of Vietnamese children were malnourished. As a very poor country with scant prospects for a better future, Vietnam was in the same category as many of the poorest countries in Africa, Asia, and Latin America.

Starting in the late 1980s and continuing through the 1990s, Vietnam transformed itself from an economic "basket case" into one of the most successful countries in the world in terms of economic growth, poverty reduction, and increased household welfare. This transformation raises significant questions for anyone concerned with poverty in the poorest developing countries: What accounts for Vietnam's astonishing success? What can Vietnam do to ensure continued success? Finally, can other very poor countries achieve this same success by following Vietnam's policies?

This book seeks to answer these questions. It will do so by analyzing Vietnam's success in detail, using a variety of data from Vietnam and elsewhere. Vietnam is fortunate, not only because of its economic and social success but also because of the existence of an unusually large amount of high-quality data. The analyses in the chapters that follow make full use of these data and thus provide a wealth of information that can be used by researchers and policymakers in Vietnam and in other developing countries.

This chapter sets the stage for the book. The first section describes the new economic policies that Vietnam has adopted since the late 1980s. The next section provides an overview of Vietnam's achievements in the 1990s. The following section summarizes the results from the various chapters, and a final section summarizes the conclusions and raises issues for future research. An appendix at the end of the chapter provides information on the 1992–93 and 1997–98 Vietnam Living Standards Surveys (VLSSs), the data that are used most frequently in the book.[1]

Doi Moi Policy Reforms

In the 1980s, Vietnam was an extremely poor country, with a low rate of economic growth. Inflation rose dramatically as government deficits were financed by printing money; by 1986, the annual inflation rate had risen to 487 percent. Vietnam's response to this poor economic performance was the adoption of the *Doi Moi* ("renovation") policy reforms in the late 1980s.[2] This process began with the Sixth Congress of the Communist Party, held in December 1986. At this meeting, the government explicitly adopted the goal of replacing central planning with a regulated market economy. A series of fundamental policy changes was quickly implemented in the following years, so that by 1989 most forms of private economic activity were legal and price controls had been removed for almost all goods and services. This section describes these policy changes, as well as several that were implemented in the 1990s, in more detail.

The first important policy changes were implemented in the agricultural sector. In 1987 and 1988, price controls were gradually removed for agricultural goods, and farm households were allowed to sell any surplus products at whatever price the private market would bear. Another decisive change occurred when Decree Number 10 was issued in April 1988. That decree dismantled agricultural cooperatives and divided up almost all agricultural land among the rural households that had worked for those cooperatives. Those households were provided with leases that lasted for 15 or more years for the plots of land they received. Households were required to pay taxes for the right to use the land, but after taxes all output was the property of the households.

These changes in agricultural policy, along with the lifting of many restrictions on overseas exports in the late 1980s, helped Vietnam to become the world's third largest rice exporter by 1992, a dramatic change from its status as a rice importer in the mid-1980s. Yet land rights were still limited at the beginning of the 1990s; agricultural land could not be transferred to another household, nor could it be transferred in the form of an inheritance. In the 1990s, the government increased property rights for farming households and, more generally, reduced restrictions on agricultural markets. Decree Number 5 of 1993 (often referred to as the 1993 Land Law) granted more land rights and security. Tenure lengths were extended to 20 years for annual cropland and 50 years for perennial cropland. Households were allowed to rent out and mortgage their land and to transfer land use rights, including transfer by inheritance. Another important policy change was Decree Number 140 of 1997, which relaxed restrictions on the internal trade of agricultural commodities. Most of the remaining export restrictions were removed in the 1990s.

Sweeping policy changes were also made in other sectors of Vietnam's economy. To ensure macroeconomic stability, and in particular to reduce the rate of inflation, the central government reduced spending and modified the tax system to raise more revenue. This reduced the central government budget deficit from 8.4 percent of GDP in 1989 to 1.7 percent in 1992, one consequence of which was that the rate of inflation plummeted, as will be seen in the next section. Much of this spending reduction took the form of closing or selling unprofitable state-owned enterprises (SOEs), and reducing the number of employees at many of those that remained. Between 1989 and 1992, the number of SOEs was cut in half, from 12,000 to 6,000, and about 800,000 employees of SOEs (about one-third of the initial number) were laid off. The rapid growth of private sector employment opportunities, and the small share of SOE employees in the total work force, helped Vietnam avoid a sizable increase in unemployment from this sharp reduction in public sector jobs.

A third area of major policy changes was in foreign trade and investment, although these changes were more gradual. One of the first steps took place in 1989, when the exchange rate was unified and then devalued. Barriers to exports and imports were gradually dismantled in the late 1980s and early 1990s, and the monopoly on foreign trade granted to a small number of state trading companies was ended. A law encouraging private investment was passed in 1987 and implemented in early 1988. It loosened regulations on joint ventures and allowed for 100 percent foreign-owned enterprises. Policy changes in the 1990s continued to remove trade and investment barriers. By 2003, import quotas existed for only two items, sugar and petroleum products, and quantitative restrictions on exports applied to only a few items. Import tariffs gradually decreased, with the average tariff falling from 12.7 percent in 1996 to 9.3 percent in 2003.

Social sector policies also experienced major changes under *Doi Moi*, especially in the areas of health and education. A fundamental deregulation of the health care system was implemented in 1991. Doctors, nurses, and other health care personnel were allowed to establish private clinics, and private shops and individuals were permitted to sell a wide range of drugs. Both public and private health facilities were able to charge fees for medicines and health services. In 1994, the central government assumed the responsibility of paying employees in commune health centers, which previously had been the responsibility of the communes. In 1993, a health insurance program was started, which by 2001 covered 12 percent of the population.

In education, changes were less radical, but they were still substantial. Private schools were legalized in 1989. Spending per pupil has increased dramatically in real terms, increasing from 1.8 percent of GDP in 1992 to 3.5 percent in 1998. At the same time, tuition fees were introduced at the secondary and postsecondary levels. Government jobs were no longer guaranteed for graduates of upper secondary and postsecondary schools. A more recent change is that entrance examinations are no longer used to limit student enrollment into lower secondary and upper secondary schools. Finally, several programs have recently been introduced to increase school enrollment among ethnic minorities.

A final aspect of Vietnam's *Doi Moi* reforms has been integration into the international economy. In 1992, the country signed a preferential trade agreement with the European Economic Community. Diplomatic relations were reestablished with the United States in 1994, and in 2001, Vietnam and the United States signed a wide-ranging bilateral trade agreement. Vietnam joined the Association of Southeast Asian Nations (ASEAN) in 1995, which included membership in the ASEAN Free Trade Area. In 1995, it also submitted an application to join the World Trade Organization, and negotiations started in earnest in 2002.

Economic and Social Performance

Vietnam's *Doi Moi* policy changes were followed by more than a decade of rapid economic growth. The average annual rate of real economic growth from 1988 to 2000 was 7.1 percent. In the early 1990s, Vietnam became the world's third largest exporter of rice, and in the late 1990s, it became the second largest exporter of coffee. This performance is all the more extraordinary given that Vietnam's main economic benefactor in the 1980s, the former Soviet Union, dissolved in 1991, ending a variety of subsidies that it had been providing to the Vietnamese economy. While the East Asian financial crisis in 1997 and 1998 slowed economic growth somewhat, the slowdown was minor and short-lived. Although GDP growth dropped to 5.8 percent in 1998 and 4.8 percent in 1999, it increased to 6.8 percent in 2000 (World Bank, Asian Development Bank, and United Nations Development Programme 2000).

Economic and Social Trends from 1984 to 2000

Table 1.1 provides economic and social data for Vietnam for four years: 1985, 1988, 1994, and 2000 (1985 is the earliest year for which comparable economic data are available). The period from 1985 to 1988 reflects conditions before the *Doi Moi* policies were in place; although some policies were adopted in 1987 and 1988, a year or two is usually needed before they have major effects. During this period, Vietnam's real GDP grew at a respectable rate of 4.2 percent, but its population growth of 2.1 percent resulted in a per capita annual increase of only 2.0 percent. This rate of growth was far behind the growth rates of higher-performing East Asian economies such as China, Hong Kong, Malaysia, the Republic of Korea, Singapore, Taiwan (China), and Thailand. Disaggregation of total GDP into agriculture, industry, and

Table 1.1. Vietnam's Economic and Social Performance

					Annual growth rates (percent)		
Economic and social indicators	*1985*	*1988*	*1994*	*2000*	*1985–88*	*1988–94*	*1994–2000*
GDP (trillion dong, 1994 prices)	106.18	119.96	178.53	273.58	4.2	6.9	7.4
Agriculture	36.83	38.87	48.97	63.35	1.8	3.9	4.4
Industry	26.40	33.35	51.54	96.92	8.1	7.5	11.1
Services	42.95	47.74	78.03	113.31	3.6	8.5	6.4
Population (million)	59.87	63.73	70.82	77.64	2.1	1.8	1.5
GDP/capita (thousand dong, 1994 prices)	1,774	1,882	2,521	3,524	2.0	5.0	5.7
Budget deficit (% of GDP)	—	7.1	3.0	2.8	n.a.	n.a.	n.a.
Inflation rate (percent)	91.6	374.4	9.5	–1.6	n.a.	n.a.	n.a.
Exports (US$ billion)	0.50	0.73	4.05	14.45	13.4	33.1	23.6
Imports (US$ billion)	0.90	1.41	5.25	14.07	16.1	24.5	17.9
Trade balance (US$ billion)	–0.41	–0.68	–1.20	+0.38			
Poverty rate	~75.0% (1984)	—	58.1% (1993)	37.4% (1998)			
School enrollment ratios (gross)							
Primary	103	104	113	106			
Secondary	43	40	41	67			
Life expectancy	65	66	68	69			
Child malnutrition (stunting)	—	—	51% (1993)	34% (1998)			

— Not available.

n.a. Not applicable; original number is already a rate or percent.

Sources: GDP: General Statistical Office ([GSO] 2000, 2002); population: GSO (2002) and World Bank (2002a); budget deficit and trade: World Bank (1993, 1996a, 2002a); inflation: International Monetary Fund (2003); poverty rate: Dollar and Litvack (1998) and World Bank (1999); school enrollment: United Nations Educational, Scientific, and Cultural Organization (various years); life expectancy: World Bank (1987, 1990, 1996b, 2002b).

services reveals very slow growth in agriculture (1.8 percent, which is less than the population growth rate), modest growth in services (3.6 percent), and high growth in the industrial sector (8.1 percent).

The high growth in Vietnam's industrial sector could give a false impression of success in this sector during the 1980s. Yet much of this "success" reflects large government subsidies to this sector, which had negative consequences for the economy as a whole. The 1980s were characterized by high and growing government budget deficits and consequent high and growing rates of inflation. By 1988, the budget deficit was 7.1 percent of GDP and the annual inflation rate was 374 percent. Another characteristic of Vietnam in the 1980s was low levels of exports and a large trade deficit; in 1988, the value of imports was almost double the value of exports (US$1,410 million and US$730 million, respectively).

This mediocre economic performance was accompanied by high rates of poverty and little improvement in social indicators. A rough estimate is that 75 percent of Vietnamese were poor in 1984 (Dollar and Litvack 1998), in the sense that their consumption expenditures were insufficient to purchase a basket of food items that meet minimal caloric requirements (after allowing for purchase of essential nonfood items). The primary school enrollment rate was high, but the (gross) secondary school enrollment rate dropped slightly, from 43 percent in 1985 to 40 percent in 1988. Life expectancy was also high, but it was almost certainly accompanied by very high rates of child malnutrition. (Data for the 1980s are scarce, but the high rates in the early 1990s suggest even higher rates in the previous decade.)

Vietnam's prospects dramatically improved in the late 1980s. The GDP growth rate increased rapidly, from 4.2 percent in the mid-1980s to 6.9 percent from 1988 to 1994 and 7.4 percent from 1994 to 2000. It is particularly remarkable that the East Asian financial crisis in the late 1990s had almost no effect on Vietnam's economic growth. Increases in per capita GDP growth are even more dramatic as a result of declining population growth; that growth rate nearly tripled, from 2.0 percent in the mid-1980s to 5.0 percent from 1988 to 1994 and 5.7 percent from 1994 to 2000. Dividing overall GDP into agriculture, industry, and services, the agricultural growth rate more than doubled, from 1.8 percent in the mid-1980s to 3.9 percent from 1988 to 1994 and 4.4 percent from 1994 to 2000. In contrast, industrial growth dropped slightly, from 8.1 percent in the mid-1980s to 7.5 percent from 1988 to 1994, but then it jumped to 11.1 percent from 1994 to 2000. Finally, changes in the growth in services are similar to those in agriculture; they more than doubled, from 3.6 percent in the mid-1980s to 8.5 percent from 1988 to 1994, after which growth was somewhat lower at 6.4 percent from 1994 to 2000. Thus, in the initial years after the *Doi Moi* policies were introduced, most of the increase in economic growth occurred in agriculture and services, and only in the latter half of the 1990s did economic growth in industry surpass the levels seen in the mid-1980s.

While industrial growth in Vietnam after the *Doi Moi* policies were adopted may seem less impressive given the high growth rates in this sector in the mid-1980s, it is important to recall that nearly 1 million employees of SOEs lost their jobs in the late 1980s and early 1990s, and more generally that the high growth in the late 1980s and early 1990s was maintained while government budget deficits (and thus government subsidies to industry) were shrinking. As seen in table 1.1, Vietnam's government budget deficits shrank from 7.1 percent of GDP in 1988 to about 3 percent in the 1990s, and inflation virtually disappeared (9.5 percent in 1994 and –1.6 percent in 2000). Another sign of economic health is exports, which include both agricultural and industrial products. Vietnam's exports grew dramatically, at an annual rate of 33 percent from 1988 to 1994 and a slightly lower annual rate of 24 percent from 1994 to 2000. By 2000, Vietnam was running a trade surplus, with a 20-fold increase in exports over a 12-year period.

This rapid economic growth was accompanied by a sharp decrease in poverty and dramatic improvements in social indicators. Specifically, the poverty rate declined from about 75 percent of the population in 1984 to 58 percent in 1993 and 37 percent in 1998. The sharp drop in only five years from 1993 to 1998 is an achievement that is rarely seen in any developing country, and the economic growth since 1998 suggests that the poverty rate has continued to decline into the 21st century. Turning to social indicators, the (gross) primary school enrollment rate increased somewhat from its already high rates in the 1980s, and (gross) secondary school enrollment rates rose from 40 percent in the mid-1980s to 67 percent by 2000. The incidence of child malnutrition, as measured by stunting (low height for age) among children younger than five years of age, also declined dramatically, from 50 percent in 1993 to 35 percent in 1998. Finally, life expectancy continued its steady rise to rates usually seen only in high-income countries.

In summary, Vietnam's economic and social performance in the 1990s was arguably better than that of any other developing country during the same period, with the possible exception of China. Yet despite these impressive gains, Vietnam remains a very poor country, and future success is far from assured. One issue that commands particular attention is trends in inequality. This is discussed further in the next subsection.

Economic Growth and Inequality

Ever since Simon Kuznets (1955) examined the relationship between economic growth and inequality in developed countries, many economists and other social scientists have investigated whether economic growth inevitably leads to increased inequality. For Vietnam, the question is whether the rapid economic expansion that followed the adoption of the *Doi Moi* policies led to an increase in inequality and, if so, whether future economic growth will be accompanied by even greater inequality. Vietnamese policymakers are genuinely concerned about inequality, because reductions in poverty brought about by economic growth are diminished by increases in inequality. There are no reliable data on inequality in Vietnam in the 1980s, but the 1993 and 1998 VLSSs show what happened in the 1990s. Table 1.2

Table 1.2. Changes in Inequality in the 1990s

Inequality index	*1993*	*1998*
Gini coefficient	0.329	0.352
Theil index	0.197	0.230
Decomposition of Theil index		
A. Urban/Rural		
Within	0.155	0.158
Between	0.042	0.072
B. Regions		
Within	0.171	0.180
Between	0.026	0.050
C. Education of head of household		
Within	0.181	0.197
Between	0.016	0.033
D. Ethnic group		
Within	0.177	0.206
Between	0.020	0.024

Source: Glewwe, Gragnolati, and Zaman (2000).

presents information from those two surveys on inequality of consumption expenditures, and how that inequality changed, in the 1990s.[3]

The Gini coefficient is the most commonly used index of inequality. Table 1.2 shows that it increased by 7 percent from 1993 to 1998, from 0.329 to 0.352. Another commonly used measure of inequality is Theil's entropy measure; that index increased at a faster rate, rising by 17 percent (from 0.197 to 0.230). The Theil measure has the useful feature that when the total population is divided into a few groups, overall inequality is the sum of the (weighted) average inequality within each group plus inequality in the mean incomes (in this case, mean consumption expenditures per capita) across the different groups. To see the usefulness of this property of the Theil measure, consider the simplest decomposition: division of Vietnam's total population into the 20 percent that lives in urban areas and the 80 percent that lives in rural areas. The weighted average of inequality within urban areas and within rural areas increased only slightly over the five years, an increase of 2 percent from 0.155 to 0.158. In contrast, the inequality due to the difference between mean (average) urban expenditures and mean rural expenditures increased by 71 percent. Thus, almost all of the increase in inequality as measured by the Theil index was due to the increased gap between mean per capita expenditures in urban areas and mean per capita expenditures in rural areas; very little comes from increased inequality within urban and rural areas.

Three other decompositions of the Theil inequality index are shown in table 1.2. When Vietnam is divided into its seven economic regions (Northern Uplands, Red River Delta, North Central Coast, Central Coast, Central

Highlands, Southeast, and Mekong Delta), average inequality within each of these regions increased by only 5 percent, while average inequality between regions almost doubled. Thus, about three-fourths of the increase in the Theil measure (0.024 out of 0.033) is accounted for by greater inequality in the mean expenditure levels across regions, as opposed to increased inequality within regions. As noted later in this chapter, there is evidence that the returns to education have increased in Vietnam in the 1990s. One way of assessing the contribution of this change to the overall increase in inequality is to divide the population into groups according to the education level of the head of household (none, primary, lower secondary, upper secondary, and so forth) and apply the Theil decomposition property. This decomposition shows that about half of the total increase in inequality (0.016 out of 0.033) is due to inequality within these groups and the other half is due to increases in equality in the mean expenditure levels of these groups. A final decomposition divides the population into different ethnic groups. In this case, increased gaps in mean expenditure levels across ethnic groups play very little role in explaining increased inequality, accounting for only about 12 percent (0.004 out of 0.033) of the increase in the Theil index.

Income and expenditure levels are only one dimension of the quality of life; thus, inequality in other dimensions also merits attention. There are worrisome trends in health and education, but there are also some changes in a more egalitarian direction, as discussed further below. One worry in health is that declines in infant mortality rates appear to be concentrated among middle-income and better-off households, with little reduction in infant mortality among low-income households. A more positive result is that malnutrition, as measured by child stunting, has dropped for all income groups. In education, one bright spot is that primary school enrollment rates have increased fastest among poorer households, especially ethnic minority households, but at the secondary and postsecondary levels, large differences in enrollment rates have persisted and may even have increased.

Overall, increased economic growth in Vietnam has been accompanied by a modest increase in inequality of consumption expenditures, as well as increased inequality in some, but not all, other dimensions. The decompositions in table 1.2 provide some information on the nature of the increase in expenditure inequality, and they can provide some guidance for Vietnamese policymakers on how to prevent, or at least minimize, future increases in inequality. The next section reviews the chapters in this book, after which the policy conclusions are summarized (including a discussion of policies to reduce inequality) and suggestions are provided for future research.

Summary of the Volume

Vietnam's success in maintaining high economic growth and reducing poverty has already been described in other publications, such as a recent report by the World Bank and other donor agencies (World Bank 1999). The distinguishing characteristic of the chapters in this book is that they attempt to explain the reasons for this success and draw lessons for the future. They do so by going beyond simple descriptive exercises and presenting rigorous analyses of a wide variety of topics.

Economic Performance

Economic growth is important not only because it raises incomes but also because it leads to a wide array of better socioeconomic outcomes, such as increased school enrollment and better health. Chapters 2 to 5 in this book examine the impact of Vietnam's policies on economic growth and the nature of that growth in different sectors of the economy. Chapter 2, by David Dollar, looks at the economy as a whole; chapter 3, by John Luke Gallup, focuses on the incomes of wage earners; chapter 4, by Wim P. M. Vijverberg and Jonathan Haughton, considers nonagricultural businesses; and chapter 5, by Dwayne Benjamin and Loren Brandt, looks at farming households.

David Dollar begins chapter 2 by posing a question: How can Vietnam's impressive record of economic growth be reconciled with the fact that its economic policies are not necessarily better than those of many other developing countries? For example, in one index of economic freedom (O'Driscoll, Holmes, and Kirkpatrick 2000), Vietnam was ranked 144th out of 155 countries. Dollar argues that Vietnam's policies in the 1980s were even worse than they were in the 1990s, and this improvement in policies explains its enviable economic performance in the last decade.

Yet Dollar goes on to argue that the boost from this modest improvement in policies is likely to be temporary, and sustained economic growth (and the poverty reduction that comes with it) cannot continue unless additional pro-growth policies are adopted. Indeed, he argues that there is much room for improvement in Vietnam's policies. In the general area of property rights and governance, Vietnam's rank with respect to other countries is better than average for political stability, but it is worse than average in terms of property rights, government effectiveness, regulatory burden, and corruption. In terms of market development, Vietnam's financial system and labor market are both rated as very weak by the international business community. Finally, although much progress has been made, there are still significant barriers to trade and foreign investment.

To support his interpretation of Vietnam's current situation and its future prospects, Dollar uses cross-country growth regressions. This allows him to provide much more specific advice than Dollar and Litvack (1998) provided several years earlier. Yet such regression results must be treated with care, and the recommendations provided in this chapter are likely to be controversial. Even so, the debate that this chapter will provoke should prove fruitful to policymakers and researchers alike.

The most important economic asset of the vast majority of Vietnamese households is their labor. In chapter 3, John Luke Gallup provides an overview of labor markets in Vietnam and how they have changed during the 1990s, giving particular attention to the inequality of labor income. Most Vietnamese workers are farmers, but the proportion of workers who were farmers—compared with workers who work for wages or who work in nonagricultural self-employment activities—slowly declined in the 1990s. Gallup focuses on wage earners, and chapters 4 and 5 examine self-employed workers.

Gallup shows that real wage rates increased dramatically in the 1990s, at an average rate of 10.5 percent per year. This is particularly true of skilled nonagricultural workers, whose real wages increased by nearly 13 percent per year from 1993 to 1998. The number of hours worked also increased substantially. Gallup also shows that the returns to education are low in Vietnam, although they did increase during the 1990s.

The increases in wages have a distinct regional dimension. Wages were highest, and increased the fastest, in the two largest cities in Vietnam, Hanoi and Ho Chi Minh City. This disparity is not explained by the fact that workers in these two cities tend to have more skills and education; it is still large even when comparing workers with the same skills and educational backgrounds, and regression analysis confirms that the gap is large and is not decreasing. This likely reflects legal barriers that discourage migration from other areas into these two cities, which is consistent with recent qualitative research on migration in Vietnam.

The rapid increase in wage income, the wage gap between Hanoi and Ho Chi Minh City and the rest of Vietnam, and the increase in the return to education all raise the question of whether overall income inequality has increased in Vietnam, and what will happen in the future. Gallup shows that inequality of wage income declined modestly in the 1990s for Vietnam as a whole, although it did increase in Hanoi and Ho Chi Minh City. Despite that overall decline, the fact that agricultural income is much more equally distributed than wage income, combined with the steady decline over time of agricultural income as a share of total income, led to a slight increase in inequality in the 1990s. Using simple simulations based on data from the two household surveys, Gallup demonstrates that inequality is likely to increase in the future as wage work becomes a larger share of total employment in Vietnam.

Although Gallup's focus on wage earners provides many insights, the lessons learned have limited implications because only about 20 percent of the working population works for wages. Chapters 4 and 5 examine income from self-employment. Wim Vijverberg and Jonathan Haughton begin chapter 4 by investigating the nature of nonagricultural self-employment in Vietnam. Small household enterprises are potentially very important for private sector economic growth in Vietnam because they are, traditionally, the first step in the development of a vibrant small and medium enterprise sector.

Vijverberg and Haughton argue that the role of household enterprises in future economic growth may be much more modest than some have hoped. Instead of providing the basis for the expansion of the private sector, self-employed workers in household enterprises decreased from about 26 percent to about 24 percent of the labor force between 1993 and 1998. On a more positive note, household enterprises do appear to be a stepping-stone to more lucrative wage employment for Vietnamese workers. Although the recent policy changes have simplified the procedure for registering new enterprises, the authors nevertheless conclude that household enterprises will play only a modest role in Vietnam's economic transformation. This assessment is somewhat more pessimistic than that given by Vijverberg (1998).

About 60 percent of Vietnamese workers are self-employed farmers. Farming households are poorer than both wage earners' households and households operating nonagricultural enterprises, so the fate of farmers is closely tied with the prospects for future poverty reduction in Vietnam. In chapter 5, Dwayne Benjamin and Loren Brandt use the extensive data on agricultural activities in the 1993 and 1998 VLSSs to provide a detailed analysis of agriculture and income distribution in rural Vietnam. They focus on two important events that affected Vietnamese farmers in the 1990s—the large increase in the relative price of rice and the sharp drop in the price of fertilizer—both of which occurred as a result of the lifting of marketing and trade restrictions.

Benjamin and Brandt show that the increase in rice prices and the decrease in fertilizer prices raised the incomes of most rural households in Vietnam, which helps explain why poverty decreased in rural areas in the 1990s. In addition, poverty was reduced by the shifting patterns of agricultural production, with increasingly intensive cultivation of rice in southern areas and shifts into nonrice crops in northern areas. The authors also find that income inequality did not increase in rural areas of Vietnam; even though the price of rice increased, many rural households (including many low-income households) were net sellers of rice, so their incomes increased. They conclude that liberalized agricultural policies did not have any adverse effects on inequality or poverty in rural areas.

Poverty Reduction

Chapters 6 through 8 focus directly on poverty in Vietnam and on programs designed to reduce poverty. Chapter 6, by Dominique van de Walle, examines the extent to which government safety net programs actually benefit the poor. Chapter 7, by Nicholas Minot and Bob Baulch, focuses on the spatial distribution of the poor and investigates whether there is potential to target assistance to the poor based solely on their area of residence. Chapter 8, by Bob Baulch, Truong Thi Kim Chuyen, Dominique Haughton, and Jonathan Haughton, investigates poverty among minority groups, who are much more likely to be poor than are ethnic Vietnamese (the Kinh).

The Vietnamese government has in place many different programs that transfer resources to households and communities. Some are explicitly intended to reduce poverty, and others provide income support for groups that may or may not be poor, such as retired government workers and disabled military veterans. Funding for these programs more than doubled in the 1990s. The effectiveness of these programs at reducing poverty often depends on how they are implemented at the local level—indeed, some programs must be financed at the local level. Chapter 6 examines a wide variety of programs, including school fee exemptions, pension and disability funds, assistance from nongovernmental organizations, and government transfer payments to disadvantaged households.

In chapter 6, van de Walle's findings are both disturbing and highly informative. Most of these programs provide low benefits to a wide range of households instead of focusing most of their benefits on poor households. Indeed, the typical nonpoor household often receives more benefits than the typical poor household. An example of this is Vietnam's social insurance payments, which accrue mainly to urban households and better-off rural households. There is little coordination across programs, and many poor households in poor communities receive low benefits in part because the funding for many programs comes primarily from within those very same communities.

Based on the panel data, the findings of chapter 6 suggest that Vietnam's social assistance programs played no role in the poverty reductions that occurred during the 1990s, and they typically failed to prevent households from falling into poverty. The chapter argues that Vietnam's Hunger Eradication and Poverty Reduction program has produced "little discernable progress." Overall, van de Walle finds much room for improvement, and the chapter concludes with several recommendations to enhance the design of Vietnam's poverty reduction programs. In particular, it recommends less reliance on local resources to finance local programs, more monitoring of the allocation of central government funds within provinces and districts, and restrictions on local discretion in implementing centrally mandated poverty reduction programs.

In chapter 7, Nicholas Minot and Bob Baulch pose a fundamental question concerning poverty policies in Vietnam: To what extent is poverty concentrated in certain geographic areas? This question is important because it is very difficult, in practice, to identify poor households. Yet if poor households are concentrated spatially, then it may be more efficient to assist all households in poor communities, regardless of their income levels, instead of spending a large amount of time—and money—to distinguish poor from nonpoor households within each geographic area.

Minot and Baulch point out that many of Vietnam's poverty reduction programs use some kind of geographic targeting, but they do so rather ineffectively. This is consistent with van de Walle's findings in chapter 6. Chapter 7 combines the VLSS data with the data from Vietnam's 1999 census to estimate the incidence of poverty in each of Vietnam's 61 provinces. The authors find that poverty is concentrated in six provinces bordering China and the Lao People's Democratic Republic and in eight other provinces in the Northern Uplands, the North Central Coast, and the Central Highlands. They also find that the Vietnamese government's official list of poor communes is not very accurate. Chapter 7 concludes by recommending a method that combines census and VLSS data to estimate the incidence of poverty at the district level.

About 15 percent of the Vietnamese population consists of ethnic minorities. With the sole exception of the Chinese, who are relatively well off, ethnic minorities in Vietnam are considerably poorer than the Kinh. They also have lower school enrollment, higher fertility, and less access to basic health services, although they do not appear to have higher rates of malnutrition. In chapter 8, Bob Baulch, Truong Thi Kim Chuyen, Dominique Haughton, and Jonathan Haughton provide an in-depth analysis of the socioeconomic conditions of ethnic minorities in Vietnam, using both the VLSS data and data from the 1999 census. Particular care is taken to avoid aggregating minorities into a single group; instead, the authors distinguish among minority groups in different parts of Vietnam.

Baulch and his coauthors find that most ethnic minorities have shared in many of the gains of the 1990s. Yet this is not the case for ethnic minorities in the Central Highlands, whose per capita expenditures did not increase in the 1990s. Another interesting (and potentially controversial) finding is that ethnic minorities that are more open to assimilation with the Kinh, both economically and culturally, have done relatively well. However, some ethnic minorities, such as the Khmer and the Thai, appear to have assimilated economically while retaining their distinct ethnic and cultural identity.

Chapter 8 uses regression analysis to investigate why ethnic minorities are poorer than the Kinh majority. The results suggest that observable differences between ethnic minority and Kinh households explain, at most, only one-third of the gap between these households. This implies that the "returns" to ethnic minority assets appear to be lower than the returns to the assets of Kinh households. Unfortunately, the underlying reasons for this cannot be examined until household survey data are collected that have much larger samples of ethnic minority households.

Social Sectors

Chapters 9 through 13 examine progress in health and education in Vietnam in the 1990s. Dramatic progress occurred in both sectors in that decade, but there is room for further progress, and there are some signs that inequality in health and education outcomes is increasing.

Adam Wagstaff and Nga Nguyet Nguyen examine infant and child mortality in Vietnam in chapter 9. Compared with other low-income countries, Vietnam's performance in this area is unusually good, in that it has much lower infant and child mortality rates than other countries at its level of income (which is less than US$1 a day, or about US$300 per capita annually). In addition, its infant and child mortality rates dropped steadily in the 1990s. Despite this progress, Wagstaff and Nguyen point out a worrisome finding: Most of the reductions in these mortality rates occurred among nonpoor households, so that inequality in mortality rates across different income groups increased significantly in the 1990s. Indeed, it appears that there has been no reduction in infant mortality among the poorest 25 percent of the population.

The authors carefully examine the determinants of infant and child mortality in Vietnam. They find that many factors played a role, including increased incomes. These estimates provide suggestions for policies to reduce infant mortality in the future. Specifically, increasing years of schooling of young women, improved sanitation, and increasing the proportion of births that occur in medical facilities, or at least are attended by trained medical personnel, should lead to substantial decreases in the infant mortality rate among the poor. Information campaigns may also be helpful, but the evidence in favor of this is indirect.

Finally, chapter 9 uses the estimates to predict future infant and child mortality rates through to 2015. The authors find that it may be possible for Vietnam to reach its goal of reducing child mortality by two-thirds from 1990 to 2015, but this will depend on whether reductions in child mortality can be accelerated among poor households.

Infant and child mortality is only one indicator of children's health status. Another important indicator is the health and nutritional status of the vast majority of children who survive. In chapter 10, Paul Glewwe, Stefanie Koch, and Bui Linh Nguyen examine progress in child nutrition in Vietnam in the 1990s. Vietnam was again fortunate in that children's nutritional status, as measured by height for age, was much higher in 1998 than in 1993. This chapter investigates the extent to which increased household incomes explain improvements in children's nutritional status and then investigates what role other factors may have played to bring about those improvements.

Glewwe, Koch, and Nguyen find that growth in household incomes did not play a decisive role in reducing the incidence of stunting in Vietnam. Using a variety of different estimation methods, they find that increases in households' per capita expenditures always explain much less than one-half of the total reduction in stunting. This confirms the prediction of Ponce, Gertler, and Glewwe (1998), and it implies that something else, most likely changes in health services and health care policies, is primarily responsible for the improved nutritional status of young Vietnamese children.

Chapter 10 employs regression analysis, using detailed data from commune health centers, to understand what aspects of health services and health care policies may be responsible for the improvement in children's health status. The results suggest that reducing the distance to private pharmacies could lead to better child nutrition outcomes, although the size of this effect is rather small. They also suggest that providing commune health centers with sanitary toilets and ample supplies of oral rehydration salts could have substantial positive impacts on child health in Vietnam. Unfortunately, these findings are tentative at best because of a variety of difficult estimation problems.

Chapter 11 presents the third and final study of health in Vietnam—Pravin Trivedi's study of health care use. This study examines health care use by all household members, not just by children. It finds that poorer households, almost all of whom are found in rural areas, rely on commune health centers for medical services, and better-off households are much more likely to use public hospitals, which are almost always found in urban areas. Both rich and poor households spend most of their health care money on purchases of medicines from private providers, as opposed to spending it on medical consultations.

This is consistent with the earlier findings of Gertler and Litvack (1998), but Trivedi goes beyond descriptive analysis by estimating the determinants of health care choices, giving particular attention to the role played by health insurance in the use of different medical services. He finds that households with health insurance are more likely to use public health facilities, especially hospitals, and less likely to use private providers or to purchase medicines without consulting medical personnel. He also estimates the income elasticity of health care expenditure and finds it to be quite high; this implies that as households' incomes increase, they spend a larger percentage of their income on health care. Trivedi also finds clear evidence that households are dissatisfied with commune health centers.

Trivedi draws several policy conclusions from his analysis. First, he suggests three routes to reducing the high reliance of Vietnamese households on nonprescription purchases of antibiotics: increasing household incomes, increasing education levels, and expanding health insurance coverage. Second, he finds clear evidence of dissatisfaction with commune health centers, which are the first line of defense in Vietnam's health care system; the more other options are available, the less households use these facilities. Finally, he argues for a larger role for private health care providers.

The next two chapters examine education in Vietnam. In chapter 12, Nga Nguyet Nguyen provides a broad overview of education in the country, with particular focus on school finance issues. School financing is a topic of particular interest in Vietnam. On the one hand, school fees have been eliminated for primary schools. On the other hand, other costs associated with education are still a significant burden on households, and recent moves to decentralize education finance may prove to be particularly burdensome for poor communities.

Nguyen shows that the Vietnamese government greatly increased spending on education in the 1990s, tripling the amount spent in real terms. Spending increases for primary and lower secondary education in Vietnam were even higher and were accompanied by particularly high increases in primary school enrollment among the poorest 20 percent of the population. Increases in school enrollment were widespread, affecting both boys and girls and all regions, ethnic groups, and income levels. This is in marked contrast with the situation in the late 1980s and the early 1990s, when school enrollment rates were declining (Glewwe and Jacoby 1998).

However, significant problems remain. Enrollment gaps between rich and poor continue, and may even have increased, at the secondary and postsecondary levels. The quality of education may also vary dramatically, because only better-off households can afford to pay for the extra classes and private tutors that compensate for the unusually short school day, which is typically only three or four hours long. The chapter ends with an analysis of the rate of return to education, based on earnings regressions. Nguyen finds that rates of return to education increased in the 1990s, particularly at the upper secondary and postsecondary levels. In contrast, vocational education appears to have no impact on workers' wages.

In chapter 13, Paul Glewwe investigates the determinants of school progress and academic achievement, as measured by test scores, for students in primary and secondary schools. As mentioned above, enrollment rates increased during the 1990s, especially at the secondary level. One of the most interesting and encouraging findings is that enrollment rates increased much more rapidly for ethnic minority groups than they did for the Kinh, closing much of the gap between the Kinh and the ethnic minorities. Indeed, regression analysis demonstrates that much—and perhaps most—of the remaining gap between the Kinh and ethnic minorities is due to differences in the communities in which they live, as opposed to being due to any inherent traits.

Two other findings of interest from the regression analysis have direct policy implications. First, there is no evidence that teaching ethnic minorities in their own languages has any positive effect on their school progress or academic achievement; indeed, negative impacts were found in some estimates. Second, there is some evidence that shorter children, who presumably were malnourished in early childhood, do worse in school, but the effects are not strong and often lose statistical significance.

On a more disappointing note, the regression analysis in chapter 13 did not produce clear findings regarding what schools can do to improve schooling outcomes. This result is due to serious estimation problems that are difficult to overcome. Much more work and more intensive data collection are needed before useful advice can be provided to Vietnamese policymakers on ways to improve primary and secondary schools.

Other Topics

The last three chapters of this book treat a diverse set of subjects that attract high interest in Vietnam and elsewhere. In chapter 14, Eric Edmonds and Carrie Turk examine an issue that has received increased attention in the last decade: child labor. In many developing countries, children in rural areas help their parents with farm work, and in some countries, children are found working in factories or other institutions in which the working conditions may fall far below the minimal standards set in developed countries. There is also concern that child labor reduces school enrollment, although the direction of causality is not always clear.

Edmonds and Turk find that child labor in Vietnam declined in the 1990s, and they argue that this came about in large part as a result of increased economic growth. Yet they also find that child labor is still common in Vietnam, and the hours worked per week by some children are quite high. They also point out that girls are more likely to be child laborers than boys, and ethnic minority children are more likely to work than Kinh children.

Finally, they find evidence that current regulations limiting child labor are not enforced.

Chapter 14 concludes with some specific recommendations for government policy that, if implemented, would further reduce child labor. First, any policy changes should be made with the participation of the families who will be affected; outright banning of child labor could worsen the situation by making poor households even poorer. Second, to reduce child labor among girls, reductions in tuition—or even direct subsidies—could be offered for girls to encourage parents to send them to school. Third, special attention needs to be given to children of households that migrate to urban areas; policies to stem such migration, such as excluding children of unregistered migrants from public schools, may increase child labor among migrant children. Fourth, proposals to increase the length of the school day should be considered cautiously, because many children who work also go to school, and increasing the length of the school day may cause some of them to leave school.

In chapter 15, Paul Glewwe and Phong Nguyen examine economic mobility in Vietnam. More specifically, they examine the extent to which households change their position in the distribution of income over time. This issue is an important one because transitory poverty is probably less worrisome than chronic poverty. Similarly, for a given level of inequality at a point in time, increased economic mobility reduces long-run inequality.

At first glance, Glewwe and Nguyen appear to have found a large amount of economic mobility in Vietnam. When the population is divided into quintiles (five equal groups, with the poorest 20 percent in the first group, the second poorest 20 percent in the second group, and so on), it appears that many households were in a different quintile in 1998 than they were in 1993. Only 41 percent of the population remained in the same quintile in both years. About 40 percent moved up or down by one quintile, and 19 percent moved up or down by two or more quintiles.

Yet these figures, which are based on expenditure data, ignore the fact that household consumption expenditures are almost certainly measured with error. This will lead to overestimation of the extent of economic mobility. Glewwe and Nguyen use several methods to correct for measurement error and find that about one-half of the estimated mobility is simply measurement error, which implies that actual mobility is much lower than it initially appears to be. This implies that poverty is more of a permanent condition than a casual look at the data indicates.

Finally, in chapter 16, Donald Cox examines transfers of income from one household to another. He finds that such transfers were quite common throughout the 1990s, as found in earlier work by Cox, Fetzer, and Jimenez (1998). Unlike almost all other developing countries, such transfers in Vietnam primarily flow from the young to the old. These transfers can have significant effects on poverty and other socioeconomic outcomes, so it is important to understand how they work.

Cox finds that interhousehold transfers flow from wealthier households to poorer ones and thus equalize income distribution. They also serve as an important source of income for retired households, an essential function in Vietnam, where pensions are rare. Analysis of the panel data shows that many households changed roles in the 1990s—many recipients in the 1993 survey were donors in the 1998 survey and vice versa. Such changes in transfer flows appear to respond to changes in household circumstances and thus serve as a kind of informal (though hardly comprehensive) insurance mechanism. A final point is that about half of all households do not participate in transfers either as senders or as recipients. It is unclear whether these households can depend on transfers should they become poor or need money for some other reason.

Conclusions and Suggestions for Future Research

It is clear that Vietnam was one of the most successful countries in increasing economic growth and reducing poverty in the 1990s. This success raises the three questions posed at the beginning of this chapter: What accounts for Vietnam's astonishing success? What can Vietnam do to ensure continued success? And can other very poor countries achieve this same success by following Vietnam's policies? Although it is almost impossible to provide complete answers to these questions, the research in this book provides some answers. The following paragraphs summarize those answers, after which issues for future research are raised.

What accounts for Vietnam's astonishing success? Most of the credit for the dramatic decrease in poverty, as measured by per capita expenditures, must go to Vietnam's broad-based economic growth. In contrast, chapters 6 and 7 show that social assistance and antipoverty programs have had very little effect on poverty; indeed, the official list of poor communes is not particularly accurate and excludes a large proportion of the poor. As explained in chapter 5, the key policies for raising incomes—and thus reducing poverty—in rural areas were the lifting of marketing and trade restrictions on rice and fertilizer. These policies increased the price of rice and reduced the price of fertilizer, which raised the incomes of most rural households, including many poor rural households. More generally, chapter 2 cites Vietnam's reduction of inflation and the government budget deficit, removal of barriers to trade and foreign investment, and financial liberalization as the main reasons for its increased economic growth.

Yet economic growth may not explain all improvements in household welfare, nor does it guarantee improvements in every dimension of a nation's standard of living. Chapter 9 shows that increases in the expenditure levels of the poorest households had little effect on child mortality rates, and chapter 10 finds that growth in household expenditure levels had very little direct effect on child nutrition, although an indirect effect may have operated through increased government expenditures on health services. Finally, the relationship between economic growth and school attainment is rather complex; in the late 1980s and early 1990s, secondary school enrollment rates dropped even though economic growth was quite high, and only in the mid- to late 1990s was continued economic growth accompanied by large increases in school enrollment rates.

What can Vietnam do to ensure continued success? The chapters in this book provide extensive advice. Chapter 2 gives general advice on economic growth, warning the government and donor agencies that Vietnam's economic growth will decline if no further policy reforms are adopted. It argues that additional pro-growth policies are needed to strengthen property rights and government effectiveness, reduce regulatory burden and corruption, develop an efficient and modern financial system, improve the operation of labor markets, and reduce barriers to trade and foreign investment. For the agriculture sector, where most poor households are found, chapter 5 cautions that, unlike the past, future increases in rice prices may not have the same beneficial effect because many rural households are moving out of rice production and into other crops.

On a more pessimistic note, chapter 4 argues that it is unlikely that nonfarm household enterprises will play a decisive role in raising economic growth in the future, because their share of the total labor force slowly declined in the 1990s. Indeed, it appears that their main role is to serve as a temporary source of employment for workers who will eventually find wage work. Thus, policies to encourage these firms may be justified, but they are unlikely to have dramatic effects on Vietnam's overall economic performance.

Economic growth will continue to play a critical role in reducing poverty, and there is also a role for government programs to play, a role for which there is much room for improvement. Chapters 6, 7, and 8 give specific suggestions on how to do so. Vietnam's social assistance programs should reduce their reliance on local resources to finance local programs, because poor communes have few resources to contribute to their own poverty reduction programs. Better monitoring is needed of the allocation within provinces and districts of central government funds, and local jurisdictions should have less discretion on the implementation of centrally mandated poverty reduction programs. Combining household survey data with recent census data can provide a much more accurate picture of which of Vietnam's 522 districts, and perhaps even its more than 10,000 communes, are the poorest in the country. Finally, while many ethnic minority households, particularly the Khmer and those in the Northern Uplands, have shared in the benefits of economic growth, other ethnic minorities, such as those in the Central Highlands, are being left behind. Special programs appear to be necessary for these groups, but more needs to be learned about the barriers that prevent them from participating in overall economic growth.

Much more can also be done in the areas of health and education. The analysis of infant mortality in chapter 9 suggests that increasing the years of schooling of young women, improving sanitation, and increasing the proportion of births that occur in medical facilities (or at least are attended by trained medical personnel) can significantly reduce the infant mortality rate among the poor. To reduce child malnutrition, regression analysis in chapter 10 suggests that providing commune health centers with sanitary toilets and ample supplies of oral rehydration salts could have substantial positive impacts on child health in Vietnam, but these results are tentative. Finally, chapter 11 concludes that, in the long run, increases in household incomes and education levels should reduce the worrisome reliance of Vietnamese households on nonprescription purchases of antibiotics. In the short to medium term, expansion of health insurance coverage should also reduce the high use of antibiotics.

Useful policy advice was harder to come by in the area of education, as explained in chapters 12 and 13. Two current worries are that school days are very short (about three hours) and that many schools offer "extra classes" that are open only to parents who can afford to pay. Yet increasing the length of the school day may have the unintended consequence that some children who work while attending school may decide to drop out. Another issue is the value of vocational education, which does not appear to have any effect on workers' wages. Regression analysis also shows no discernible impact of providing lessons in ethnic languages on school enrollment or academic achievement, which raises doubts about the merits of such policies.

Child labor is also a topic of great interest in Vietnam. Fortunately, it is decreasing—but it is still quite common. Chapter 14 argues that policies to reduce child labor must be chosen carefully. An outright ban could hurt poor households by depriving them of a source of income. One possibility to reduce child labor among girls is tuition reductions (or direct subsidies) to encourage parents to send their daughters to school. Finally, special attention needs to be given to children of households that migrate to urban areas.

Finally, consider the issue of inequality, which is a serious concern among Vietnam's policymakers. Chapter 3 argues that Vietnam is likely to experience an increase in equality as the labor force continues the shift from self-employment in agriculture to nonagricultural wage work. One way to reduce inequality would be to relax restrictions on migration from rural to urban areas, because those restrictions almost certainly exacerbate inequality between the countryside and the cities. Chapter 15 points out that Vietnam's worries about increasing inequality should not be dismissed because there is a high degree of mobility—simple estimates of mobility greatly overestimate its true value. On a more positive note, chapter 16 points out that interhousehold transfers, which are very common in Vietnam, appear to equalize the distribution of income. The policies recommended to improve Vietnam's social assistance programs can reduce inequality at the lower end of the income distribution, especially the recommendation to reduce the reliance on local resources to finance local social assistance programs. A last recommendation regarding inequality in Vietnam is that policies are needed that raise the incomes of residents in rural areas; as seen earlier in this chapter, these areas had much lower growth than urban areas, and the increased gap between urban and rural areas accounts for almost all of the increase in inequality in Vietnam in the 1990s.

Can other very poor countries achieve Vietnam's success by following its policies? This is the most difficult question to answer. David Dollar's analysis in chapter 2 is based on cross-country data, thus it should apply to other countries as much as it does to Vietnam. This suggests that Vietnam's policies for stimulating macroeconomic growth should be successful elsewhere. Yet lessons from such analyses are, at best, averages across a large number of countries, which implies that Vietnam's policies may not be as effective in some countries. A more specific lesson for the few remaining countries that still pursue a planned economy, such as Cuba and the Democratic People's Republic of Korea, is that privatization should begin in agriculture. The two countries that followed this path, China and Vietnam, had a much more successful transition to a market economy than the countries of Eastern Europe and the former Soviet Union, most of which did not begin their privatization policies with the agricultural sector. A final potential lesson for other countries is the role played by education. Relative to other poor countries, Vietnam has long had very high levels of education. It may be that its transition to a market economy was smoothed, and rapid increases in inequality were avoided, by these high education levels. This suggests that other countries should focus on raising education levels as early as possible.

Although the research in this book answers many questions about Vietnam, many questions remain unanswered and thus more research is needed. Fortunately, the VLSS data used in almost all of the chapters of this book are available for use by researchers, and new household survey data are now being collected every two years, beginning in 2002, in the new Vietnam Household Living Standard Survey. Another development that augurs well for future research in Vietnam is that there are now many more well-trained Vietnamese researchers than there were in the 1990s. An indicator of this is the number of Vietnamese authors in this book. Specifically, in an earlier book based on the 1993 VLSS (Dollar, Glewwe, and Litvack 1998), none of the chapters had Vietnamese authors. In contrast, in this book, 5 of the 16 chapters have Vietnamese authors or coauthors. This demonstrates Vietnam's increased capacity to do research; this increased ability in Vietnam is not only an end in itself but will prove invaluable for designing policies and, ultimately, increasing the quality of life in Vietnam.

What issues require immediate attention of Vietnamese and international researchers? In the area of economic growth, more detailed advice is needed on how to improve government effectiveness and reduce corruption, as well as how to develop a well-functioning financial system. Another topic for further research is labor markets in Vietnam, such as the impact of migration barriers on inequality. The impact of government policies on nonfarm household enterprises is also largely unknown; a better understanding of these firms would be useful, but such research is fraught with difficulties and thus will prove to be challenging. Research is also lacking on the prospects for income growth for farming households in Vietnam; per capita expenditures in the country have increased at a much higher rate in urban areas than in rural areas.

Future research on poverty reduction in Vietnam should investigate whether poorly targeted programs within provinces are due to weak implementation capacity or to deliberate diversion of funds to less needy groups. More analysis is also needed on how best to monitor local implementation of centrally mandated programs. Additional study is needed to see whether combining household survey data and census data can be used to estimate accurately the incidence of poverty in Vietnam's more than 10,000 communes. Finally, special studies are needed to understand why ethnic minorities in the Central Highlands have not benefited from overall economic growth in Vietnam.

Several issues in the health and education sectors require further research. First, the underlying causes for the apparent increase in the inequality in infant mortality rates across rich and poor households are still not well understood. Second, more analysis is needed on what factors other than higher household income led to better child nutrition outcomes; the recently completed Vietnam Health Survey has the potential to shed much light on both of these questions. Third, a better understanding is needed of why households are dissatisfied with commune health centers, which are often bypassed by households that are able to visit public hospitals or private health care providers, and more research is needed on the role of private health care providers in expanding and increasing the quality of health care services. Fourth, the apparent inability of vocational education to raise workers' wages deserves further scrutiny. Fifth, much more research is needed on what determines learning in Vietnamese schools; regression analysis is hampered by many estimation problems, which suggests that randomized trials may be useful for assessing the impact of education policies on students' academic achievement.

There are also several research priorities on other topics. The relationship between child labor and school attendance is complex and merits further study. Policy questions of particular interest are whether increasing the length of the school day will raise dropout rates and whether children of migrants face significant barriers to schooling that cause their parents to put them to work. More generally, much remains to be learned concerning the relatively high rates of child labor of girls and ethnic minority children. Economic mobility is not well understood, and its relationship with the long-run distribution of income is also unclear; panel data are needed that follow households over a long time to make further progress on this issue. Finally, much more remains to be learned about interhousehold transfers in Vietnam, particularly whether government programs to provide income support and pensions may crowd out informal systems that are already in place.

Appendix 1A The Vietnam Living Standards Surveys

Much of the analysis in this book is based on the 1993 and the 1998 Vietnam Living Standards Surveys (VLSSs). To avoid needless repetition in the different chapters, this appendix briefly describes both surveys.

The 1993 and 1998 VLSSs were conducted by Vietnam's General Statistical Office (GSO), with financial assistance from the United Nations Development Programme and the Swedish International Development Agency and technical assistance from the World Bank. The 1993 VLSS covered 4,800 households, and the 1998 VLSS surveyed 6,000 households. Both surveys are nationally representative. About 4,300 households were covered in both surveys and thus constitute a large, nationally representative panel dataset.

The 1993 VLSS used three questionnaires: one for households, one for rural communities, and one for collecting community price data. The household questionnaire covered a wide variety of topics, including education, health, employment, migration, housing, fertility, agricultural activities, small household businesses, income and expenditures, and credit and savings. The community questionnaires were completed only in rural areas (where about 80 percent of Vietnamese households live), and detailed price questionnaires were completed in both urban and rural areas.

The 1998 VLSS used the same three questionnaires as in 1993 and two additional questionnaires. School questionnaires were completed for all primary, lower secondary, and upper secondary schools in rural areas covered by the survey. The school questionnaire collected data on teachers, physical facilities, recent examination results, and finance. Commune health center questionnaires were also completed in rural areas. They collected data on clinical staff, medical equipment and services, supply of medicines, and fees charged.

Many chapters in this book make use of a variable constructed from the VLSS data on total consumption expenditures. This variable was created by a team of GSO and World Bank staff. It includes explicit expenditures on food and nonfood items, the value of food produced and consumed at home, and the estimated annual rental value of durable goods and the household's dwelling.

More detailed information on the survey and the constructed variables are given in World Bank (2000). This document and the questionnaires used in both surveys are found on the World Bank's Living Standards Measurement Study Web site: <http://www.worldbank.org/lsms/docs.htm>. That Web site also contains information on how to obtain access to the VLSS data.

Future research will also be possible using data now being collected by the GSO. At the time of this writing (mid-2002), the GSO is conducting the Vietnam Household Living Standards Survey, which will have a much larger sample size but a smaller household questionnaire (and thus less information for each household). The GSO plans to implement this survey every 2 years for the next 10 years.

Notes

I would like to thank Bob Baulch, David Dollar, Jonathan Haughton, Dominique van de Walle, and two anonymous reviewers for comments on previous versions of this chapter.

1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted one year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.
2. For more details on Vietnam's *Doi Moi* policies, see Litvack and Rondinelli (1999) and World Bank (1993, 2002a).
3. These data on inequality are from Glewwe, Gragnolati, and Zaman (2000), which provides a much more detailed analysis of inequality and poverty in Vietnam.

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Part I

Vietnam's Economic Performance in the 1990s

2

Reform, Growth, and Poverty

David Dollar

Vietnam has been one of the fastest-growing economies in the world in the 1990s, and yet by many conventional measures it has economic policies that are mediocre at best. In the Heritage Foundation's *Index of Economic Freedom 2000* (O'Driscoll, Holmes, and Kirkpatrick 2000), for example, Vietnam is ranked 144th out of 155 countries on a measure that seeks to capture the environment for investment and growth.[1] The objective of this chapter is to explain this apparent anomaly, and to do so in a way that provides useful guidance to policymakers in Vietnam on the institutional and policy reforms needed for sustained growth and poverty reduction.

Between the 1980s and 1990s Vietnam carried out significant economic reforms, notably stabilization, introduction of positive real interest rates, trade liberalization, and initial property rights reform in agriculture. If these changes are related to the empirical growth literature, Vietnam's growth acceleration is seen to be about what would be predicted. Conditional convergence suggests that the country's high growth rate will decelerate unless further reforms are taken.

The section titled "Determinants of Growth" provides a framework for the chapter by briefly reviewing modern growth theory and the empirical growth literature. The empirical results on important institutions and policies for growth, as well as the phenomenon of conditional convergence, are stressed. Policy improvements generally lead to growth accelerations, but without further reform the growth rate will tend to slow over time.

"Experience with Reform" then examines a number of indicators of Vietnam's reform in the late 1980s and 1990s, notably the macroeconomic reforms of stabilization, positive real interest rates, trade liberalization, and initial property rights reform in agriculture. These changes are related back to the empirical growth literature with an estimate of what growth effect

Vietnam should have received from its reform compared with what actually transpired, to see if its performance really is an anomaly.

The next section, "Vietnam Compared with Other Emerging Markets," looks at the level of institutional and policy development in Vietnam, comparing it with other emerging market economies. While Vietnam's policies have improved, they have done so starting from a truly low base. Hence, it can be simultaneously true that Vietnam's policies have improved a great deal and yet are mediocre in comparative perspective. A comparison of governance indicators, financial sector issues, and the infrastructure of international integration reveals serious institutional weaknesses in Vietnam that need to be addressed if a high growth rate is to be sustained. A final section briefly sums up.

Determinants of Growth

There is a vast empirical literature that investigates the determinants of growth. Much of this was spurred by the endogenous growth theories of Romer (1986) and Lucas (1988). The new growth models emphasized the importance of creating a good environment for firms to innovate—either through research and development to generate truly new products or processes, or through transfer or imitation of advanced technologies from other countries, which is a type of innovation for the local economy.

Researchers have looked at a wide range of different variables that may affect growth. This cross-country empirical literature needs to be approached with some caution. The number of countries in the world is not very large, so this work uses relatively small samples. Many of the variables that researchers have looked at are correlated among themselves; as a result it is difficult to precisely identify the effects of different policies. There are issues surrounding the way that the causality runs. Nevertheless, this empirical literature is useful for summarizing important patterns in the growth data.

Empirical studies of growth are based on the "standard" cross-country growth regression in equation 2.1:

$$y_{ct} = \beta_0 + \beta_1 \cdot y_{c,t-k} + \beta_2' X_{ct} + \eta_c + \gamma_t + \nu_{ct} \tag{2.1}$$

where y_{ct} is log-level of per capita gross domestic product (GDP) in country c at time t, $y_{c,\mathrm{t-k}}$ is its lag k years ago, and X_{ct} is a set of control variables measured as averages over the decade between $t - k$ and t. Subtracting lagged income from both sides of the equation gives the more conventional formulation in which the dependent variable is growth, regressed on initial income and a set of control variables. The disturbance term in the regression consists of an unobserved country effect that is constant over time (η_c), an unobserved period effect that is common across countries (γ_t), and a component that varies across both countries and years that is assumed to be uncorrelated over time (ν_{ct}).

Most of the early empirical studies considered growth over a very long period ($k = 25$ years or more), so that there is only one observation per country. As a result, all of the effects of interest are estimated using only the cross-country variation in the data. Some studies consider shorter periods, such as decades or quinquennia, and typically combine the cross-country and within-country variation in the data in an ad hoc manner. Caselli, Esquivel, and Lefort (1996) provide a useful critique of conventional panel growth econometrics and a proposed solution, which is to estimate equation 2.1 in differences, using appropriate lags of the right-hand-side variables as instruments. In particular, they advocate estimating the regression as shown in equation 2.2:

$$y_{ct} - y_{c,t-k} = \beta_1 \cdot (y_{c,t-k} - y_{c,t-2k}) + \beta_2{}' \, (X_{ct} - X_{c,t-k}) + (\gamma_t - \gamma_{t-k}) + (\nu_{ct} - \nu_{c,t-k}). \tag{2.2}$$

On the one hand, this is nothing more than a regression of growth on lagged growth and on changes in the set of explanatory variables. On the other hand, subtracting lagged growth from both sides of the equation reveals changes in growth from one decade to the next as a function of initial growth and changes in the explanatory variables. Much of the recent work on growth adopts this approach, which has the advantage of controlling for country-specific effects that do not change over time. Elaborations of these techniques involve jointly estimating a system of two equations, in levels (equation 2.1) and in differences (equation 2.2), and using lagged changes of endogenous variables as instruments for levels in the former (Arellano and Bover 1995). This approach can yield important efficiency gains (Blundell and Bond 1998).

Five results are fairly robust in the empirical growth literature that draws on these techniques. First, Fischer (1993) finds that high inflation is bad for growth. This commonsense result is hard to dispute. To some extent, inflation reflects shocks and other things beyond the government's control, but truly high inflation (above, say, 40 percent) obviously reflects monetary mismanagement. In addition, there is a clear negative relationship between government consumption and growth that was first noted by Easterly and Rebelo (1993). Some recurrent government expenditures are socially productive, but countries with very high government spending usually have inefficient bureaucracies and high levels of corruption. A number of studies—most recently Frankel and Romer (1999) and Dollar and Kraay (2001)—find that openness to trade and foreign direct investment (FDI) accelerate growth. These latter findings are very much in the spirit of the new growth models, which emphasize the importance of the size of the market for creating a fine division of labor and stronger incentives to innovate.

In addition to macroeconomic and trade policies, financial development is also a spur to growth (Levine, Loayza, and Beck 2000). After controlling for other variables, it has been found that countries that have more developed stock markets or deeper banking systems, or both, tend to grow fast. Finally, measures of the strength of property rights, rule of law, or level of corruption are highly correlated with growth (Kaufmann, Kraay, and Zoido-Lobatón 1999; Knack and Keefer 1995). The existing measures of property rights or corruption come from surveys of private businesses and reflect the extent to which investors perceive there to be problems with harassment, corruption, and inefficient regulation.

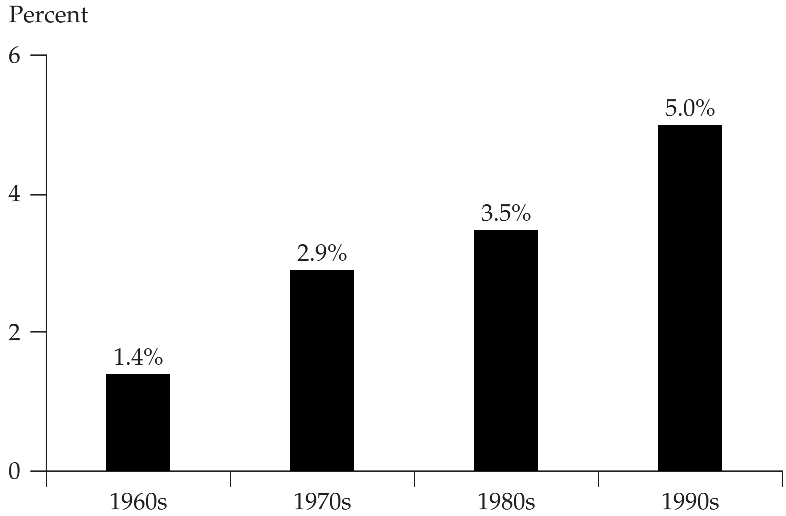
There are many other variables that researchers have used in empirical studies of growth. There are some studies that link infrastructure deficiencies in telecommunications or power to poor growth performance (for example, Easterly and Levine 1997). However, it can be inferred from reading the evidence that those variables are not that robust if there are also controls for all of the institutions and policies noted above. Infrastructure provision is the result of good public institutions and policies.

While disputes remain about the importance of individual policies, in general there is broad agreement among economists that growth is promoted by the policy package of private property rights, sound rule of law, macroeconomic stability, government spending that is not excessive and is well focused on public goods, and openness to foreign trade and FDI.

A final important result from the growth literature is "conditional convergence." Holding institutions and policies constant, there is a tendency for the growth rate to slow over time. This means that, cross-sectionally among a group of economies with similar institutions and policies, poorer economies will grow faster and hence "converge" on richer economies. This convergence can be seen, for example, among Organisation for Economic Co-operation and Development (OECD) countries. The ones that were relatively poor in 1960 (such as Japan and Italy) grew rapidly in the 1960s and 1970s, but then their growth rates slowed. The growth rate of the productivity leader, the United States, has been stable at about 2 percent per capita annually. As a result of this convergence among OECD economies, the overall growth rate of the rich countries has slowed decade by decade and in the 1990s was at about 2 percent.

A growing number of developing countries have acted on this growth-oriented agenda in the past 15 years, and in general they have seen good results from reform. For example, Dollar and Kraay (2001) identified a group of "globalizers" (the top one-third of developing countries in terms of increased participation in international trade over the past two decades). This group has had a particularly large increase in trade to GDP: 104 percent, compared with 71 percent for the rich countries. What is striking is that the remaining two-thirds of developing countries have actually had a decline in trade to GDP over this period. The globalizing group has also cut import tariffs significantly, 34 points on average, compared with 11 points for the nonglobalizers. The list of post-1980 globalizers includes some well-known reformers—Bangladesh, China, Hungary, India, Malaysia, Mexico, the Philippines, and Thailand. These countries have been moving on the broad policy agenda outlined above. These recent globalizers have experienced an acceleration of their growth rates, from 1.4 percent per year in the 1960s to 3.5 percent in the 1980s and 5 percent in the 1990s (figure 2.1), while the growth rates of rich countries slowed over this period. What about developing countries not in the "globalizing" group? They had a decline in

Figure 2.1. Per Capita GDP Growth Rates, 1960s to 1990s



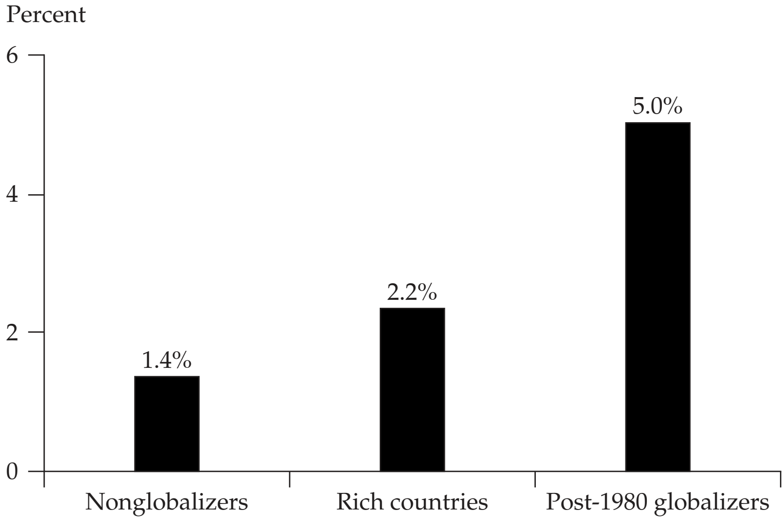
Source: World Bank 2000.

the average growth rate from 3.3 percent per year in the 1970s to 0.8 percent in the 1980s and 1.4 percent in the 1990s.

While there has been growing consensus over the past few years about what policies are good for growth, the old debate about growth and inequality has simultaneously resurfaced. It is common to hear claims that this era of globalization is leading to mounting inequality within countries, so that growth is not benefiting the poor. Mazur (2000), for example, says, "Globalization has dramatically increased inequality between and within nations. . . ." Neither part of this claim is true. The globalizing developing countries grew at 5 percent in the 1990s and hence converged on the rich countries, which were growing at only 2.2 percent (figure 2.2). The developing countries that are not embracing globalization are being left behind.

What about the claim that globalization and growth in general lead to higher inequality within countries? To test whether growth is associated with higher inequality within countries (that is, whether growth is biased against the poor), Dollar and Kraay (2002) put together a large dataset on income inequality, compiled from a variety of existing sources (primarily the dataset constructed by Deininger and Squire [1996]) with several updates using more recently available data). The data, which cover 137 countries, consist of Gini coefficients for a large number of countries and years, and five points on the Lorenz curve for most of these country-year observations. As noted by these and other authors, there are substantial difficulties in comparing income distribution data across countries. Countries differ in the concept measured (income versus consumption), the measure of income

Figure 2.2. Convergence and Divergence in Per Capita GDP Growth Rates in the 1990s



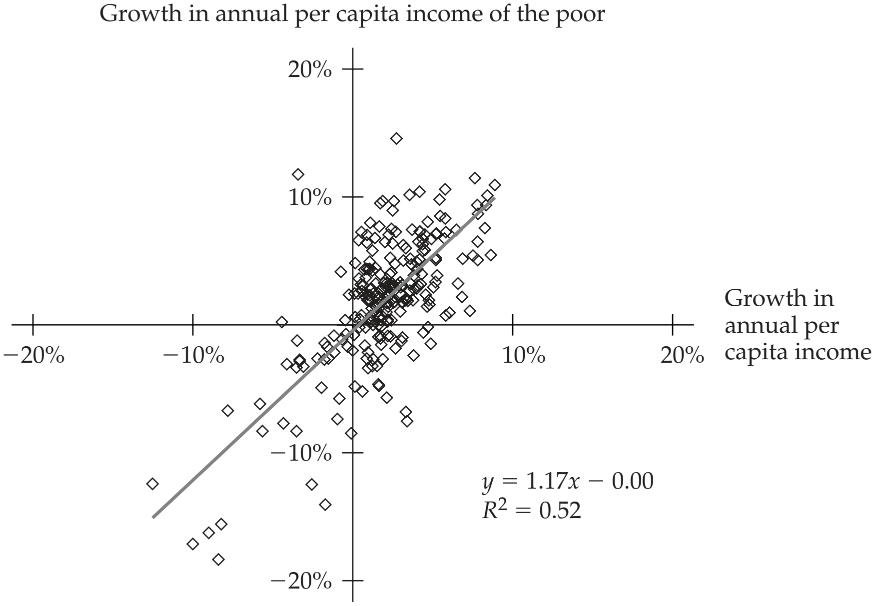
Source: World Bank 2001.

(gross versus net), the unit of observation (individuals versus households), and the coverage of the survey (national versus subnational). Dollar and Kraay restrict attention to distribution data based on nationally representative sources identified as high quality by Deininger and Squire (1996) and perform some simple adjustments to control for differences in the types of surveys.

Dollar and Kraay use these data to try to understand what is happening to the income of the bottom 20 percent (that is, the lowest quintile) of the income distribution as globalization proceeds. There is a one-to-one relationship between the growth rate of income of the poor and the growth rate of per capita income, but a great deal of variation around that average relationship (figure 2.3). In other words, percentage changes in incomes of the poor, on average, are equal to percentage changes in average incomes. A useful way of interpreting these results is to say that they are equivalent to the finding that changes in the distribution of income are not systematically associated with the growth rate.

Can deviations around the one-to-one relationship, which reflect changes in inequality, be explained? The hypothesis that greater trade openness leads to growing household inequality is equivalent to the hypothesis that growing openness leads to points "below the line" in figure 2.3: that is, that growth of the poor's income is less than proportionate to per capita GDP growth. Dollar and Kraay considered a variety of possible variables that might explain cross-country differences in the extent to which growth accrues to

Figure 2.3. Economic Growth and Income of the Poor
(percent)

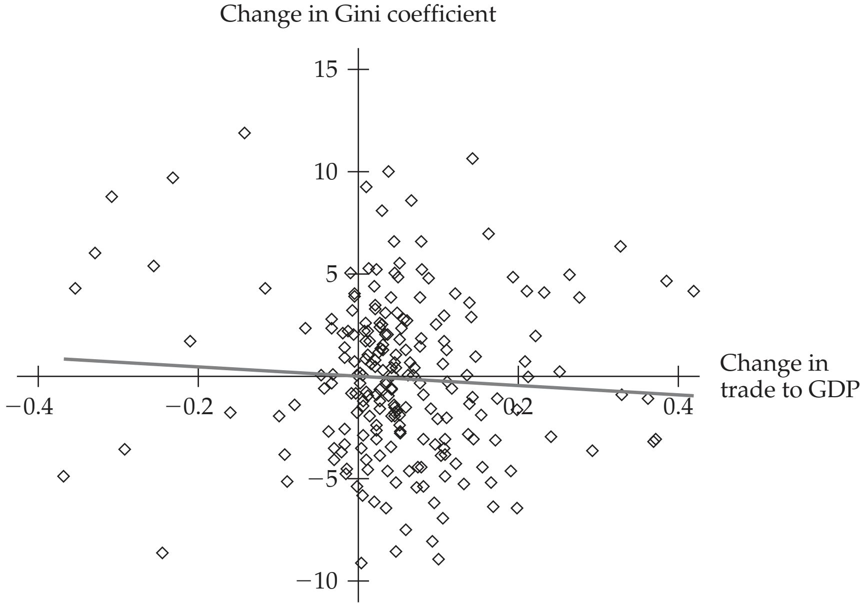


Source: Dollar and Kraay 2002.

those in the bottom quintile, but with little success. One of the variables considered was trade volumes, but Dollar and Kraay found no evidence whatsoever of a systematic relationship between changes in trade and changes in inequality. There is simply no association between changes in trade to GDP and changes in the Gini measure of inequality (figure 2.4). Certainly trade and investment liberalization has distributional consequences—that is, there are "winners" and "losers" in the short run. However, the losers do not come disproportionately from the poor. While it is heartening to note that this is true, nevertheless, it is a concern that some poor households are hurt in the short run by trade liberalization. It is thus important to complement open trade policies with effective social protection measures such as unemployment insurance and food-for-work schemes. (Closed economies obviously need safety nets also, because households are subject to shocks from business cycles, technological change, weather, and disease.) To the extent that trade openness raises national income, it strengthens the fiscal ability of a society to provide these safety nets.

Increased trade generally goes hand in hand with more rapid growth and no systematic change in household income distribution; thus, increased trade generally goes hand in hand with improvements in the poor's well-being. Dollar and Kraay (2002) similarly examine whether or not other

Figure 2.4. Increased Trade and Changes in Inequality
(percent)



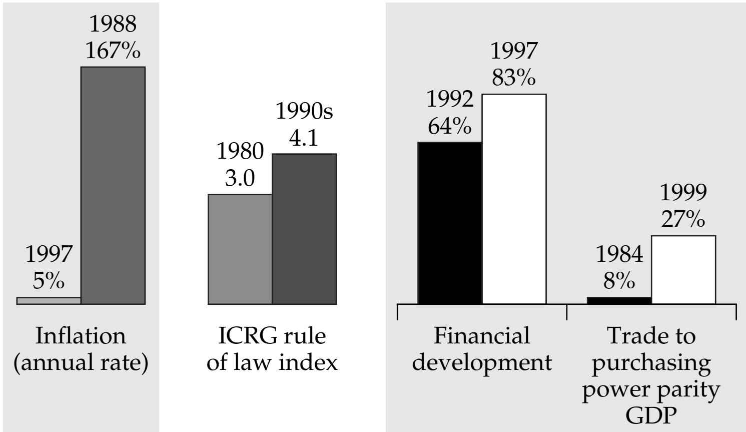
Source: Dollar and Kraay 2002.

institutions and policies that are good for growth tend to affect inequality. For trade openness, rule of law, and financial development, the distribution effects are all very small and not significantly different from zero. In the case of government consumption and inflation, there are more significant distributional effects. In general, high inflation and large consumption by the government are especially bad for the poor. Such policies create a poor environment for growth and tend to harm the poor disproportionately. Based on empirical evidence, the view that growth-enhancing policies, including integration with the global economy, do not work for the poor can be rejected.

Experience with Reform

Cross-country growth analysis is useful for summarizing what is true in general or on average. However, individual country experiences can vary a great deal from what would be expected or predicted from the cross-country regressions. This section looks at some indicators of Vietnam's reform between the late 1980s and the late 1990s, and asks whether the

Figure 2.5. Indicators of Vietnam's Reforms: Mid-1980s to Late 1990s
(percent)



Source: World Bank 2003.

country got the expected boost in growth or whether it is an anomaly in either direction (that is, whether there was higher or lower growth than would be predicted).

There is a growing descriptive literature of Vietnam's economic reform (Dapice 1995; de Vylder and Fforde 1996; Dollar 1994; Le Dang Doanh 1995; Ljunggren 1993). It is widely recognized that stabilization from high inflation was one key aspect of the reform. The inflation rate declined from almost 170 percent a year in 1988 to 5 percent in 1997 (figure 2.5). This stabilization was the result of fiscal adjustment and monetary restraint in the early 1990s.

Together with the stabilization there were some initial financial sector reforms, raising interest rates to positive real levels and introducing some element of competition into the system. A measure of financial development that has been used in the growth literature is commercial bank assets relative to total bank assets. In Vietnam, this measure of financial development increased from 0.64 in 1992 to 0.83 in 1997 (unfortunately, the data before 1992 are not available).

Liberalization of foreign trade and FDI has been an important part of Vietnam's reform. The trade system was highly restricted through the mid-1980s. Reform has included dismantling of nontariff barriers and tariff reductions (Dollar and Ljunggren 1997). It is difficult to measure the extent of trade policy reform. One good indicator is the volume of trade in constant prices relative to purchasing power parity GDP. This ratio increased from 0.08 in 1989 to 0.27 in 1997. Today trade is closely related to FDI. Vietnam also liberalized its policies toward FDI. Flows of FDI averaged more than 5 percent of GDP in the second half of the 1990s, up from virtually zero in the 1980s.

Some of the most important reforms in Vietnam involved strengthening of property rights. The initial land reform gave use rights over land to peasant families, and in practice there is quite an active market in land. Company law and FDI law improved the property rights over plant and equipment. It is difficult to measure this change in the extent of property rights. One indicator is the International Country Risk Guide (ICRG) rule of law index, with a scale from 1 (complete lack of property rights) to 6 (OECD standards). This measure shows Vietnam increasing from 3.0 to 4.1 between the 1980s and 1990s, one of the largest improvements recorded (though not quite as good as China's improvement from 3.0 to 4.5 over the same period).

If the changes in figure 2.5 are taken as rough indicators of the major reforms that have occurred in Vietnam, what would the effect of reform be in light of the empirical growth literature? In table 2.1, the parameter estimates are taken from a recent panel growth regression (Dollar and Kraay 2002) and applied to the changes in policies observed in Vietnam between the late 1980s and the late 1990s. The result is that trade liberalization is estimated to account for an increase in the growth rate of 0.1 percentage point; disinflation, 1.9 percentage points; financial deepening, 1.0 percentage point; and

Table 2.1. Estimated Growth Effect of Vietnam's Reforms

	Growth regression				
Indicator	*(1) Coefficient*	*(2) Standard error*	*Annual effect (3) = (1)/7*	*Change during reform (4)*	*(5) = (3)×(4)*
Control variables					
Lagged income	0.67	0.17			
Lagged inequality	−0.09	0.06			
Secondary education	0.10	0.06			
Institutions/ policies					
Trade volume	0.05	0.07	0.007	0.19	0.001
Inflation	−0.15	0.13	0.02	−0.93	0.019
Government consumption	−0.97	0.42	0.14	0.009	0.000
Financial development	0.37	0.17	0.05	0.19	0.010
Rule of law	0.18	0.08	0.026	0.64	0.016

Note: The numbers in parenthesis are column numbers. The growth regression is taken from Dollar and Kraay (2002, table 6). The time periods used there are seven years, so the parameter estimates are divided by seven to give the annual effects. The changes in Vietnam are taken from figure 2.5. The change in inflation is the log difference.

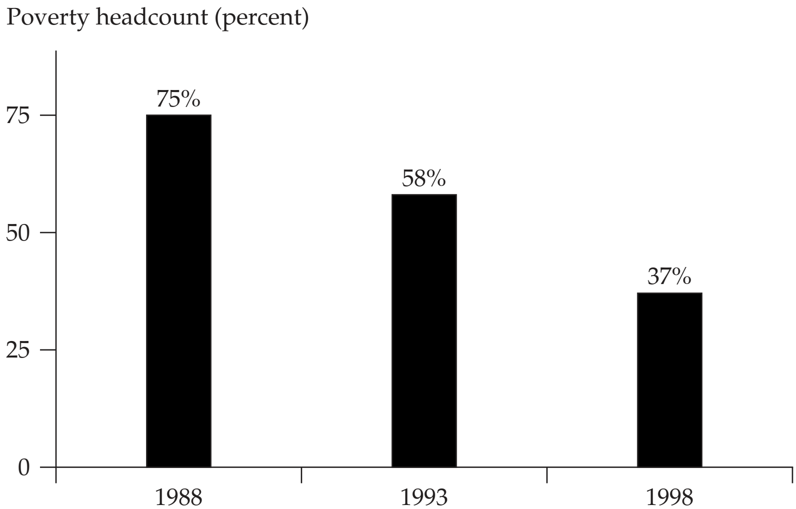
property rights reform, 1.6 percentage points.[2] These are each independent effects: The total effect of these reforms would thus be an increase in the growth rate of nearly 5 percentage points.

One should, of course, view these point estimates with a certain amount of skepticism. It is nevertheless interesting that the estimated effect of reforms from the cross-country growth literature—a large boost in growth—accords quite well with Vietnam's experience. For much of the 1980s, real per capita growth was zero; for the 1992–98 period, it was 5.4 percent. Thus, the actual increase in Vietnam's growth rate was quite similar to what would have been expected from its reforms based on the empirical growth literature.

Vietnam has seen the expected results from economic reform in terms of growth. What about developments in inequality and poverty? Here, too, it turns out that Vietnam is typical. The last section noted that in general there is no strong relationship between the kinds of reforms that Vietnam has carried out and changes in household income inequality. The 1992–93 Vietnam Living Standards Survey (VLSS) found relatively low inequality in Vietnam (with a Gini coefficient of 0.33), and the follow-up VLSS in 1997–98 found only a slightly higher degree of inequality (Gini coefficient of 0.35).[3]

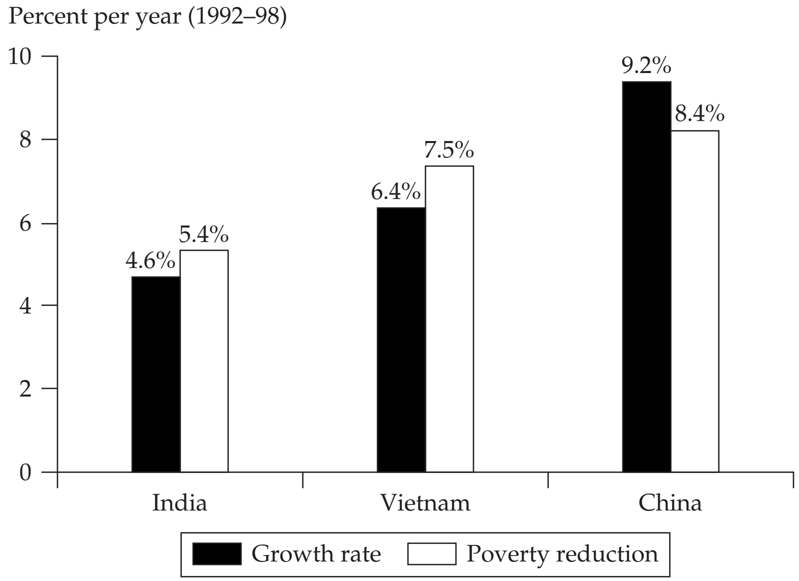
Thus, reforms in Vietnam have led to a dramatic increase in income of the poor. The poverty headcount rate (based on a 2,000-calorie poverty line) declined from 75 percent of the population in 1988 to 58 percent in 1993 and then to 37 percent in 1998 (figure 2.6). Poverty was halved in a decade. It is

Figure 2.6. Effect of Economic Reform on Poverty, 1988–98



Source: World Bank 2000.

Figure 2.7. Poverty Reduction and Growth Rate in India, Vietnam, and China, 1992–98



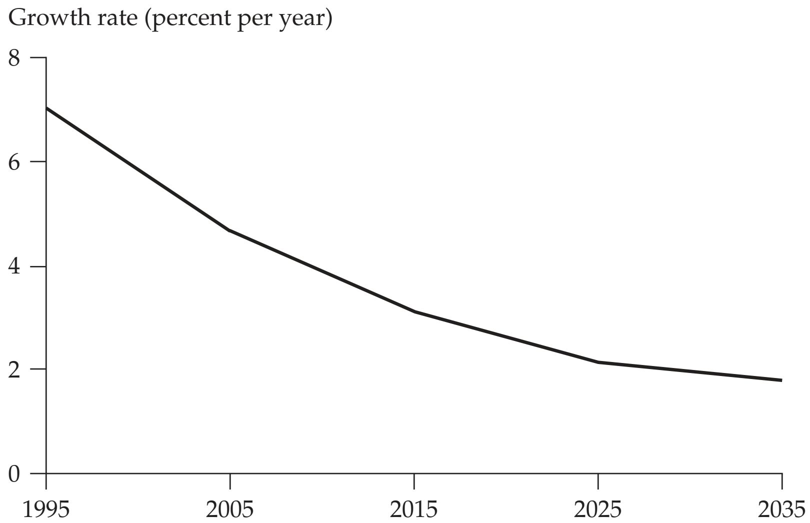
Source: World Bank 2001.

interesting to put Vietnam's poverty reduction experience in perspective by comparing it with that of China and India. In both China and India, reform has coincided with mounting inequality, hampering the extent to which growth has translated into poverty reduction (figure 2.7). While Vietnam's growth rate has been distinctly lower than China's, its rate of poverty reduction has been nearly the same.[4]

Thus, Vietnam's experience so far has been quite positive. There were large improvements in policies between the 1980s and the 1990s, an acceleration in growth, and a dramatic decline in poverty. The sectoral composition of this growth has been similar to that experienced in other rapidly growing East Asian economies. Because of land reform and price liberalization in agriculture, that sector grew well by historical standards between 1990 and 2000, at 4.3 percent per year. However, Vietnam is a densely populated country whose main comparative advantage lies in labor-intensive manufactures. Over the same period, industry was the leading engine of growth, expanding at 10.9 percent per year. The industrial growth was spurred by the opening to the international market and led by products such as garments and footwear. The service sector also expanded rapidly from 1990 to 2000, at 7.5 percent per year.

Although Vietnam has done well for a decade, conditional convergence is the fly in the ointment and cannot be disregarded. Vietnam started out in

Figure 2.8. Conditional Convergence, 1995–2035



Source: Dollar and Kraay 2001.

the 1980s as an extremely poor country with extremely poor policies. In that context, its initial reforms were large improvements in policies, and, starting from an extremely low base, Vietnam was able to grow very rapidly. However, if policies remain the same, Vietnam's growth rate will slow as the country gets richer. Dollar and Kraay (2001) estimate a convergence coefficient of 0.67; that is, a per capita growth rate of 6 percent in one decade will be 4 percent in the next, assuming policies remain the same (figure 2.8). The next section turns to the question of the level of Vietnam's policies compared with other emerging market economies. This comparison is a useful way of highlighting key areas in which Vietnam needs to move in its reform if it is to sustain a high growth rate.

Vietnam Compared with Other Emerging Markets

This section focuses on the level of policies in Vietnam in the late 1990s, comparing it with other emerging markets in the areas of property rights and governance, financial and labor markets, and openness to foreign trade and FDI.

Property Rights and Governance

Kaufman, Kraay, and Zoido-Lobatón (1999) combine dozens of indicators from 13 sources under five categories that measure broad dimensions of governance. The categories are:

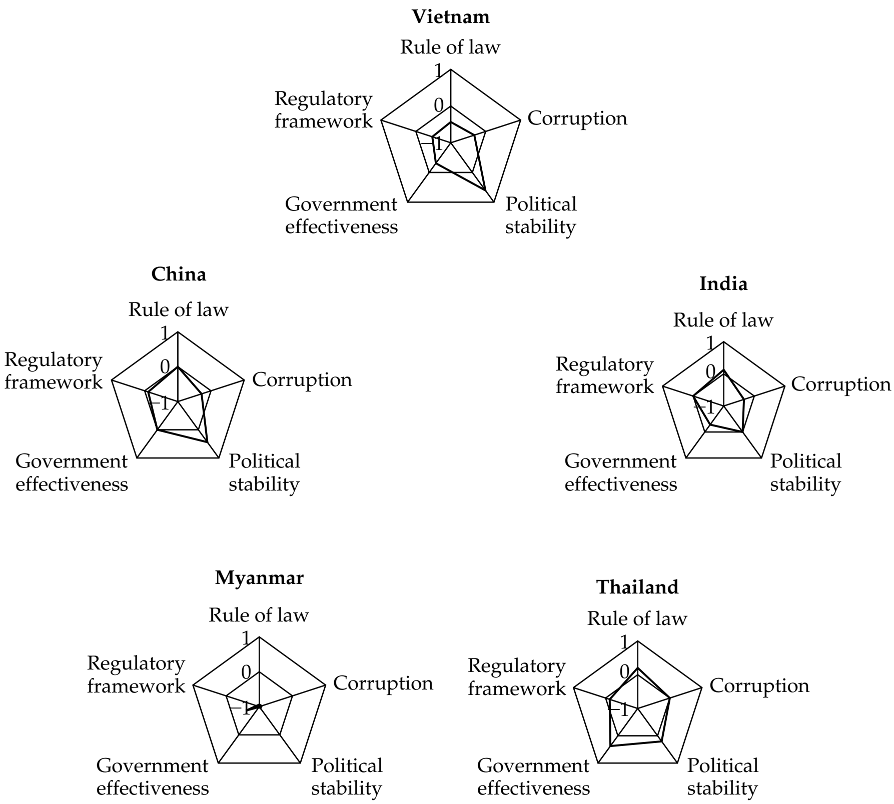
- *Government effectiveness* measures bureaucratic delays, the competence of officials, the quality of public service delivery, and the independence of the civil service from political pressures. This grouping of indicators covers the elements needed for government to design and implement good policies.
- *Regulatory burden* includes the number of regulations within a market, the number of markets that are regulated, competition policy measures, and price controls. This captures more of the outcomes of the policies and provides a sense of the extent to which the investment climate is market friendly.
- *Rule of law* captures the extent of crime, property rights, tax evasion, and the legal system's effectiveness. It indicates the enforceability of contracts and the predictability of rules.
- *Graft* measures include the frequency and size of irregular payments.
- *Political instability and violence* measures the incidence of coups d'état, assassinations, riots, and armed conflicts, and provides a measure of the likelihood of a violent overthrow of a governing party.

The political instability measure is primarily concerned with the probability of violent shifts in political power rather than constitutionally sanctioned shifts in policy stance. The other four categories are highly correlated, with correlations of 0.69 to 0.93. These indicators capture different dimensions of property rights: basic contract enforcement and the rule of law, political stability and freedom from violence, and freedom from corruption. At first glance, the link from the other two measures—government effectiveness and regulatory burden—to property rights may not be obvious. Together, though, they capture the extent to which there is an efficient division of labor between the public and private sectors, where an inefficient division leads to poor use of resources in both the public and private sectors.

Figure 2.9 shows governance in Vietnam and four other Asian countries (China, India, Myanmar, and Thailand). For each indicator in the figure, the mean for all countries in the world is zero and the standard deviation is 1. Vietnam is thus perceived as having above-average political stability, but it is well below average on the other four dimensions of governance. In terms of basic property rights and rule of law, Myanmar is very poor, at about the level Vietnam was at 10 years ago. Vietnam is about one-half a standard deviation better than Myanmar, but significantly worse than China or India. Thailand, in turn, is significantly better than China or India. (Countries in the developing world that score especially high on this measure are Chile and Singapore; in making comparisons, those countries are disregarded to concentrate on countries that are not too far from Vietnam's level of development.)

In terms of regulatory framework for business and government effectiveness in providing services, Vietnam also lags significantly behind China and India. In terms of corruption, China, India, and Vietnam are all perceived to be about the same.

Figure 2.9. Governance Pentagons: Vietnam, India, Thailand, Myanmar, and China



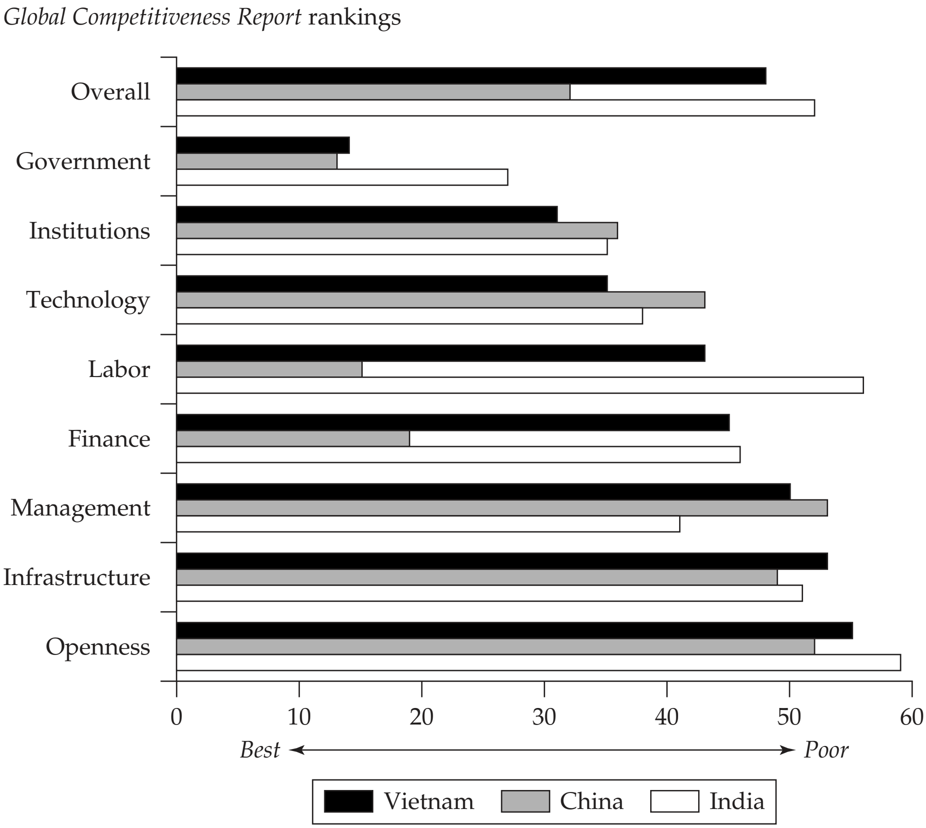
Source: Kaufmann, Kraay, and Zoido-Lobatón 1999.

Because these are indexes, the interpretation of these differences is complex. The measures of rule of law, regulatory burden, and government effectiveness are highly correlated. For all of them, Vietnam lags behind China by about one-half a standard deviation. In growth analysis, that large difference is "worth" about 1.5 percentage points in growth.

Factor Markets

Another useful source of comparative information is the *Global Competitiveness Report,* which ranks a large number of countries in terms of different dimensions of competitiveness. These are subjective assessments of the international business community and should be treated with some caution. Still, it is interesting to see that Vietnam is ranked among the lowest of the countries rated (figure 2.10). Vietnam is seen to be far less competitive than China (which is in the middle of the rankings). Two areas that are singled

Figure 2.10. ***Global Competitiveness Report*** **Rankings: Vietnam, China, and India**
(ranking out of 60 countries)



Source: World Economic Forum 2002.

out as particular weaknesses in Vietnam relative to China are financial markets and labor markets.

Vietnam initiated reforms in its financial sector but then has done little in the past five years to follow up. The banking sector is still dominated by a few (and poorly managed) state banks. Much of the outstanding credit of these institutions is to state-owned enterprises (SOEs). Some of the SOEs, especially those working with foreign partners, are doing well, but many are in financial difficulty. Hence, the financial sector is saddled with a large number of nonperforming loans. This results in high spreads and poor ability to channel funds to the most productive investments. To the extent that all of this is explicitly or implicitly backed by the government, it also represents a contingent liability that weakens the government's fiscal position.

A similar situation prevailed in Thailand before its 1997 financial crisis. The government's fiscal situation looked good on the surface; however, it was the guarantor of a risky and poorly managed financial system. A modest shock then precipitated a large financial and exchange rate crisis (Burnside, Eichenbaum, and Rebelo 2001). Vietnam has a relatively closed capital account, but it would be naive to think that this alone will insulate it from a potential financial or currency crisis. As Vietnam's economy develops and is more integrated with the global economy on the real side (trade and FDI), it becomes increasingly difficult to maintain capital controls. Thus, reforming the financial system is a high priority, both to help create a good environment for growth and to provide insurance against a financial or currency crisis that would really set back the country's development.

Openness

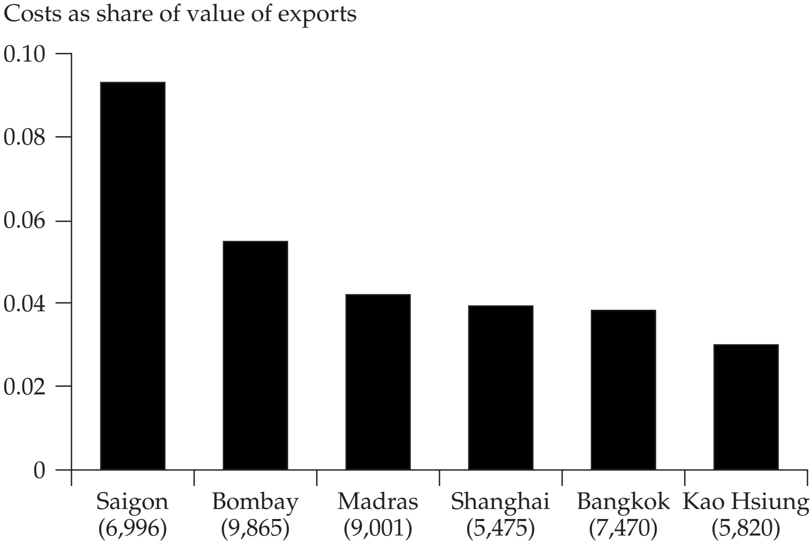
Vietnam has been negotiating to join the World Trade Organization (WTO), and that process has revealed that the country still has significant barriers to trade. Following through on its plans to join the WTO will require addressing these barriers. Participating more in the global economy has been an important part of Vietnam's success to date, but to deepen that participation will require not only trade reforms but also improvements in both the hard and soft infrastructure of trade: ports, customs administration, insurance, and finance. There are indications that Vietnam is lagging behind its competitors in these key areas.

For example, there are good data available on shipping costs on all shipments into the United States. For shipments of garments in 1998, the shipping cost from Ho Chi Minh City to the west coast of the United States was nearly 10 percent of the value of the shipment, compared with 4 percent for similar shipments from Shanghai or Bangkok (figure 2.11). There are small variations in the distances from these different cities to the United States, but they cannot explain the variations in shipping costs (Ho Chi Minh City is actually closer than Bangkok to the United States). Rather, these differences result, to a large extent, from the level of port efficiency, which leads to delays and high costs in the case of Vietnam.

In the case of garments, Vietnam has great potential as a producer and exporter, especially as it joins the WTO and the Multifibre Arrangement is phased out. The shipping cost difference between Ho Chi Minh City (nearly 10 percent) and Shanghai (4 percent) may not seem like much, but it means a great deal to a producer in a competitive industry in which the margins are very thin. If there are other bottlenecks in domestic transport (to get to the port) or in customs administration to get inputs into and outputs out of the country, then each of these will be an additional "tax," further eroding the potential profit.

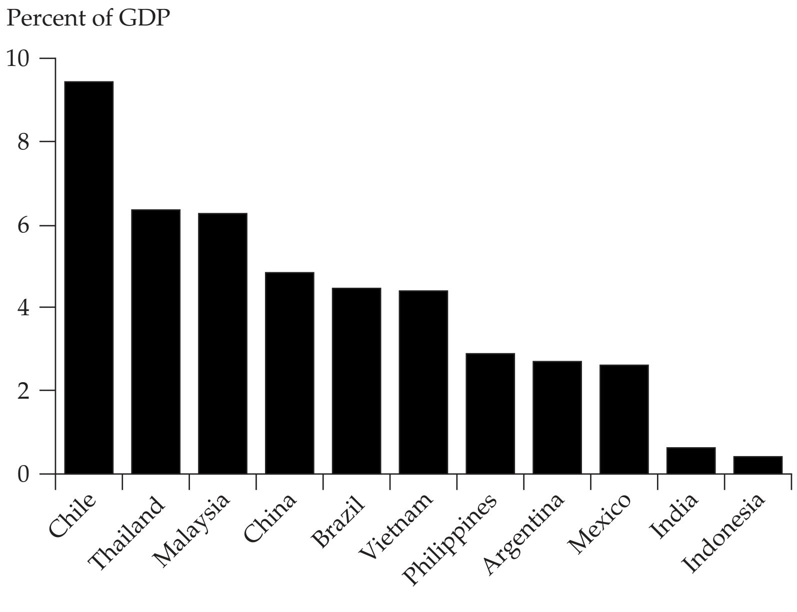
Thus, in comparing Vietnam with other emerging market economies, a number of deficiencies in the investment climate that will influence investment and growth are revealed. The underlying weaknesses are institutional,

Figure 2.11. Maritime Transport to the United States (West Coast): Garments



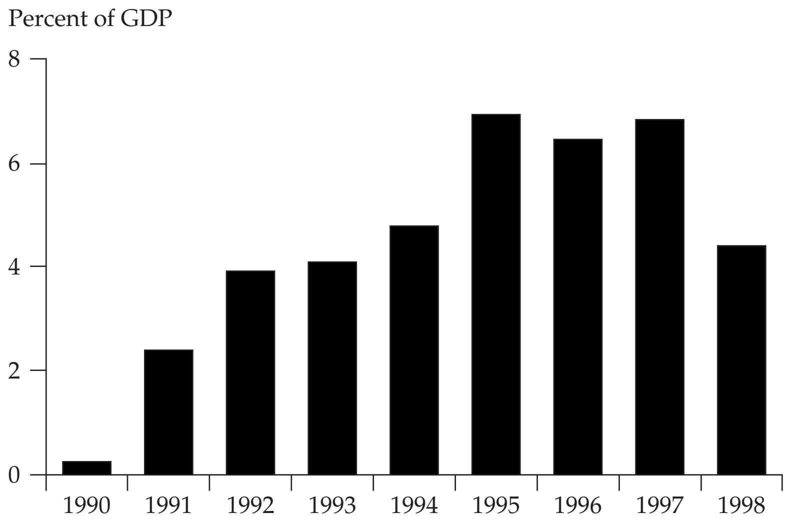
Source: Clark, Dollar, and Micco 2002.

Figure 2.12. Foreign Direct Investment as a Share of GDP, 1998



Source: World Bank 2003.

Figure 2.13. Foreign Direct Investment in Vietnam in the 1990s



Source: World Bank 2003.

concerning the protection of property rights and efficient regulation of markets, the supervision of the financial system, and the policy framework for infrastructure development. Vietnam's reforms initially attracted a great deal of enthusiasm from foreign investors. In 1998, the level of FDI, relative to GDP, in Vietnam was comparable to other emerging markets, such as Brazil and China, though it was well behind Chile, Malaysia, or Thailand (figure 2.12).

The time trend of FDI into Vietnam, however, raises some concerns. Volumes rose sharply from 1990 through 1995, but then leveled off and declined (figure 2.13). It might appear that the decline in 1998 was partly related to the overall East Asian financial crisis. However, FDI worldwide actually increased during the crisis years (while portfolio flows dropped sharply). Hence, in an overall improving global climate for FDI, Vietnam has been getting diminished attention from investors.

Conclusions

In the 1990s, Vietnam was one of the fastest-growing economies in the world, although the level of institutions and policies in Vietnam was mediocre compared with other emerging market economies. These two, apparently discordant, facts can be reconciled within the framework of modern growth theory and evidence. The key to the apparent anomaly lies in Vietnam's initial conditions in the mid-1980s. The country has a good location and good human resources. However, in the mid-1980s, it had very weak economic policies that translated into an extremely low per capita income. Starting from such a low base, a modest set of initial reforms will have a large impact and generate a very high growth rate (especially in a good location, such as Vietnam's). The initial reforms are quite feasible technically for a low-income country. They involve macroeconomic policy changes such as price liberalization, devaluation, trade liberalization, and interest rate increases. Vietnam also carried out land reforms in agriculture that were important but simple (such as returning land to peasant families). All of these reforms require political will, but they are not technically difficult.

Hence, Vietnam received the kind of growth boost that is to be expected from an initial set of macroeconomic reforms in a low-income environment. But another well-established, empirical regularity of the growth literature is conditional convergence: Holding policies constant, there is a tendency for the initially high growth rate in a low-income country to slow as it develops. Thus, the key to sustained high growth over several decades is continual upgrading of economic institutions and policies: legal reform, regulatory improvements, deepening of the financial system, and regulation that allows efficient infrastructure investment and thus reduces transactions costs. The highly successful economies—such as Taiwan, China—demonstrate this kind of continual improvement over several decades.

The slowdown in FDI into Vietnam, and the fact that the country's growth rate remains well below that of neighboring China, suggest that Vietnam has not followed its initial reforms with sufficient institutional upgrading. These institutional dimensions are hard to measure, but there are various informative indicators. This chapter has presented a number of these indicators, painting a consistent picture of weaknesses in Vietnam's governance, financial sector, and transport infrastructure that identify important areas in need of further reform. Without these reforms, Vietnam's growth rate will probably decelerate. A balanced assessment of Vietnam in the 1990s is that initial successful reforms produced good results and have led to an important decline in extreme poverty. However, there has been some tendency for the government to rest on its laurels in recent years, leading to a decline in FDI and growth. For Vietnam to keep up with other competitive economies in the region, the government will have to "get back on the reform horse."

Notes

This chapter was presented as a paper at the workshop on "Economic Growth and Household Welfare: Policy Lessons for Vietnam," Hanoi, May 16–18, 2001, and benefited from helpful comments from attendees and from Paul Glewwe and Nisha Agrawal. I am grateful to the Research Support Budget for financial assistance and to Ximena Clark and Pablo Zoido-Lobaton for excellent research assistance.

1. This index may not be an unbiased assessment of Vietnam's investment climate, but its low rating of Vietnam is mirrored in other indicators that are taken up

in the section of this chapter titled "Vietnam Compared with Other Emerging Markets."

2. The growth regression used for this counterfactual estimate is in table 6 of Dollar and Kraay (2002). The rule of law index used in that regression averages the ICRG rule of law index with other, similar measures. By construction it has a standard deviation of 1.0. Vietnam's improvement on the ICRG rule of law index between the 1980s and the 1990s was 0.64 of a standard deviation.

3. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

4. This mapping from growth to poverty reduction depends not only on changes in the distribution of income, but also on the initial level of per capita income and the initial degree of inequality.

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3

The Wage Labor Market and Inequality in Vietnam

John Luke Gallup

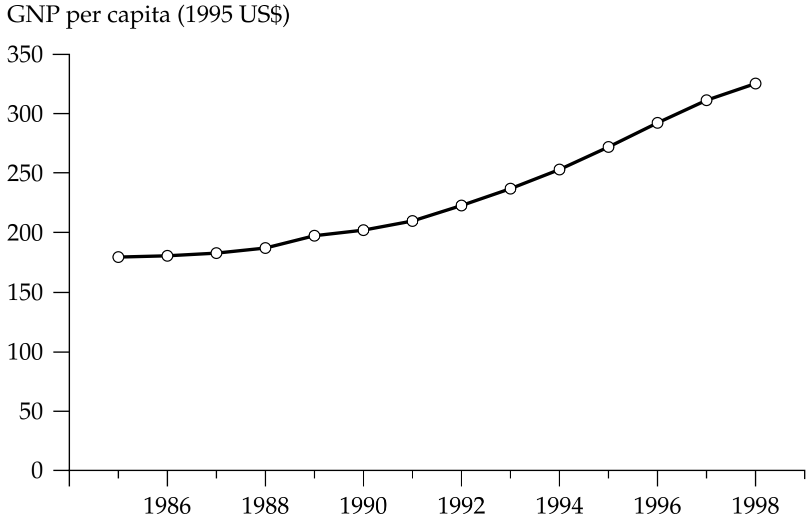
Vietnam has had rapid economic growth since the implementation of the *Doi Moi* (renovation) policies in the late 1980s, despite a sometimes fitful market reform process. This fitfulness has been due to ideological doubts about moving toward a market-based economy, as well as concern about the social impact of a market-based transformation.

The changes have indeed been dramatic. Output per person grew at an average rate of 5.5 percent per year from 1988 to 1998, raising the average level of output per person by 73 percent in a decade (see figure 3.1).[1] This transformation has been of such magnitude that it has touched all facets of society and dramatically reduced poverty.

Family farms and small household enterprises still dominate the income-generating activities of the population, and much of the initial change due to *Doi Moi* occurred in the small farm and small household enterprise sectors. But wage employment is the future. Historically, the process of economic development has always caused a transition out of small farms and household enterprises into wage employment, as worker productivity increases and nonhousehold enterprises dominate the economy. Scrutinizing the evolution of the labor market in the 1990s gives us clues about how economic development in Vietnam will continue to affect households and society in the coming decades.

The economic transformation in Vietnam, despite its positive impact on poverty, could increase inequality. If that occurs, the labor market is likely to be the source of the disparity. The development of urban private enterprise could polarize workers between those in high-paying skilled jobs and others, often immigrants from the countryside, who are eligible only for low-skilled, low-paying jobs. If employment creation concentrates in the cities, it widens the gap between rural and urban dwellers. In a situation where there

Figure 3.1. Economic Growth in Vietnam



Source: World Bank 2000b.

is a lack of opportunity for the poor and an increasing disparity of income, the economic transformation could contribute to many social problems.

This chapter uses the two completed rounds of the Vietnam Living Standards Survey (VLSS)[2] to evaluate the contribution of wage employment to inequality and income growth over the period of rapid economic growth in the 1990s that followed market reforms. It will address the question: Has the expansion of wage employment in Vietnam exacerbated social inequalities, despite its contribution to income growth? If Vietnam is able to sustain its economic development, wage employment will become an increasingly important source of household income as family farms and small household enterprises become less prevalent. Comparing the recent evolution of wage employment to farm and nonfarm self-employment provides clues as to how economic development will change Vietnamese society, in particular its impact on income inequality within and between communities.

This chapter shows that standard methods for calculating income inequality can be severely biased by measurement error when decomposing the contribution of different sectors, regions, or groups to overall inequality. An easily calculated, alternative, consistent method for decomposing income inequality is proposed.

The first section reviews developments in the Vietnamese labor market in the 1990s, focusing on wage employment as opposed to self-employment. The following section explores the determinants of wages to find the individual and community characteristics that explain why different people are paid different wages. A presentation of standard inequality measures follows. This section considers the important impact of measurement error on inequality statistics and proposes a new statistic that is not subject to the biases of standard inequality measures. The section on Vietnamese wage inequality describes wage inequality in the country and how it has changed during the last decade. This is followed by a discussion of the contribution of wage employment to overall income inequality. Finally, the relationship between income sources and overall inequality is used to predict future changes in income inequality, followed by the conclusion.

The Vietnamese Labor Market

This section evaluates how the rapid economic changes in Vietnam have affected labor force participation, unemployment, sectoral shifts in employment, and the growth and regional differences in wages.

Labor Force Participation and Unemployment

In Vietnam, a high percentage of the working-age population works. Even when housework is excluded (but work on the household farm or household business is included), 81 percent of all Vietnamese women and 85 percent of men ages 16 to 60 were working in 1993 (see table 3.1).[3] As income rose during the 1990s, participation rates rose by 2 percent for women and were unchanged for men.

In rural villages, participation rates are even higher—83 percent for women and 87 percent for men in 1993. Rural participation rates jumped by 4 percent for women and stayed unchanged for men, so that both rural men and rural women had the same 87 percent participation rate in 1998.

Participation rates were lower in urban areas than in rural areas in 1993, at 74 percent for urban women and 78 percent for urban men. Unlike rural

Table 3.1. Labor Force Participation, Ages 16–60
(percent)

Population	*1993*	*1998*	*Change, 1993–98*
Female			
Rural	82.8	87.0	4.2
Urban	73.4	70.4	–3.4
Total	80.5	82.8	2.3
Male			
Rural	87.1	87.1	0.0
Urban	77.7	77.3	–0.4
Total	84.7	84.7	0.0

Note: Labor force participation is the percentage of the working age population (16–60) who were working in the previous seven days or who were looking for work.

Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 3.2. Unemployment Rates
(percent)

Sector	*1993*	*1998*
Rural	0.5	0.4
Urban	1.6	1.5

Note: The unemployment rate is the percentage of people ages 16 to 60 in the labor force in the seven days before the survey who were not working and who were looking for work.

Source: Author's calculations from the 1993 and 1998 VLSSs.

women, urban women's participation fell substantially by 3 percent to 70 percent in 1998. Urban men's participation also fell slightly to 77 percent in 1998.

Unemployment—people looking for work who do not have a job—is very low in Vietnam. In 1993, the unemployment rate was 0.5 percent in rural areas and 1.5 percent in urban areas (table 3.2). Unemployment fell by 0.1 of a percentage point from 1993 to 1998, an insignificant change. The virtual absence of unemployment is probably due to a combination of factors, including the fact that Vietnam's income level is too low to permit people to be without work while job searching, and the wide availability of self-employment on a household farm or enterprise.

The Composition of Employment

Vietnam is still a highly agricultural country, with half of all workers working on family farms, but the share of agricultural employment is shrinking.

"Self-employment" is defined here in an unconventional way because of inconsistencies between the two rounds of the VLSS. The survey question asking whether the survey respondent was self-employed in his or her main job in the previous seven days was changed from the 1993 to the 1998 survey.[4] Using this self-employment question results in dramatic, but spurious, changes in type of self-employment between 1993 and 1998. To ensure comparability, tables 3.3, 3.4, and 3.5 use the questions about whether the respondent has worked in any job in the three sectors (wage employment, nonagricultural self-employment, and agricultural self-employment) during the previous week, so that the sector designations are not mutually exclusive. To make the sectors mutually exclusive, "wage employment" includes anyone who has worked in wage employment, whether it was the person's main job or not. "Nonagricultural self-employment" excludes anyone who has participated in any wage employment, and "agricultural self-employment" excludes anyone with any other employment. This tends to exaggerate the number of wage employees and nonagricultural self-employed at the expense of the agricultural self-employed, but it should not bias the rate of change over time.

The share of agricultural self-employment (family farms) fell from 52 percent in 1993 to 50 percent in 1998 (table 3.3). The 2 percentage point drop in

Table 3.3. Sectoral Composition of Employment
(percent)

Employment sector	*1993*	*1998*	*Change, 1993–98*
Wage employment	23.9	24.9	1.0
Agricultural self-employment	51.6	49.7	−1.9
Nonagricultural self-employment	24.5	25.4	0.9

Note: Sectoral employment is the percentage of workers ages 16 to 60 employed in each of the three sectors in the previous seven days. See text for definition of sector.

Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 3.4. Rural Composition of Employment, by Sex
(percent)

Sector	*1993*	*1998*	*Change, 1993–98*
Men			
Wage employment	24.5	26.3	1.8
Agricultural self-employment	57.4	54.8	−2.6
Nonagricultural self-employment	18.0	18.9	0.9
Women			
Wage employment	13.0	12.7	−0.3
Agricultural self-employment	67.1	66.1	−1.0
Nonagricultural self-employment	20.0	21.2	1.2

Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 3.5. Urban Composition of Employment, by Sex
(percent)

Sector	*1993*	*1998*	*Change, 1993–98*
Men			
Wage employment	50.9	53.0	2.1
Agricultural self-employment	12.9	8.2	−4.7
Nonagricultural self-employment	36.2	38.8	2.6
Women			
Wage employment	35.0	37.7	2.7
Agricultural self-employment	15.0	12.7	−2.3
Nonagricultural self-employment	50.0	49.6	−0.4

Source: Author's calculations from the 1993 and 1998 VLSSs.

the employment share of agricultural self-employment was equally shared by increased wage employment and nonagricultural self-employment. Wage employment and nonagricultural self-employment each grew to 25 percent of total employment.

Rural men's employment changed more decidedly than overall employment toward the wage labor market. Of the 3 percentage point fall in rural men's agricultural self-employment from 1993 to 1998, 2 percentage points went into wage employment, but only 1 percentage point went into nonagricultural self-employment.

Rural women's employment is the most highly agricultural, with two-thirds of employed women working on family farms. It also fell the least, by 1 percentage point. Rural women's wage employment also fell slightly, while nonagricultural self-employment expanded by 1 percentage point.

The changes in the urban sectoral composition of employment were more dramatic (table 3.5). For urban men, agricultural self-employment still accounted for 13 percent of employment in 1993, but it had fallen 5 percentage points by 1998. There was a roughly equal transfer of employment into nonagricultural self-employment and into wage employment, which made up 53 percent of all employment by 1998.

Urban women saw the greatest increase in wage employment, almost 3 percentage points from 1993 to 1998. The expansion of the wage employment came from a sharp reduction in agricultural self-employment and a small reduction in nonagricultural self-employment.

Agricultural employment shrank for everyone between 1993 and 1998. It fell twice as much in urban areas as rural areas, and twice as much for men as for women. Where the agricultural workers went differed for men and women. Men's employment expanded roughly equally into wage employment and nonagricultural self-employment in both urban and rural areas. Rural women's movement out of agricultural work was entirely absorbed by nonagricultural self-employment, while urban women's reduced participation in agriculture went entirely into wage employment.

This chapter will focus on wage employment of adults and its impact on inequality. Questions of agricultural and nonagricultural employment are left aside, but other chapters in this volume focus on agriculture (see chapter 5, by Dwayne Benjamin and Loren Brandt) and household enterprise (see chapter 4, by Wim P. M. Vijverberg and Jonathan Haughton).

Wage Growth

As shown above, there was a steady expansion of wage employment in Vietnam in the 1990s for men and urban women. What happened to wages as this expansion occurred? Despite the increase in the supply of wage workers, wages in Vietnam grew extremely rapidly. Average hourly wages increased by 10.5 percent per year in real terms between the 1993 and the 1998 VLSSs (table 3.6). Over the course of just five years, wage levels jumped by two-thirds. Wage growth was considerably faster than the growth in household income

Table 3.6. Wage Levels and Growth, by Region

Region	*1993 wage*	*1998 wage*	*Annual change, 1993–98 (percent)*	*Percent of 1998 Ho Chi Minh City wage*
Ho Chi Minh City	2.60	4.70	11.9	100.0
Hanoi	1.94	4.91	18.6	104.5
Medium urban	1.64	3.10	12.8	66.0
Small urban	1.81	2.91	9.5	61.9
Rural north	1.54	2.39	8.8	50.9
Rural central	1.50	2.41	9.5	51.2
Rural south	1.93	2.65	6.4	56.4
Total	1.85	3.13	10.5	66.6

Note: Wages are mean hourly compensation in thousand 1998 dong.
Source: Author's calculations from the 1993 and 1998 VLSSs.

per person in the same period, which grew at 8.7 percent per year, as well as output per person in the economy as a whole, which grew at 6 percent per year.[5]

Regional Wage Differences

Wage growth and wage levels were distributed unevenly across different regions of the country, with a split between the two primary cities—Ho Chi Minh City and Hanoi—and the rest of the country (table 3.6).[6] The two urban centers had higher wages than the rest of the country in 1993, and their wages grew much faster from 1993 to 1998.

In 1998, average Ho Chi Minh City and Hanoi wages were more than 50 percent higher than in all the other regions. Ho Chi Minh City wages started out 37 percent higher than all other regions in 1993, and grew 1 percentage point faster than overall wages from 1993 to 1998.

Wages in Hanoi were not much higher than wage levels in other parts of the country in 1993, but grew by 19 percent per year to become the highest wages in the country. In 1998 wages in Hanoi were even 5 percent higher than they were in Ho Chi Minh City.

Ho Chi Minh City and Hanoi together make up a significant part of Vietnam's wage labor market, accounting for 25 percent of all wage jobs in 1998, although they account for only 8 percent of the country's population (18 percent of all wage employment is in Ho Chi Minh City and 7 percent is in Hanoi).[7]

Outside Ho Chi Minh City and Hanoi, average wages were surprisingly similar across regions in 1993, and they had become even more similar by 1998. Regions with lower wages in 1993 are the ones that saw the largest wage increases in the 1993–98 period, and the regions with the highest wages initially tended to grow more slowly. Medium-size urban and rural central regions had the lowest average wages in 1993 and saw the largest

Table 3.7. Skilled, Private, Nonagricultural Wages, by Region

Region	*1993 wage*	*1998 wage*	*Annual change, 1993–98 (percent)*	*Percent of 1998 Ho Chi Minh City wage*
Ho Chi Minh City	2.34	5.57	17.3	100.0
Hanoi	1.50	5.75	26.8	103.1
Medium urban	1.53	3.16	14.5	56.7
Small urban	1.82	2.95	9.7	53.0
Rural north	1.90	2.58	6.2	46.4
Rural central	2.57	3.02	3.2	54.2
Rural south	2.23	3.62	9.7	65.1
Total	2.01	3.78	12.6	67.9

Note: Wages are mean hourly compensation in thousand 1998 dong.

Source: Author's calculations from the 1993 and 1998 VLSSs.

increase in wages by 1998. The rural south, which had the highest wages outside the two largest cities in 1993, saw the lowest increase in the following five years. With the exception of the two largest cities, labor markets seem to have been equilibrating over this period, with wages becoming more similar over the course of the decade.

The divergence of the largest cities from the rest of the country could be due to the fact that the demographic characteristics of workers and the kinds of employment are different in different parts of the country. If the best-educated, most productive workers are drawn to the main cities, the wage disparity could be due to differences in worker characteristics rather than differences in wages for the same kinds of workers. Table 3.7 makes wage rates more comparable across regions by restricting wages of those workers with at least a lower secondary school education, working for a private nongovernmental or non-state-owned enterprise, and a nonagricultural business. Wages for skilled, private, nonagricultural work show even faster growth and a stronger convergence across regions over the 1993–98 period than overall wages, again with the exception of the two primary cities. Hanoi had the lowest level of skilled private wages of any region in 1993 but caught up so fast that it had the highest wages of all by 1998, with wage growth of 27 percent per year.[8] When considering workers with high education and private, nonagricultural, employers, Hanoi and Ho Chi Minh City still have more than a 50 percent wage premium. Except for the rural south, the two largest cities have a 75 percent wage premium over the rest of the country for skilled private employment.

Hours Worked

At the same time that hourly wages grew extremely rapidly and employment shifted toward the wage labor market, hours worked in wage labor also increased rapidly, all of which contributed to the large rise in wage income.

Table 3.8. Average Annual Hours Worked in Wage Employment

Region	*1993*	*1998*	*Change, 1993–98 (percent)*
Ho Chi Minh City	2,176	2,365	8.7
Hanoi	2,022	2,113	4.5
Medium urban	2,027	2,184	7.7
Small urban	1,816	2,169	19.4
Rural north	1,113	1,460	31.2
Rural central	1,321	1,576	19.3
Rural south	1,276	1,628	27.6
Total	1,572	1,862	18.4

Source: Author's calculations from the 1993 and 1998 VLSSs.

On average, hours worked in wage employment increased by 18 percent from 1993 to 1998 (table 3.8). In 1993, there was a sharp difference between rural and urban wage employment in terms of total hours worked. Workers in medium-size and large cities worked, on average, about 50 percent more hours per year than rural wage laborers. Workers in Ho Chi Minh City worked the longest hours in 1993, averaging 2,176 hours per year. Assuming an eight-hour workday and a five-day workweek, this works out to 272 work days, or 54 workweeks.[9] These are long hours by any standard. Despite this, by 1998, working hours in Ho Chi Minh City had grown by 9 percentage points. Ho Chi Minh City, Hanoi, and medium-size urban centers had the highest average working hours in 1993, but their increases in working hours were more modest than the increases in rural areas and small urban centers. Rural areas and small urban centers partially caught up with the working hours in the medium-size and large cities between 1993 and 1998, with very large increases in rural wage labor working hours.

State-Owned Enterprise Employment

The Vietnamese government has made plans for the reform of state-owned enterprises (SOEs) since the beginning of *Doi Moi* in the late 1980s. Despite plans for staff reductions, the political commitment to reform has not always been clear because SOE employees are an important political constituency for the government. All of Vietnam's 5,740 SOEs are scheduled to be privatized or restructured by 2005 (Belser and Rama 2001), so it is useful to review what was accomplished between 1993 and 1998.

SOE personnel account for 5 percent of the labor force and more than 15 percent of wage employment. Surprisingly, SOE employment as a share of wage employment *grew* by almost 1 percent from 1993 to 1998 in the VLSS sample, from 15.9 to 16.7 percent (table 3.9). The estimates of SOE employment in the VLSS should be reasonably accurate because there is a sample of 340 SOE employees in 1993 and 563 employees in 1998.

Table 3.9. State-Owned Enterprise Employment

SOE employment measures	*1993*	*1998*	*Change, 1993–98 (percent)*
SOE share of wage employment (percent)	15.9	16.7	0.8
Average hourly wage in SOEs (thousand 1998 dong)	1.72	2.90	68.4
Share of SOE employees, female (percent)	7.6	7.4	−0.2
Share of all wage employees, female (percent)	43.0	39.8	−3.1

Source: Author's calculations from the 1993 and 1998 VLSSs.

The increasing share of SOE employment in wage employment occurred while wage employment was growing as a fraction of total employment (table 3.3), while employment participation was growing (table 3.1), and while the total population was growing. If we apply the total population growth of 8.3 percent from 1993 to 1998 (World Bank 2002, p. 108) to the working population, that implies that SOE employment grew by 20.2 percent from 1993 to 1998, or 3.7 percent per year.

Wage levels at SOEs mirrored the changes in other wage employment. SOE wages increased by 68 percent in real terms from 1993 to 1998, while all wages grew by 69 percent (table 3.9). SOE wages remained slightly lower than average wages in other jobs, at a steady 93 percent of average wages in both 1993 and 1998. Although SOE wages were typical of overall wages, the rapid increase in SOE wages in the 1990s is surprising during a period of planned retrenchments of SOEs.

The VLSS data show that SOE employment is predominantly male. Only 7.6 percent of SOE workers were women in 1993, and this stayed essentially the same in 1998. The small participation of women in SOEs is untypical of overall wage employment, where 43 percent of workers were women in 1993, although this fell to 40 percent by 1998.

Wage Employment Patterns

In sum, wage employment shows remarkable growth in wage levels and hours worked, as well as a more modest increase in the fraction of workers employed outside the home. Hanoi and Ho Chi Minh City maintain large wage premia, probably because the residency permit restrictions in these cities exclude people who were not born in the city. SOE employment levels showed a surprising 20 percent increase between the surveys, and SOE wages kept up with the rapid increase in overall wages.

Determinants of Wages

Which individual characteristics or employment characteristics determine how much an individual earns in the labor market? Previous work shows that wages are typically positively correlated with education levels and with work experience (at a decreasing rate).[10] In other countries, wages are typically negatively correlated with being female or being a member of an ethnic minority.[11] Wages also typically vary by regions within a country. In the case of Vietnam, where much of wage employment is still offered by the state and there is still a large amount of agricultural employment, indicators of private and nonagricultural employment also explain wage levels.

Returns to Education and Experience

The determinants of wages can be explored with a simple earnings equation:

$$\log(Wage_i) = \beta_0 + \beta_1 X_{1i} + \cdots + \beta_K X_{Ki}$$

where $Wage_i$ is the wage of individual i, $X_{1i}, \ldots, X_{Ki}$ are the K correlates of wages (such as education, experience, and so on), and $\beta_0, \beta_1, \ldots, \beta_K$ are the effects of the correlates on wages. Log(·) is the natural logarithm. With certain assumptions, the coefficient on education (β_1) can be interpreted as the internal rate of return to an additional year of schooling (Berndt 1991, p. 162).

The estimated effect of education and experience on wages is shown in table 3.10. The estimated rate of return to schooling in Vietnam in 1993 was quite low, just 2.9 percent. The rate almost doubled to 5 percent in 1998, but it is still very low compared with other developing countries. Psacharopoulos (1985, p. 588), for example, reports an average rate of return of 11 percent for

Table 3.10. Wage Regressions: Estimated Effect of Education and Experience

Independent variables	*1993*	*1998*	*Difference, 1998–93*
Schooling (years)	0.029	0.050	0.021
	(6.29)***	(14.61)***	(3.84)***
Experience (years)	0.033	0.025	−0.008
	(5.42)***	(4.80)***	(0.93)
Experience squared	−0.001	−0.001	0.000
	(5.37)***	(4.52)***	(0.66)
Constant	7.269	7.757	0.488
	(91.40)***	(128.23)***	(4.76)***
Observations	2,007	3,033	
R^2	0.04	0.08	

***Significant at 1 percent level.

Note: Absolute value of *t* statistics in parentheses.

Source: Author's calculations from the 1993 and 1998 VLSSs.

Asia, 13 percent for Africa, and 14 percent for Latin America, averaging over many similar studies using this model of wage determinants. The increase in the rate of return to schooling from 1993 to 1998 of 2.1 percent is statistically significant.

The average rate of return to a year of education was quite low in the 1990s, but there was considerable variation in the return to different levels of schooling, at least for private employment, as shown in chapter 16 of this volume. Particularly for the small number of university graduates in the sample, the return to a year of university in private employment was negligible in 1993 but had become a very good investment in 1998.

"Experience," which is actually years since completion of schooling, is strongly positively correlated with wages, but at a decreasing rate, as expected, and its effect shows no sign of changing from 1993 to 1998.

Table 3.11 shows a broader group of correlates of wages: being female, a member of a non-Chinese ethnic minority, having Chinese origins, working for a nonagricultural employer, working for a nongovernmental employer, and indicators of living in the two primary cities in Vietnam. The correlation of real wages with years of schooling is still strongly positive, though even lower with the inclusion of other correlates, and it still has a statistically significant increase from 1993 to 1998. Experience has a stable, positive correlation with wages.

Women in Vietnam earn much less than men with the same observable characteristics, although the difference in earnings decreased between 1993 and 1998. In 1993, wages for women were 31 percent less than for their male counterparts, even after controlling for education and experience.[12] The gap between men's and women's wages in Vietnam became smaller by 1998, when women's wages were 17 percent smaller. The wage gap between men and women halved between 1993 and 1998, a statistically significant change.

Non-Chinese ethnic minorities do not show lower wages in 1993, but they do show a 10 percent lower wage in 1998. Ethnic Chinese in Vietnam had a 25 percent wage premium in 1993, but this all but disappeared by 1998.

In both 1993 and 1998, nonagricultural employers paid higher wages, and in 1998, private employers paid a statistically significant higher wage than state employers.

The regression in table 3.11 properly tests whether the two primary cities, Ho Chi Minh City and Hanoi, have significant wage premia, other things being equal. Residents of both cities earn much higher wages than residents of other regions with the same characteristics. Workers in Ho Chi Minh City earned a remarkable 80 percent higher wage than rural or small and medium-size urban area residents with the same education, experience, and so on in 1998. Hanoi residents earned 47 percent higher wages in 1998 than Vietnamese living outside the two largest cities. There is no sign that the wage premia of Ho Chi Minh City and Hanoi fell during the period of 1993 to 1998.

Table 3.11. Wage Regressions: Broader Group Correlates

Independent variable	*1993*	*1998*	*Difference, 1998–93*
Schooling (years)	0.019	0.035	0.016
	(3.27)***	(8.01)***	(2.19)**
Experience (years)	0.027	0.028	0.001
	(4.72)***	(6.04)***	(0.15)
Experience squared	−0.001	−0.001	−0.000
	(4.71)***	(5.55)***	(0.29)
Female	−0.370	−0.182	0.188
	(10.69)***	(6.83)***	(4.27)***
Non-Chinese ethnic minority	0.030	−0.107	−0.137
	(0.39)	(2.05)**	(1.58)
Chinese origins	0.224	0.005	−0.220
	(2.66)***	(0.07)	(2.17)**
Nonagricultural employment	0.126	0.289	0.163
	(2.79)***	(6.42)***	(2.45)**
Private (nongovernmental) employer	0.001	0.082	0.081
	(0.01)	(2.38)*	(1.37)
Ho Chi Minh City	0.609	0.589	−0.020
	(11.19)***	(16.24)***	(0.32)
Hanoi	0.296	0.384	0.088
	(4.15)***	(6.58)***	(1.06)
Constant	7.353	7.530	0.177
	(71.91)***	(91.24)***	(1.24)
Observations	2,007	3,033	
R^2	0.18	0.22	

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.
Note: Absolute value of t statistics in parentheses.
Source: Author's calculations from the 1993 and 1998 VLSSs.

It should be noted that only 18 percent and 22 percent of the variation of wages in 1993 and 1998, respectively, were explained by the correlates in table 3.11 (as measured by the R^2 statistics), so the largest part of wage variation is due to other unidentified factors.

Table 3.12 shows the effect of correlates on wage levels in 1998 separately by seven regions. The regional differences are strong. The rates of return to schooling are especially low in the rural central region, in small urban areas, and in the rural south, where the rate of return is not significantly different from zero. The rate of return to schooling in Hanoi and the rural north is more than double the level in the three lowest regions, approaching a respectable 8.5 percent in Hanoi and 6.9 percent in the surrounding rural north.

The disadvantage of being female is similar around the country, except in the rural north and the rural central region, where women come closer to

Table 3.12. Wage Regressions, by Region, 1998

Independent variables	*Ho Chi Minh City*	*Hanoi*	*Medium urban*	*Small urban*	*Rural north*	*Rural central*	*Rural south*
Schooling (years)	0.054	0.085	0.045	0.032	0.069	0.027	0.015
	(6.11)***	(4.20)***	(3.86)***	(2.44)**	(4.63)***	(2.54)**	(1.59)
Experience (years)	0.019	0.029	0.022	0.047	0.026	0.020	0.035
	(1.76)	(1.58)	(1.79)	(3.15)***	(2.28)**	(1.63)	(3.54)***
Experience squared	−0.000	−0.001	−0.000	−0.001	−0.001	−0.000	−0.001
	(1.25)	(1.43)	(1.06)	(2.72)***	(2.44)**	(1.43)	(3.90)***
Female	−0.241	−0.284	−0.204	−0.196	−0.134	−0.066	−0.249
	(3.99)***	(2.40)**	(3.19)***	(2.84)***	(1.54)	(1.02)	(4.47)***
Non-Chinese ethnic minority	−0.345	1.561	0.116	−0.301	0.138	−0.067	−0.202
	(3.36)***	(15.18)***	(0.51)	(1.16)	(1.17)	(0.71)	(2.25)**
Nonagricultural employment	0.245	1.218	0.235	0.502	0.896	0.300	0.352
	(0.87)	(5.50)***	(1.74)	(3.02)***	(4.70)***	(3.48)***	(5.12)***
Private (nongovernmental) employer	0.012	0.014	−0.154	−0.052	0.260	0.406	0.057
	(0.15)	(0.11)	(1.98)**	(0.46)	(2.65)***	(5.07)***	(0.78)
Constant	8.093	6.480	7.774	7.205	6.312	7.384	7.727
	(24.73)***	(12.30)***	(32.66)***	(25.19)***	(22.52)***	(36.55)***	(51.21)***
Observations	556	215	499	402	270	433	658
R^2	0.13	0.19	0.13	0.12	0.23	0.15	0.16

**Significant at 5 percent level.
***Significant at 1 percent level.

Note: Robust t statistics in parentheses.

Source: Author's calculations from the 1993 and 1998 VLSSs.

obtaining their male counterparts' earnings. The disadvantage of being a woman is greatest in Hanoi, where average wages for women are 25 percent lower than wages for men with similar characteristics.

The disadvantage of being a non-Chinese ethnic minority varies widely across regions.[13] Only in Ho Chi Minh City and the rural south did ethnic minorities have statistically significantly lower wages in 1998—29 percent lower in Ho Chi Minh City and 18 percent lower in the rural south. In Hanoi, the wages of ethnic minorities were, on average, almost four times higher than the wages of Kinh and Chinese workers with the same observable characteristics. This may be due to a small sample effect, because this reflects just 16 persons out of the small Hanoi sample of 215 wage earners, but the coefficient remains significant and of similar size in a quantile regression (not shown).

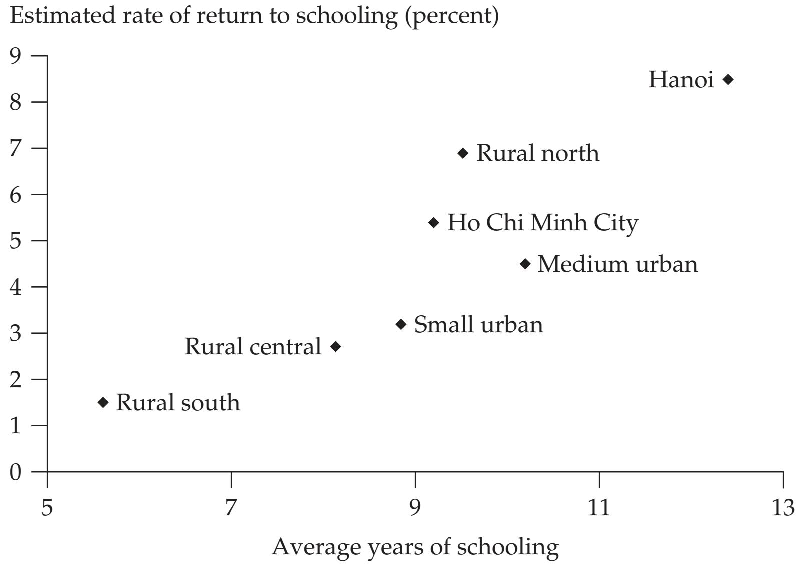
Nonagricultural employers paid higher wages in all the regions, but the effect was most pronounced in Hanoi, the rural north, and small urban areas. Private (nongovernmental) employers clearly paid a wage premium only in the rural north and the rural central region; this wage premium could be due to the traditionally strong communist roots in these two regions, which could motivate workers to take government jobs despite low government wages.

The most notable results from exploring the determinants of wage levels are very high wage premia in Hanoi and Ho Chi Minh City, and low returns to schooling in Vietnam. With the same observable characteristics, workers in the two primary cities earned 50–80 percent higher wages than similar workers elsewhere in the country. The high wages in the primary cities create disparities with the countryside and drive up the cost of doing business in two crucial markets. The wage disparities are underpinned by the system of household registration, which prevents nonnatives from obtaining residency permission in the primary cities except for those obtaining government jobs or (with difficulty) those sponsored by their employer. The distorting impact of this system is suggested by anecdotal evidence that residency papers for Hanoi and Ho Chi Minh City improve young people's marriageability and are even the basis for marriages of convenience.

The wage premia in the primary cities reported here are for registered residents. The VLSS data are based on household registration records, so unfortunately they leave out unregistered migrants to the primary cities. The unregistered migrants almost certainly find higher wages than they would have in the countryside, or they would not have moved to the city, but their wages are much lower than the wages of legal residents. The difficulty in obtaining residency status in the primary cities has created a strong disparity between native residents and the class of illegal residents who are dispossessed by law. The unregistered migrants are not allowed to use government services, including education and health care, nor can they obtain jobs in most registered businesses.

The labor market rate of return to schooling in Vietnam is quite low, though it seems to have improved during the 1990s. Figure 3.2 shows the strong correlation between estimated rates of return to schooling and average level of schooling across regions. It points to a vicious cycle in regions with

Figure 3.2. Levels of Schooling versus Labor Market Returns to Schooling by Region, 1998



Source: Author's calculations from 1998 VLSS data.

low education, because the rate of return is lowest in those parts of the country with the lowest education levels, and the rate of return to education is highest in the regions with highest education. This pattern may be explained by poor education quality in regions with low educational attainment.

There is also a significant male-female wage gap, although it diminished during the 1990s.

Methods for Measuring Inequality

The previous sections explored the remarkable growth of Vietnamese wages in the 1990s. The rest of the chapter will examine the impact of wage employment on inequality in Vietnam, starting with a consideration of a number of different measures of inequality that have desirable properties.

Inequality measures are chosen according to three criteria: (a) they satisfy the principle of transfers, (b) they are additively decomposable across subgroups, and (c) they can handle negative income values.[14] The principle of transfers is the intuitively appealing requirement that a transfer of income from a poorer to a richer person will increase the measure of inequality, as long as the transfer is not so large as to reverse the two persons' relative positions. All the commonly used inequality measures satisfy the principle of transfers. In particular, the Gini coefficient, the generalized entropy measures, and the Atkinson inequality measures all adhere to the principle of transfers.

The decomposition of inequality across a set of groups is useful for assessing how much of total inequality is due to differences *within* the groups and how much is due to differences *between* the groups. These groups can be any mutually exclusive subgrouping of the population, such as region of residence or a household characteristic. Among inequality measures with standard characteristics, only the generalized entropy measures of inequality are additively decomposable, where the inequality within subgroups and the inequality between subgroups sum to total inequality (Shorrocks 1984).

The decomposition of inequality across the source of income is a different problem because the sources are not mutually exclusive categories. Many households have income sources from more than one sector, for example, from farming and wage employment. The additive decomposition of inequality across sources or uses of income is possible for any inequality index, and Shorrocks (1982) shows that there is only one rule for decomposing the inequality that satisfies a small number of reasonable properties.

Only two of the common inequality measures that satisfy the principle of transfers are well defined for negative income levels, such as occur when there are year-on-year losses to farm and enterprise self-employment: the Gini coefficient and one of the generalized entropy measures (I_2, which is half the squared coefficient of variation).

This study uses four measures of inequality: the Gini coefficient and three generalized entropy inequality measures (see appendix 3A for formal definitions of the inequality measures). The Gini coefficient is probably the most commonly used inequality measure, and it can be defined as a multiple of the covariance of individual income and the rank of individual income divided by average income. The Gini coefficient ranges between zero (perfect equality) and one (perfect inequality).

The generalized entropy measures of inequality are designated I_α, where the more positive the α parameter, the more sensitive the index is to differences at the top of the income distribution rather than the bottom. This chapter uses I_0 (also known as the mean logarithmic deviation), I_1 (also known as the Theil index), and I_2 (one-half the squared coefficient of variation).

For mutually exclusive groups of people, a generalized entropy income inequality index for the whole population decomposes into a weighted sum of the inequality indexes of the groups that make up the whole. Generalized entropy indexes I_α can be written as the sum $I_\alpha = I_{\alpha W} + I_{\alpha B}$ of the total within-group inequality $I_{\alpha W}$ and between-group inequality $I_{\alpha B}$.[15] The formulas for $I_{\alpha W}$ and $I_{\alpha B}$ are in appendix 3A.

The solution for decomposing the share of inequality from income sources is simpler and more elegant (see equation 3.1). For any J sources of income, overall income inequality can be decomposed into the inequality contributed by each source:

$$I = \sum_{j=1}^{J} \frac{\operatorname{cov}(y_j, y)}{\operatorname{var}(y)} I, \tag{3.1}$$

where cov(·) is the sample covariance and var(·) is the sample variance. Because the inequality index I appears on both sides of the equation, it implies that the shares of inequality sum to one, and that they are independent of any particular inequality index chosen. Our interest is the relative contribution of each income source; thus, the actual inequality index can be dispensed with entirely. Note that if the covariance of the income from a particular source is negatively correlated with total income, that income source makes a *negative* contribution to total inequality. In particular, income sources characteristic of poor households may contribute negatively to inequality—when these sources predominate in the household, total income is lower, resulting in a negative correlation.

Measurement Bias

Measurement error is a serious problem when studying inequality, even more serious than when studying other issues. Averages and growth rates of averages are typically unbiased in the presence of random measurement error, due to the law of large numbers. Inequality measures, in contrast, are typically biased and inconsistent in the presence of measurement error. Inequality is a measurement of variability, which is systematically increased by errors. Positive and negative errors balance out in a sample average, but both positive and negative errors add to the variance.

More important for this study than biases in the estimated level of inequality is that different income sources are likely to suffer from very different levels of measurement error. Wage incomes are usually well known by the survey respondents and others, making them easier to report accurately. Income from household farms and household enterprises is very difficult for the household and the researcher to calculate correctly. If household self-employment income has systematically large measurement error, household enterprises would appear (spuriously) to contribute a great deal to inequality compared to wage employment, even when true income from both sources has the same inequality.

Most inequality indexes depend on the variance of some transformation of income. The bias to inequality measures caused by measurement error is easily seen in the case of the I_2 inequality measure, which is the sample variance of income divided by its sample mean squared. If measured income y_i^* is assumed to be equal to actual income y_i plus a mean zero measurement error ε_i, with variance σ_ε^2, then:

$$y_i^* = y_i + \varepsilon_i.$$

Actual income y_i has mean μ and variance σ^2 and is uncorrelated with the measurement error. Average measured income $\bar{y}^*$ is unbiased, $E(\bar{y}^*) = E(\bar{y}) = \mu$, but the sample variance of measured income *is* biased, $\text{var}(y^*) = \text{var}(y) + \text{var}(\varepsilon) = \sigma^2 + \sigma_\varepsilon^2$. This causes inequality measures such as I_2 to be inconsistent when income is measured with error:

$$I_2^* = \frac{\text{var}(y^*)}{2\bar{y}^{*2}}$$

$$\text{plim}\, I_2^* = \frac{\sigma^2 + \sigma_\varepsilon^2}{2\mu^2} > \frac{\sigma^2}{2\mu^2} = \text{plim}\, I_2.$$

The larger the measurement error, the larger the bias in the inequality index.[16]

In a similar way, if the relative contribution to inequality is calculated from different income sources using Shorrocks' formula in equation 3.1, the calculated contribution to inequality of income from sources that are poorly measured would be greater than the calculated contribution of income sources measured more accurately, simply as a result of measurement error. This is shown formally in appendix 3B.

Measurement Error in Income

Measurement of household income is fraught with error, especially in low-income countries. Survey respondents may be reluctant to state their true incomes; this is especially true where household farm and nonfarm enterprises predominate, as in Vietnam, and households may not even know their precise incomes. Calculating net revenue for household enterprises requires aggregating large numbers of recurrent input and labor costs and product sales, as well as addressing intractable practical and conceptual problems. How does one account for home production, barter arrangements, and, especially, purchases of expensive capital equipment that will provide services over many years? The VLSS makes a valiant effort to measure *all* of these items across hundreds of categories of inputs and outputs, but the overall aggregation of household net revenues nonetheless inevitably contains substantial errors. There are quite extreme positive and negative outliers in farm and nonfarm household net revenues. There is no practical way to ensure that answers to all these questions about components of household net revenues add up to a consistent inventory of costs and revenues (although it would be interesting to confront the survey respondents with the calculated net result to see if they felt it corresponded to reality!). Researchers using the calculated household net income often resort to more or less arbitrary ways of trimming the outliers, but this does nothing to solve the problem of statistical bias caused by measurement error.[17]

Researchers usually work around this problem by ignoring the income data and using instead the household expenditure data that are more accurately measured. In fact, household expenditure—that is, consumption—is what should be measured, because it is a direct measure of the material well-being attained by the household.

Household expenditure can be thought of as an estimate of "permanent income" (Friedman 1957). Household consumption decisions and well-being depend on the household's assessment of the smoothed expected income rather than on the fluctuating annual transitory income. Because we care about the inequality in household well-being rather than inequality of transitory annual income, the measured annual income could be viewed as subject to two kinds of measurement error. One is the mismeasurement of annual income due to imperfect collection of household information; the other is the mismeasurement of permanent income using accurately measured annual income data. In a context of highly variable annual income from year to year, inequality in well-being using household income data will be overestimated when households are able to smooth consumption.[18]

The simple solution of using household expenditure data rather than income data for inequality calculations does not work when studying income sources. Expenditure does not tell us how wage employment, relative to other sources, contributes to household income. Using income data directly for investigating the contribution of wages to inequality is especially problematic, because measurement errors are large for household self-employment earnings, but the errors in wage earnings data are probably much smaller. Survey respondents usually know precisely what they are paid, and they know that people around them already have a good idea of what they earn, so they have less reason to hide what they earn.[19] This makes calculating the contribution to income inequality of wage employment versus household production misleading. Even with exactly the same distribution of income from wage employment as from household self-employment, measurement errors in the self-employment data would spuriously show that self-employment contributes much more to income inequality, giving the false impression that wage employment is an equalizing force. In addition, household farm and nonfarm production revenues are inherently variable because of natural weather and market fluctuations, whereas wage payments are relatively stable. The distribution of well-being is what is important here; thus, estimating the inequality contribution of household production income versus wage employment income, even with perfectly measured annual income data, would also spuriously show that household production was disequalizing, even when permanent income actually had the same inequality across the income sources.

Nevertheless, the contribution of wage employment versus household production to the distribution of household income can be consistently estimated by combining the data on source-specific income with total expenditure data. Because the measurement errors for income are generally uncorrelated with the measurement errors in expenditure, we can derive an estimator for which measurement errors cancel out as in averages and do not accumulate as in variances. The result is a consistent estimate of the contribution of income sources to inequality, as shown formally in appendix 3B.

Vietnamese Wage Inequality

The methods described in the previous section can be applied to look empirically at the relationship between wages and distribution in Vietnam using the two VLSSs, but first we look at average wages by quintile.

Table 3.13. Wages, by Quintile

Quintiles	*1993 wage*	*1998 wage*	*Annual percent change*
Poorest quintile	0.59	1.18	13.8
Middle three quintiles	1.60	2.58	9.6
Richest quintile	3.94	7.01	11.5
Total	1.87	3.13	10.3

Note: Wages are mean hourly wages in thousand 1998 dong.
Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 3.14. Changes in Wages, by 1993 Quintile

Quintiles in 1993	*1993 wage*	*1998 wage*	*Annual change (percent)*
Poorest quintile in 1993	0.61	2.07	24.4
Middle three quintiles in 1993	1.60	3.03	12.8
Richest quintile in 1993	3.82	4.80	4.6

Note: Wages are mean hourly wages in thousand 1998 dong.
Source: Author's calculations from the 1993 and 1998 VLSSs.

The distribution of wages equalized to some extent during the 1990s (see table 3.13). Wage earners can be divided into the "rich," the highest 20 percent of wages (the highest quintile), the "middle class" with the middle 60 percent of wages (the three middle quintiles), and the "poor" with the lowest 20 percent of wages (the lowest quintile). The wages of the poor grew at 14 percent per year, which was faster than the growth in the wages of the middle class (which was 10 percent per year) and the rich (12 percent per year). Note that households in the rich, middle, and poor categories in 1993 are not necessarily the same households in those categories in 1998.

Since the VLSS reinterviewed the same households in 1998 that were in the original 1993 survey, evidence of what happened to those who were in the poorest or richest quintile in 1993 can be seen (table 3.14). There was a high degree of earnings mobility, both up and down.[20] Of those who started out in the poorest quintile in 1993, only 34 percent were among the poorest in 1998. Because of this wage mobility, average wages of the poorest 20 percent in 1993 grew, on average, 24 percent per year. However, of those in the richest 20 percent in 1993, only 54 percent were still among the richest wage earners in 1998, and average wages of the richest in 1993 grew by only 5 percent per year.

It is also possible to look back from the perspective of those who ended up in the richest or poorest quintile of earners in 1998 (see table 3.15). The picture is quite different from this angle. Those who ended up the poorest actually

Table 3.15. Changes in Wages, by 1998 Quintile

Quintiles in 1998	*1993 wage*	*1998 wage*	*Annual percent change*
Poorest quintile in 1998	1.25	1.20	−0.7
Middle three quintiles in 1998	1.78	2.66	8.1
Richest quintile in 1998	2.81	6.40	16.4

Note: Wages are mean hourly wages in thousand 1998 dong.
Source: Author's calculations from the 1993 and 1998 VLSSs.

saw their average wage decline by 1 percent in the previous six years, while those who were the richest saw their wages grow by 16 percent per year. How can the prospective view of the richest and poorest in 1993 look so different from the view in hindsight in 1998? The poor in 1993 were not the same group as the poor in 1998. Most of the poorest wage earners in 1993 did not stay poor, and most of the poor in 1998 did not start out poor in 1993. Only 34 percent of those who were the poorest in 1998 had started out poor in 1993. This great churning within the labor market showed that those who held a job throughout this period had many opportunities to succeed and to fail. There was a strong tendency of regression to the mean—receiving especially low or especially high wages was usually a transitory phenomenon.

The simple table of wages by lowest, middle, and highest quintiles in table 3.13 suggests that the distribution of wages became more equal over the 1990s. This is confirmed by the summary measures of wage inequality in tables 3.16 and 3.17. The statistics calculated are I_0, I_1, I_2, and the Gini coefficient, as defined in appendix 3A. Overall wage inequality in Vietnam indeed fell from 1993 to 1998 by all measures except I_2, which most strongly weights high-wage earners.

The overall pattern of decreasing wage inequality contrasts sharply with what happened in the medium-size and large cities. Hanoi, Ho Chi Minh City, and the second-tier medium-size urban centers had by far the lowest wage inequality in 1993. They are also the only regions of the country to see a rise in wage inequality over the 1990s. Wage inequality in Hanoi and Ho Chi Minh City rose quickly, while it stayed the same in medium-size urban areas and fell sharply in the rest of the country. It is likely that this unusual pattern in wage inequality, similar to the wage premia in the two largest cities, is influenced by the residency permit restrictions that are enforced there. In fact, wage inequality was probably worse in 1998 than these statistics show: The VLSS sample does not properly cover illegal migrants into the two largest cities, who lack residency permits, because the survey sample was drawn from local residency records. The illegal migrants almost surely have among the lowest wages in the large cities.

Another factor that could explain the low inequality in 1993 and the high inequality in 1998 for the medium-size and large cities is the prevalence of government employment there. In 1993, government employment was likely a large part of the wage labor market, which tends to equalize wages,

Table 3.16. Inequality Measures of 1993 Annual Wages, by Region

Regions	I_0	I_1	I_2	*Gini*
Ho Chi Minh City	0.204	0.178	0.221	0.312
Hanoi	0.188	0.182	0.210	0.332
Medium urban	0.239	0.236	0.318	0.365
Small urban	0.351	0.306	0.388	0.420
Rural north	0.310	0.261	0.301	0.393
Rural central	0.242	0.231	0.276	0.372
Rural south	0.322	0.263	0.303	0.394
Total within group	0.280	0.238	0.304	n.a.
Between groups	0.036	0.039	0.044	n.a.
Overall	0.316	0.277	0.348	0.403

n.a. Not applicable.

Note: The Gini coefficient cannot be consistently decomposed into total within-group and between-group changes.

Source: Author's calculations from the 1993 VLSS.

Table 3.17. Inequality Measures of 1998 Annual Wages, by Region

Regions	I_0	I_1	I_2	*Gini*
Ho Chi Minh City	0.264	0.259	0.359	0.378
Hanoi	0.243	0.232	0.311	0.355
Medium urban	0.223	0.216	0.281	0.351
Small urban	0.241	0.243	0.356	0.362
Rural north	0.190	0.163	0.170	0.314
Rural central	0.158	0.144	0.162	0.290
Rural south	0.235	0.211	0.250	0.351
Total within group	0.222	0.218	0.329	n.a.
Between group	0.039	0.042	0.046	n.a.
Overall	0.261	0.260	0.375	0.377

n.a. Not applicable.

Source: Author's calculations from the 1998 VLSS.

because government wage levels tend to be similar across jobs. These cities are also the locations that saw the greatest structural transformation during the 1990s; thus, government employment played a much smaller role in 1998.

The three generalized entropy inequality indexes—I_0, I_1, and I_2—allow us to compare the within-region inequality versus the between-region inequality in wage rates. Despite the wage premia in the two largest cities, between-region inequality accounted for only between 12 percent and 15 percent of overall wage inequality in 1998, depending on the index (table 3.17). The balance of the inequality is due to variation within regions. Eliminating the cross-regional differences in wages would have some effect on wage inequality, but most of it would remain.

Wages and Income Inequality

If wage inequality fell between 1993 and 1998, what happened to the contribution of wages to overall income inequality? In this section, the impact of wages on income inequality is measured, using both the simple, but biased, method in equation 3.1 and the consistent method derived in appendix 3B.

The inequality of household expenditure per person (as a measure of permanent income) rose from 1993 to 1998 (table 3.18) at the same time that the inequality of wages was declining. Depending on the inequality measure, inequality rose by 5 percent to 13 percent. Wages are the major source of income for only a minority of Vietnamese households (only 18 percent of households in 1998, accounting for 21 percent of household expenditure per person—see table 3.19). Fifty-four percent of households depend on farming for their main income source, and another 18 percent rely on income from a household enterprise for their main income. The remaining 10 percent get most of their income from other sources in a given year, primarily overseas remittances and other gifts, with some interest and leasing income.

Farming households have the lowest average per capita expenditure, only 60 percent of the income of predominantly wage employment households. But the average expenditures of wage-earning households are not the

Table 3.18. Inequality of Household Expenditure Per Capita

Year	I_0	I_1	I_2	*Gini*
1993	0.188	0.211	0.308	0.339
1998	0.207	0.235	0.347	0.357

Source: Author's calculations from the 1998 VLSS.

Table 3.19. Per Capita Household Expenditure, Broken Down by Main Income Source, 1998

Income source	*Population share*	*Mean household expenditure per capita (dong)*	*Ratio of income source to overall average household expenditure per capita*	*Share of total household expenditure per capita*
Farming	0.541	2,157	0.722	0.391
Household enterprise	0.176	4,019	1.345	0.237
Wage employment	0.179	3,570	1.195	0.214
Other income sources	0.103	4,574	1.531	0.158

Source: Author's calculations from the 1998 VLSS.

Table 3.20. Decomposition of Household Income Inequality, by Source, 1993

Income source	*No correction Share of inequality (percent)*	*Consistent estimates Share of inequality (percent)*	*Share of income (percent)*
Farming	4.0	−5.2	36.3
Household enterprise	40.2	40.4	25.0
Wage employment	15.1	17.0	22.9
Other income	40.6	47.9	15.8

Source: Author's calculations from the 1993 VLSS.

Table 3.21. Decomposition of Household Income Inequality, by Source, 1998

Income source	*No correction Share of inequality (percent)*	*Consistent estimates Share of inequality (percent)*	*Share of income (percent)*
Farming	15.6	−3.4	39.0
Household enterprise	39.3	38.9	24.1
Wage employment	17.0	29.3	19.3
Other income	28.1	35.2	17.6

Source: Author's calculations from the 1998 VLSS.

highest. Households running their own businesses had an average per person expenditure 13 percent higher than wage-earning households, and households that receive their main incomes from other sources do even better, on average.

As discussed above, household income data suffer from substantial measurement errors, especially for farms and household enterprises, because income must be netted out of the large number of costs and revenues. Measurement errors tend to be large, and less obvious to survey respondents, when income is the difference between much larger numbers, the costs and revenues.

Tables 3.20 and 3.21 (in the columns labeled "No correction") present the biased calculation of the share of inequality attributed to each income source using the formula in equation 3.1. The "Consistent estimates" column in tables 3.20 and 3.21 presents the consistent calculation of inequality shares using the formula in appendix 3B.

There are large differences between the uncorrected estimates and the consistent estimates of inequality shares. Farming's contribution to inequality is overestimated by the biased calculation, and the contribution of wage employment and other income is underestimated. In both 1993 and 1998, the biased estimate shows that farming contributes to inequality, while the consistent estimate shows that farm income actually reduces income inequality. In 1998, the differences are especially dramatic. The biased calculation gives the impression that farming contributes about as much as wage employment to total income inequality. In fact, the consistent estimates show that wage employment contributes 33 percentage points more than farming income of total inequality. Whereas wage employment accounts for 29 percent of total income inequality in 1998, farming income reduces inequality by 3 percent. The consistent estimates also show how important "other income"—largely overseas remittances—is to income inequality, contributing almost one-half of all inequality in 1993, despite providing the smallest share of income, at 16 percent. The income share of other income rose to 18 percent in 1998, but its contribution to inequality fell to one-third of the total, presumably because remittances were being spread more equally among households in 1998.

The share of inequality due to wage employment increased from 26 percent in 1993 to 33 percent in 1998, at the same time that the inequality of wages declined. This is possible because wage income was strongly negatively correlated with other income sources in 1993, but essentially uncorrelated with other income sources in 1998.[21] In other words, comparing 1998 with 1993, high-wage earners are more likely to be in households with high incomes from other sources, such as farming and household businesses. In fact, all income sources have become both less negatively correlated with other sources and less variable from 1993 to 1998, but the negative correlation of wage income fell more than for the other income sources. This pattern suggests a diversification of economic activity within the household that one would expect from the period of rapid development that Vietnam has experienced in the past decade.

Another way of quantifying the contribution of wage employment to household inequality that proves useful for projecting future inequality is to divide households according to their primary income sources and decompose household expenditure inequality by type of household. Tables 3.22 and 3.23 show that households whose income source is predominantly farming have expenditure much more equally distributed than nonfarm households. Inequality of household expenditure among other kinds of nonfarm households is roughly similar, with the highest inequality among households whose income source is predominantly wage employment. Wage employment households had the highest inequality among household types in 1998, even though the previous analysis showed that wage employment income is responsible for a smaller share of household inequality than enterprise income (table 3.21), because high-income wage employment households are more likely to have extra income from nonwage sources. Households that earn income predominantly from wage employment had higher inequality in 1998 than in 1993 as a result of earned income from other sources, not from high inequality of the wages themselves.

Table 3.22. Inequality Measures of Household Expenditure, Per Capita, by Main Income Source, 1993

Main income source	I_0	I_1	I_2	*Gini*
Farming	0.115	0.124	0.161	0.263
Household enterprise	0.186	0.199	0.267	0.336
Wage employment	0.185	0.192	0.236	0.337
Other income sources	0.269	0.284	0.401	0.401
Within group	0.154	0.176	0.271	n.a.
Between group	0.033	0.035	0.037	n.a.
Total	0.188	0.211	0.308	0.339

n.a. Not applicable.

Source: Author's calculations from the 1998 VLSS.

Table 3.23. Inequality Measures of Household Expenditure, Per Capita, by Main Income Source, 1998

Main income source	I_0	I_1	I_2	*Gini*
Farming	0.103	0.106	0.125	0.251
Household enterprise	0.198	0.213	0.286	0.349
Wage employment	0.250	0.267	0.375	0.390
Other income sources	0.220	0.234	0.308	0.367
Within group	0.158	0.186	0.297	n.a.
Between group	0.048	0.048	0.049	n.a.
Total	0.207	0.235	0.347	0.357

n.a. Not applicable.

Source: Author's calculations from the 1998 VLSS.

The consistent estimates of the contribution of each income source to total income inequality show that wage employment contributes almost one-third of income equality—about on par with household enterprise income and other income, even though it contributes only about 20 percent of total income. Farm income, instead of being a substantial contributor to inequality as the uncorrected estimates make it appear, actually reduces household income inequality. The decomposition of household expenditure inequality by predominant income source also shows that predominantly wage employment households, household enterprise households, and other income households have similar levels of inequality, while farm households are substantially more equal.

Projections of Future Inequality

The previous section showed that predominantly wage income households are roughly similar to predominantly household enterprise and to "other income" households, both in terms of inequality and in terms of income levels. Farming households, however, are quite distinct. They have much less within-sector inequality, and they have a much lower average income level.

One of the clearest historical patterns of economic development is the shrinking role of the agricultural sector as the economy grows, both as an employer of labor and as a share of output. Farms now make up one-half of all households in Vietnam. Farm households are very different from other households, they are a large part of the economy, and their relative number will diminish as the economy grows. This means that inequality can be expected to change in the near future. Inequality in Vietnam will rise over time as the proportion of equally distributed farming households falls in the economy.

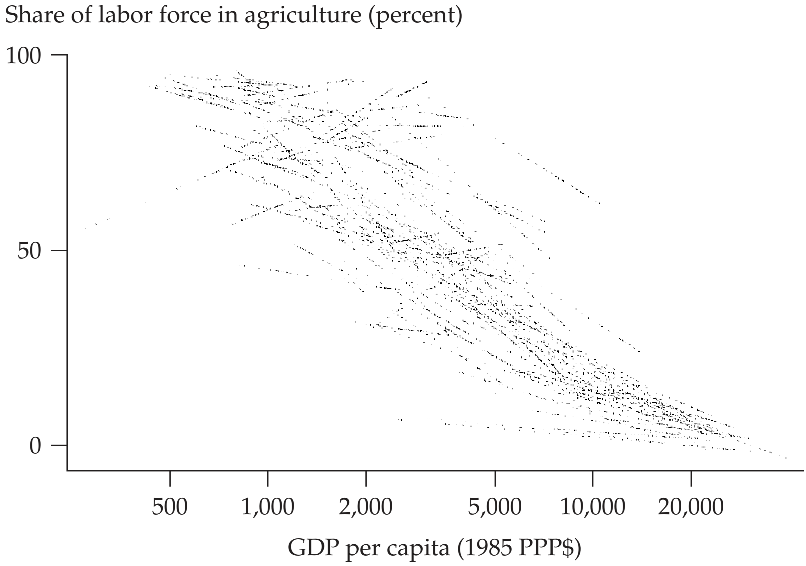
Empirical predictions of how fast inequality will change can be made as the Vietnamese economy develops by examining the relationship between the decline of agriculture and economic development in other countries around the world. The relationship between income growth and the share of labor in agriculture and the relationship between income growth and the ratio of agricultural income to total income are both well-established international patterns. By estimating these relationships from historical data—and assuming that inequality *within* the farming and nonfarming sectors remains unchanged—the future course of inequality can be predicted as a function of economic growth.

The predictions of future changes in inequality in this section have a mechanical quality to them, but they result from a mechanism from which Vietnam will find it very difficult to escape. As long as agriculture grows more slowly than the rest of the economy, overall income inequality will worsen unless inequality in the nonagricultural part of the economy declines sharply over time. Over the 1990s, in fact, inequality within households that earned income predominantly from household enterprise and wage employment *increased* (tables 3.22 and 3.23). There is no reason to be sanguine that inequality in nonagricultural households will decrease in the near future sufficiently to overcome the worsening inequality due to the gradual transition out of agriculture.

The predictions are predicated on a continuation of Vietnam's recent economic growth. If growth occurs more slowly, the worsening inequality due to the transition out of relatively equal agriculture will occur more slowly than shown in these predictions.

Statistics from the previous section confirm that farm households have more equally distributed income and lower income levels than nonfarm households, and that nonfarm households have similar income distributions and levels across sectors. The generalized entropy indexes of inequality in table 3.22 are one-half the level for farming than for other income sources. Predominantly farming households have 54 percent of the average income of nonfarming households (table 3.19). The inequality indexes for households whose main income sources are household enterprise, wage employment, or other income sources all have inequality indexes within 8 percent of each other (table 3.22) and average incomes within 30 percent of each other (table 3.19).

Figure 3.3. Agricultural Labor Force Compared with Income Level



Note: GDP = Gross domestic product. PPP = Purchasing power parity. Data points are country-specific least squares trend lines for 114 countries between 1960 and 1990.

Source: World Bank 2000b.

To estimate the relationship between income level (as measured by gross domestic product [GDP] per person) and share of labor force in agriculture, and between income level and agricultural output relative to total output, cross-country time-series data are used.[22] Figure 3.3 shows the cross-country relationship between GDP per capita and the share of labor force in agriculture. The data come from 111 countries with an average of 30 observations per country. To emphasize the patterns over time, the data shown for each country in figure 3.3 are actually points on country-specific log linear trend lines to highlight the relationship in each country. Only 4 percent of the countries had positive income growth and an increasing share of the labor force in agriculture. Of the 15 percent of countries with an upward sloping trend to the share of labor in agriculture, 11 percent were countries with shrinking incomes, so the share of labor force in agriculture fell even though the economy was getting poorer. This suggests that the share of agriculture falls over time independently of income growth due to technical change.

The estimated relationship between the share of labor force and GDP per capita using cross-country data shows a strong decline in the share of agricultural labor as the income level rises (table 3.24, second column). The regression includes country-specific constants and a time trend, which shows a clear but small decline in the share of agricultural labor over time of 0.5 percentage point per year. The simple regression is able to explain 73 percent of all the cross-country variation in the labor force share in agriculture.

Table 3.24. Agriculture, in Relation to Income, across Countries

Independent variables	*Agricultural labor share*[a]	*Agricultural output per capita ratio*[b]
GDP per capita (log of 1996 PPP, US$)	−0.056	−0.200
	(20.65)***	(26.33)***
Time (year 1960 = 1)	−0.0045	0.0042
	(57.59)***	(20.48)***
Constant	9.87	−6.18
	(69.67)***	(16.41)***
Observations	3,399	2,926
Number of countries	114	106
R^2	0.73	0.21

*** Significant at 1 percent level.

Note: PPP = purchasing power parity. Absolute value of *t* statistics in parentheses. Both regressions include country-specific constants.

a. Agricultural labor share is the fraction of agricultural workers in the total labor force.

b. Agricultural output per capita ratio is the ratio of agricultural value added per worker to GDP per capita.

Source: Author's calculations from data described in the text.

The ratio of agricultural income per person to average income per person is also strongly correlated with the level of income per person and time (table 3.24, third column). Agricultural incomes are lower relative to nonagricultural incomes at higher GDP per capita levels, but agricultural incomes become more similar to nonagricultural incomes over time, probably as a result of technical changes in agriculture. The net effect for a country growing at the rate of Vietnam in the 1990s is a decrease in agricultural incomes relative to nonagricultural incomes. The agriculture income–share regression explains 21 percent of the cross-country variation.

The inequality projection is based on the assumption that the Vietnamese economy continues to grow at the rate at which it has for the previous decade: GDP per capita grew 5.5 percent per year from 1988 to 1998. In other words, this is a projection of what would happen to income inequality if economic growth in Vietnam were to continue as it has in the recent past.

The inequality projections are shown in table 3.25. The first column shows the actual figures for 1998, and the second and third columns show the projections for 2003 and 2008, respectively. The projection of the proportion of labor in agriculture depends on the first regression estimates from table 3.24, and it shows a decline of 3.8 percent every five years. The projection of future agricultural GDP per worker depends on the second regression estimates in table 3.24, and this shows that agricultural GDP per worker as a fraction of overall GDP per capita declines by 3.4 percent every five years.

The within agriculture—and within nonagriculture—income inequalities are assumed to stay constant at the 1998 level and are measured by the I_0 inequality index. The total within-inequality measure depends on the

Table 3.25. Inequality Projections, 2003 and 2008

Indicator	*1998 (actual)*	*2003 (projected)*	*2008 (projected)*
GDP per capita[a]	325	428	563
GDP per capita growth[b] (percent)	5.5	5.5	5.5
Proportion of labor in agriculture[c] (percent)	54.1	50.3	46.5
Agricultural GDP per worker[d]	234	293	367
Nonagricultural GDP per worker[d]	432	564	734
Inequality of agricultural income (I_0)[e]	0.103	0.103	0.103
Inequality of nonagricultural income (I_0)[e]	0.223	0.223	0.223
Total within inequality (I_0)	0.158	0.163	0.167
Inequality between agriculture and nonagriculture (I_0)	0.047	0.052	0.058
Total income inequality (I_0)	0.205	0.215	0.225
Change in inequality (since five years before) (percent)	9.6	4.9	4.4

a. For 1998, this is the purchasing power parity (PPP) gross national product (GNP) per capita estimate for Vietnam (World Bank 2000b). The 1998 level of GNP per capita is not used in the projections.

b. The rate for Vietnam for 1988–98 is 5.5 percent real growth of GDP per capita (World Bank 2000b).

c. The 1998 value was estimated by proportion of working-age individuals in predominantly agricultural households in the 1998 VLSS (table 3.18).

d. The 1998 value was estimated from the ratio of average expenditures per person of predominantly agricultural and nonagricultural households (table 3.18).

e. All values are set to the 1998 value estimated from the VLSS (table 3.22).

Source: Author's calculations from data described in the text.

proportion of households in agriculture (which is taken to be equal to the proportion of labor in agriculture). As the proportion of the labor force in agriculture declines going forth to 2003 and 2008, total within-inequality increases because agricultural households have lower inequality and their share of households is shrinking.

Between-inequality also increases because average agricultural and nonagricultural incomes are diverging. Taking the sum of the within and between measures of inequality, total inequality increases by 4.9 percent from 1998 to 2003, and 4.4 percent from 2003 to 2008. This compares with an actual increase to I_0 of 9.6 percent from 1993 to 1998.

This projection shows with numbers that the secular decline in agriculture as the economy grows will increase inequality because of a shift in the composition of households, because Vietnamese agricultural households have much less inequality than nonagricultural households. The second effect captured in the projections is that the relative incomes of the average agricultural household and the average nonagricultural household will continue to diverge as the economy grows, causing the between-sector inequality to grow. This second effect actually accounts for more than half of the change in inequality in the projections, as well as more than half of the actual change from 1993 to 1998.

The predicted future inequality increases for 1998 to 2008 are only half of the actual increase for 1993 to 1998. This is primarily because agricultural incomes have fallen behind nonagricultural incomes more rapidly from 1993 to 1998, compared with the change that had been predicted by the cross-country evidence. The regression estimates predict that the ratio of agricultural GDP per worker to overall GDP per capita will fall by 3.4 percent for the five-year periods 1998–2003 and 2003–08. The actual fall in expenditures per person of predominantly agricultural households relative to the average expenditures per person for all households fell by 5.3 percent for 1993–98. If the 1993–98 rate of decline in the ratio of agricultural incomes to total incomes were to be extended to the future periods, projected total income inequality would increase by 8.9 percent from 1998 to 2003 and 8.4 percent from 2003 to 2008, which is quite similar to the 9.6 percent rise in inequality for 1993–98.

The projected rise in inequality is not inevitable if nonagricultural income distribution equalizes in the future. During the 1993–98 period, however, the earnings of both predominantly wage-earning households and nonagricultural enterprise households became less equal, although the earnings of predominantly "other income" households became more equal (tables 3.22 and 3.23). A sharp improvement in the equality of nonagricultural earnings would be surprising.

If the divergence of agricultural and nonagricultural incomes is slower than predicted in table 3.25, but income distribution within agriculture and nonagriculture remains unchanged, then income distribution will worsen more slowly than predicted in table 3.25.

The rising inequality that looks likely for Vietnam is a consequence of the declining role of agriculture as the economy develops, and the unusually equal distribution of incomes among Vietnamese farm households. In low-income countries with unequally distributed agriculture, economic development improves overall income distribution as the share of agriculture declines.

The increase in inequality due to the decline of agriculture can probably be delayed only by deliberately slowing economic growth and higher incomes in Vietnam. A way out of rising inequality (other than a sharp improvement in the equality of nonagricultural incomes) would be the rapid growth of incomes within agriculture while the equality of income distribution among agricultural households is preserved. Sustained growth in agricultural incomes on par with income growth in the rest of the economy is a historical anomaly. The unfortunate consequence of Vietnam's escaping poverty will most likely be some increase in inequality, because, historically, sustained development has almost always meant a shrinking role for agriculture. The inequality in the nonagricultural sector in Vietnam is not particularly high by international standards, however, and, if unchanged, it provides the upper limit for the effect of the declining share of agriculture on inequality.

Conclusion

The labor market in Vietnam saw very rapid change in the 1990s. Average real hourly wages grew by 10.5 percent per year between 1993 and 1998, faster than income per capita in the economy. At the same time, there was a substantial increase in hours worked, especially in rural areas, and a gradual increase in the share of the labor force in wage employment.

SOE employment showed a marked rise of 20 percent from 1993 to 1998 at a time when the government was planning to restructure state firms, which are generally perceived to be overstaffed (Belser and Rama 2001). SOE employees also fully shared in the rapid wage increases of the mid-1990s.

The rate of return to schooling is very low in Vietnam, although it increased from 2 percent in 1993 to 4–5 percent in 1998. The lowest rates of return to schooling are in the regions with the lowest education levels, and the highest rates of return are in the regions with the highest levels of schooling. Women face significant wage discrimination after controlling for their schooling and work experience, but the estimated wage gap fell by half over the period.

After controlling for worker characteristics, workers in Hanoi and Ho Chi Minh City receive a very large wage premium over the rest of the country, with average wages 50–80 percent higher than the other regions in the country. The primary-city wage premium suggests that the residency permit restrictions contribute to inequality between the two largest cities and the rest of the country. Qualitative evidence also suggests that residency permits contributed to a worsening of inequality within Ho Chi Minh City. Although households without residency permits are excluded from the VLSS sample design, participatory poverty assessment interviews indicate that poor, unregistered residents of Ho Chi Minh City perceived no improvement in their standard of living in the 1990s, unlike poor residents of other parts of the country (World Bank and Department for International Development 1999). This suggests that the residency permit requirement for formal sector jobs has kept all the benefits of rapidly rising wage levels from unregistered residents of Vietnam's largest city. In China, higher wages due to restrictions on urban residency have been a source of the sharp rise in income inequality between rural and urban areas (Yang 1999). Even though within-region income differences in China, as in Vietnam, are larger than differences across regions, Chinese rural-urban income disparities have been an important source of rural discontent.

Inequality of wages fell modestly in the 1990s despite the rapid growth of wages. However, households with high wage income were more likely to have high incomes from other sources, so in this sense, wage employment has contributed to inequality. Agricultural households, for instance, are less likely to be engaged in wage employment. This effect will diminish as higher proportions of the population are engaged in wage employment.

A new method for consistent decomposition of inequality by income source shows that, contrary to the results of uncorrected methods, wage employment contributes a roughly similar amount to overall income inequality as other nonagricultural income sources (primarily household enterprise and remittances). Agricultural income actually reduces overall income inequality because inequality between agricultural households is much lower than inequality between nonagricultural households, and agricultural income has a low correlation with other income sources.

The much lower inequality and income level in agriculture allows us to predict future inequality change in Vietnam. A declining share of agriculture as the economy grows in Vietnam will raise income inequality unless within-sector inequality in the nonagricultural sectors falls substantially. From 1993 to 1998, the within-sector nonagricultural income inequality rose somewhat. If within-sector inequality does not change, the declining share of agriculture will increase inequality by 5–10 percent each five years for the next decade, after an increase of 9.4 percent from 1993 to 1998.

This rising inequality due to the shrinking share of agriculture will be difficult to avoid without giving up economic growth and rapid poverty reduction in Vietnam. Keeping a large proportion of the Vietnamese population on household farms would keep inequality from continuing to rise over time, but it would also keep the majority of Vietnamese at very low incomes because there are not good prospects for substantial rises in farm self-employment income without a major movement of labor out of farming. Improvement of off-farm employment was a particular priority of the poor in a recent participatory poverty assessment in Vietnam (World Bank and Department for International Development 1999), indicating that the poor themselves would not be happy with efforts to keep them on the farm.

The most notable results of this overview of the Vietnamese labor market in the 1990s are that Hanoi and Ho Chi Minh City have very large wage premia; SOE employment rose substantially; labor market rates of return to education are very low, especially in the regions with the lowest education levels; and inequality will continue to rise modestly as a result of the compositional shift of the economy away from agriculture.

Appendix 3A Inequality Measures

The Gini coefficient can be defined as a multiple of the covariance of individual income and the rank of individual income divided by average income (Pyatt, Chen, and Fei 1980):

$$G = \frac{2\,\mathrm{cov}(y, r)}{N\bar{y}}$$

where y is a vector of individual incomes, y_i, r is a vector of the ranks of individuals i when the population is ordered by increasing income, cov(·) is the sample covariance, and $\bar{y}$ is average income.

The generalized entropy measures of inequality have the form (Sen 1997, p. 140):

$$I_\alpha = \frac{1}{\alpha(1-\alpha)}\frac{1}{N}\sum_{i=1}^{N}\left[1-\left(\frac{y_i}{\bar{y}}\right)^{\alpha}\right], \quad \alpha \neq 0, \alpha \neq 1$$

with limit cases

$$I_1 = \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\bar{y}}\ln\left(\frac{y_i}{\bar{y}}\right)$$

and

$$I_0 = \frac{1}{N}\sum_{i=1}^{N}\ln\left(\frac{\bar{y}}{y_i}\right).$$

The I_2 index simplifies to

$$I_2 = \frac{\mathrm{var}(y)}{2\bar{y}^2}$$

which is one-half the squared coefficient of variation.

For mutually exclusive groups, the overall generalized entropy indexes decompose into a weighted sum of the inequality indexes of the groups that make up the whole. Assume there are several groups k with population N_k, average group income $\bar{y}_k$, and within-group inequality index $I_{\alpha k}$. Then a generalized entropy index I_α can be written as the sum $I_\alpha = I_{\alpha W} + I_{\alpha B}$ of the total within-group inequality $I_{\alpha W}$ and between-group inequality $I_{\alpha B}$ (Shorrocks 1984).

$$I_{\alpha W} = \sum_k \frac{N_k}{N}\left(\frac{\bar{y}_k}{\bar{y}}\right)^{\alpha} I_{\alpha k}$$

is a weighted sum of the within-group indices. Between-group inequality $I_{\alpha B}$ has the form of I_α with $\bar{y}_k$ substituted for y_i.

Appendix 3B Inconsistency of Inequality Shares in the Presence of Income Measurement Error

For simplicity, take the case where income comes from only two possible sources: wage employment (w) and self-employment (s). Self-employment income is observed with measurement error, and wages are observed without error (relaxed below). Total income for person i is $y_i = y_{wi} + y_{si}$, where y_{wi} is wage income and y_{si} is income from self-employment. Observed income for person i is $y_i^* = y_{wi} + y_{si}^*$, where y_{si}^* is measured income from self-employment. $y_{si}^* = y_{si} + \theta_i$ where θ_i is the measurement error. Actual incomes have a constant mean and variance and may be correlated across source:

$$E(y_{wi}) = \mu_w;\ E(y_{si}) = \mu_s$$

$$\sigma^2(y_{wi}) = \sigma_w^2;\ \sigma^2(y_{si}) = \sigma_s^2$$

$$\sigma(y_{wi} y_{si}) = \sigma_{ws}.$$

Self-employment measurement error has a zero mean, constant variance, and is uncorrelated with incomes or across time:

$$E(\theta_i) = 0;\ \sigma^2(\theta_i) = \sigma_\theta^2$$

$$\sigma(\theta_i y_{si}) = \sigma(\theta_i y_{wi}) = 0$$

$$\sigma(\theta_i \theta_j) = 0\ \forall i \neq j.$$

The estimated contribution of wage employment income to inequality relative to self-employment income from Shorrocks' equation 3.1 in the text is:

$$\gamma^* \equiv \frac{\operatorname{cov}(y_w, y^*)}{\operatorname{var}(y^*)} \Big/ \frac{\operatorname{cov}(y_s^*, y^*)}{\operatorname{var}(y^*)} = \frac{\operatorname{cov}(y_w, y^*)}{\operatorname{cov}(y_s^*, y^*)}.$$

γ^* does not provide a consistent estimate of the ratio of income source contributions to inequality, γ:

$$\text{(3.B1)} \quad \operatorname{plim}\gamma^* = \operatorname{plim}\left(\frac{\operatorname{cov}(y_w, y^*)}{\operatorname{cov}(y_s^*, y^*)}\right) = \frac{\sigma_w^2 + \sigma_{sw}}{\sigma_s^2 + \sigma_{sw} + \sigma_\theta^2} < \frac{\sigma_w^2 + \sigma_{sw}}{\sigma_s^2 + \sigma_{sw}}$$

$$= \operatorname{plim}\left(\frac{\operatorname{cov}(y_w, y)}{\operatorname{cov}(y_s, y)}\right) = \operatorname{plim}\gamma.$$

Wage Income Also Measured with Error

In real life, of course, wage income will also be measured with some error, though usually much less than the errors in imputed self-employment income. Wage income certainly has "errors" if the target is the inequality of permanent income, so that annual income would be viewed as an estimate of permanent income containing substantial error, even if annual income itself were measured perfectly accurately. This section shows that, as long as the variance of self-employment income is large enough relative to wage income, then the same result as in equation 3.B1 still holds.

Let $y_i^* = y_{wi}^* + y_{si}^*$, where y_{wi}^* is measured income from wages. $y_{wi}^* = y_{wi} + \phi_i$, where ϕ_i is the measurement error. All other variables are the same as above, and

$$E(\phi_i) = 0; \sigma^2(\phi_i) = \sigma_\phi^2$$
$$\sigma(\phi_i y_{si}) = \sigma(\phi_i y_{wi}) = 0$$
$$\sigma(\phi_i \phi_j) = 0 \ \forall i \neq j$$
$$\sigma(\theta_i \phi_i) = 0.$$

Then the estimated contribution of wages relative to self-employment for income inequality is biased:

$$\text{plim}\gamma^* = \text{plim}\left(\frac{\text{cov}(y_w^*, y^*)}{\text{cov}(y_s^*, y^*)}\right)$$
$$= \frac{\sigma_w^2 + \sigma_{sw} + \sigma_\phi^2}{\sigma_s^2 + \sigma_{sw} + \sigma_\theta^2} \neq \frac{\sigma_w^2 + \sigma_{sw}}{\sigma_s^2 + \sigma_{sw}} = \text{plim}\left(\frac{\text{cov}(y_w, y)}{\text{cov}(y_s, y)}\right) = \text{plim}\,\gamma.$$

$$\text{plim}\,\gamma^* < \text{plim}\,\gamma \Leftrightarrow \sigma_\theta^2\left(\sigma_s^2 + \sigma_{sw}\right) > \sigma_\phi^2\left(\sigma_w^2 + \sigma_{sw}\right)$$

so $\text{plim}\,\gamma^* < \text{plim}\,\gamma$ if $\sigma_\theta^2 > \sigma_\phi^2$ and $\sigma_s^2 \geq \sigma_w^2$. That is, wages will appear to make a greater contribution to income inequality than they really do when measurement error is worse for self-employment income than wage income, and actual self-employment income is more variable than wage income, both of which are likely to be true.

Consistent Estimator

If a second estimate of income is observed whose measurement error is uncorrelated with the measurement error in y_i^*, then the contribution of each income source to total inequality can be estimated consistently. That is, $\alpha_j = \frac{\text{cov}(y_j, y)}{\text{var}(y)}$, and hence also the ratio of the contribution of two sources of income, γ, can be estimated consistently. Household consumption expenditure per capita, e_i, can be used as a second estimate of income. $e_i = y_i + \varepsilon_i$, where

$$E(\varepsilon_i) = 0; \sigma^2(\varepsilon_i) = \sigma_\varepsilon^2$$
$$\sigma(e_i y_i) = 0$$
$$\sigma(\varepsilon_i \varepsilon_j) = 0 \ \forall i \neq j$$
$$\sigma(\phi_i \varepsilon_i) = \sigma(\theta_i \varepsilon_i) = 0.$$

The estimator of the contribution of wage income to total inequality used here is

$$\hat{\alpha}_w = \frac{\text{cov}(y_w^*, e)}{\text{cov}(y^*, e)}.$$

$$\text{cov}(y_w^*, e) = \text{cov}(y_w + \phi, y + \varepsilon)$$
$$= \text{cov}(y_w, y) + \text{cov}(\phi, y) + \text{cov}(y_w, \varepsilon) + \text{cov}(\phi, \varepsilon)$$

$$\begin{aligned}\operatorname{cov}(y^*, e) &= \operatorname{cov}(y + \phi + \theta, y + \varepsilon)\\ &= \operatorname{var}(y) + \operatorname{cov}(\phi, y) + \operatorname{cov}(\theta, y) + \operatorname{cov}(y, \varepsilon)\,.\end{aligned}$$

Because ϕ, θ, and ε are uncorrelated with y and y_w, and ϕ and ε are uncorrelated with each other:

$$\operatorname{plim}[\operatorname{cov}(\phi, y)] = \sigma(\phi, y) = 0$$
$$\operatorname{plim}[\operatorname{cov}(y_w, \varepsilon)] = \sigma(y_w, \varepsilon) = 0$$
$$\operatorname{plim}[\operatorname{cov}(\phi, \varepsilon)] = \sigma(\phi, \varepsilon) = 0$$
$$\operatorname{plim}[\operatorname{cov}(\theta, y)] = \sigma(\theta, y) = 0$$
$$\operatorname{plim}[\operatorname{cov}(y, \varepsilon)] = \sigma(y, \varepsilon) = 0$$

so

$$\operatorname{plim}\hat{\alpha}_w = \frac{\operatorname{plim}[\operatorname{cov}(y_w, y)]}{\operatorname{plim}[\operatorname{var}(y)]} = \frac{\sigma_w^2 + \sigma_{sw}}{\sigma_w^2 + \sigma_s^2 + 2\sigma_{sw}} = \operatorname{plim}\alpha_w\,.$$

For $\hat{\gamma} = \dfrac{\hat{\alpha}_w}{\hat{\alpha}_s}$, it follows that

$$\operatorname{plim}\hat{\gamma} = \frac{\sigma_w^2 + \sigma_{sw}}{\sigma_s^2 + \sigma_{sw}} = \operatorname{plim}\gamma.$$

So combining poorly measured, source-specific income data with total household expenditure allows us to obtain consistent estimates of the relative contribution of different income sources to total inequality.

Notes

1. Output per person is measured by real gross national product (GNP) per capita in 1995 U.S. dollars (World Bank 2000b).

2. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted one year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively. The survey includes the information to make a detailed calculation of household income as well as a full household expenditure survey. The 1993 survey sampled households proportionally to the population in each region, but the 1998 survey oversampled certain areas, requiring the use of sampling weights to calculate representative statistics. The VLSS is described in more detail in the appendix to chapter 1 of this volume and in World Bank (1995) and (2000a).

3. Labor force participation used in table 3.1 refers to the seven days before the survey interview. If people are included who were not working during the past week, but who worked at some time during the year, total participation rises to 89 percent in 1998.

4. The 1993 VLSS asked a single question about whether the household members were self-employed for their main work in the past seven days. Whether they were self-employed on the family farm or in the family business could be only inaccurately inferred from other questions. The 1998 VLSS asked separate questions about whether household members were self-employed on the farm or self-employed in a family business.

5. Household income per capita growth is calculated from the 1993 VLSS and the 1998 VLSS data. Output per capita growth is measured by real GNP per capita growth in 1995 U.S. dollars (World Bank 2000b).

6. Wages here are hourly total compensation from the main job in the past seven days (or from the main job in the past 12 months if there was no main job in the past seven days). This includes the value of compensation in kind, as well as money wages.

7. The urban population of Ho Chi Minh City was 4.4 million (5.6 percent of the population) and of Hanoi, 1.6 million (2.1 percent of the population), out of a total population of Vietnam in 2000 of 77.9 million (World Bank 2000b).

8. Some of the apparent regional changes in table 3.7 may be due to small sample sizes. In the worst case, there were only 20 skilled, private, nonagricultural wage observations for Hanoi in 1993. Averages in all other tables come from sample sizes of more than 200 observations, with the exception of Hanoi in 1993, for wage-related tables with a sample size of 136.

9. Fifty-four weeks is more than a year, so the workers must have been working more than five days a week or more than eight hours a day. At the time of the two surveys, the standard Vietnamese workweek was six days.

10. See Berndt (1991, chapter 5) for an accessible explanation of wage determinants and the regression specification used in this discussion.

11. About 86 percent of the population in Vietnam is ethnically Vietnamese (Kinh). Another 2 percent is Chinese, and the remaining 13 percent is spread across a wide variety of groups found mostly in remote rural areas.

12. The estimated effect of a dummy variable in the wage regression is $e^b - 1$, where b is the coefficient estimate.

13. An indicator for Chinese ethnicity was not included in the regional wage regressions in table 3.12 because a number of regions had no Chinese in the survey sample.

14. Deaton (1997, pp. 134–40) provides a good, short explanation of inequality measures.

15. The author thanks Paul Glewwe for pointing out that the weights used to decompose the generalized entropy measure I_2 do not sum to one (unlike the decomposition weights for I_0 and I_1), which makes the decomposition of I_2 hard to interpret.

16. This has interesting implications for cross-country inequality comparisons. Countries with income data that are measured less accurately (typically, poorer countries) will have a spuriously larger calculated inequality index.

17. This is certainly not a criticism of the collection of detailed household production data in the VLSS and similar surveys. As noted, the mean income estimates are still unbiased. These data are very valuable for studying important questions of household production per se, and it is often possible to use the imprecise income data to calculate consistent estimates of income inequality, as has been done in this chapter.

18. Consumption smoothing is harder in Vietnam because financial institutions are poorly developed and, over the years, have undermined their credibility with arbitrary behavior. However, this does not prevent consumption smoothing through the saving of commodities and durable goods, informal credit and debt arrangements within the village, and cash savings, which are often in the form of gold buried under the house.

19. Household rice harvests and certain other staple crop yields are probably common knowledge in rural Vietnam, to other villagers as well as to the village tax

authorities, but input costs are not, and much of the profit in household farming in Vietnam is in nonstaple agricultural production, which is difficult to observe. Nonfarm household enterprises are also very difficult for outsiders to observe.

20. As shown in chapter 15 by Glewwe and Nguyen, measured mobility is highly sensitive to errors, so part of the apparent high wage mobility could be due to measurement errors. Glewwe and Nguyen's critique does not apply to the other inequality measures used in this chapter. The general issue that income mismeasurement can bias inequality measures is addressed at length above.

21. The share of inequality of one income source compared with another depends on the ratio of the covariance of each income source with total income (see appendix 3B). For the case of wage income, its share of inequality is greater when the covariance of wage income with total income is greater. Since $\text{cov}(y_w, y) = \text{var}(y_w) + \text{cov}(y_w, y_s) = \text{var}(y_w) + \text{cov}(y_w, y_s)$ where y_w is wage income, y is total income, and y_s is income from other sources, the share of wage income in inequality depends on both the inequality of wage income itself ($\text{var}[y_w]$) and how correlated wage income is with other income sources. Because income is measured with error, the consistent estimates of inequality use total expenditure as an instrument for total income in the covariance calculations.

22. The cross-country data for share of labor force in agriculture and the ratio of agricultural value added to total output are from World Bank (2000b). The purchasing power parity GDP per capita data are from the Penn World Table 6.0 (2002).

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4

Household Enterprises in Vietnam: Survival, Growth, and Living Standards

Wim P. M. Vijverberg and Jonathan Haughton

Vietnam aims to double its gross domestic product (GDP) over the coming decade, an objective that the World Bank has called "ambitious but attainable" (World Bank 2000, p. 18). To achieve this end, the private nonagricultural sector will need to grow even more rapidly than in the recent past. For instance, industrial GDP will need to rise by 10 percent annually, and the output of manufacturing small and medium enterprises (SMEs) may have to rise by as much as 18–25 percent every year. This may need "a vibrant private sector" (World Bank 2003, p. 133).

There are many nonfarm household enterprises (NFHEs) in Vietnam. In the Vietnam Living Standards Survey (VLSS) of 1997–98, every 100 households operate about 57 enterprises that together provide employment to 107 individuals (adults as well as children), indicating that this sector has the potential to contribute significantly to the achievement of the economic objectives of Vietnam. Almost one-quarter of adults worked in NFHEs. Based on household panel data from the VLSSs of 1992–93 and 1997–98, there is some evidence that operating an enterprise leads to greater affluence.[1]

The enterprises are found across all sectors of the economy: To list some of the more important activities, 26 percent of the enterprises manufacture various items, especially food-related products, textiles, garments, wood, and furniture; 36 percent are in retail trade; 6 percent are in the transport business; 9 percent provide various services; 4 percent are in the hotel and restaurant sector; 2 percent are found in the construction industry; and some 11 percent are active in agriculture-related activities (fishing, logging, and so forth).

NFHEs are most likely to be operated by urban households, by those with moderately good education, and by the children of proprietors. Based on a panel of NFHEs constructed over the two survey years, it was found that 39 percent of enterprises operating in 1993 were still in business in 1998.

Those NFHEs in the (more affluent) south of the country were less likely to survive, as were smaller and younger businesses.

A pattern emerges. In poor areas, the deficiencies of education, credit, and effective demand limit the development of NFHEs. In rich areas, the attraction of wage labor competes with NFHE development. NFHEs are thus most important in the period of transition, when agriculture is declining in importance but before the formal sector dominates. We expect that NFHEs will continue to play only a modest supporting role in fostering economic growth in Vietnam.

NFHEs are embryonic SMEs, and the success of Vietnam's growth plans will depend in large part on the vigor of these small firms (NFHEs and SMEs). On the one hand, some authors are skeptical about these firms' capacities. In a comparison with China, Perkins (1994) wonders where the private enterprises in Vietnam are, or from whence they will emerge. On the other hand, the environment in which small firms operate has become friendlier. In 2000, partly as a result of easier procedures (Nguyen 2000; Phan 2000a), the number of new firm registrations almost doubled to 14,400 (Asia Pulse 2001), and this pace continued into 2001, when a further 21,000 were registered (Economist Intelligence Unit 2002). Based on a survey in mid-2001, the Vietnam Chamber of Commerce and Industry estimates that about 70 percent of newly registered firms are "truly new," and the rest were preexisting enterprises (McKinley 2001).

The broad issue addressed by this chapter is whether NFHEs are up to the task of spawning enough promising firms and creating jobs in their own right. This analysis is largely based on the information collected by the VLSSs of 1993 and 1998. The next section provides the basic background information on the pattern of ownership of NFHEs and argues that participating in an NFHE, on balance, improves household expenditure levels. Attention then turns to the question of who operates an NFHE, where the logistic regression results indicate that a household is more likely to operate an NFHE if it is located in an urban area, if local wage rates are high, and if the household has a history of operating an enterprise.

The most innovative part of the chapter consists of the construction of a panel of NFHEs, observed in both 1993 and 1998. Having constructed the panel and determined that attrition bias is not serious, it is possible to ask why some NFHEs survive and others fail. This is followed by a discussion of why enterprises are born in the first place. The penultimate section looks at the determinants of NFHE performance—as measured by profits—over time and is followed by a summary of the main conclusions.

Household Enterprises and Living Standards

A concern about the sources of economic growth is not the only reason for looking more closely at NFHEs. They may also influence the distribution and level of income—between poor and rich households, urban and rural areas, ethnic Vietnamese (Kinh) and other ethnic groups, north and south. This study, therefore, begins with an analysis of these distributional effects before turning to the determinants of firm survival and formation.

Just over one-quarter of all adults worked in NFHEs in 1993, as table 4.1 shows;[2] this was true for both men and women. Over the subsequent five-year interval, GDP rose by 8.9 percent a year (Haughton 2000), and the structure of employment also changed, with a sharp decline in the number of adults involved in agriculture—from 67.1 percent in 1993 to 60.7 percent in 1998—and almost all of the decline concentrated in households in the top two quintiles of the expenditure distribution.

Perhaps surprisingly, the proportion of adults working in NFHEs also fell, from 25.7 percent to 24.2 percent, although the proportion relying on this as their sole source of earnings actually rose (9.5 percent to 10.2 percent). In very poor and very rich societies, NFHEs are rare. Between these two extremes, NFHEs first gain in importance and then get pushed aside as better economic opportunities arise. Employment in NFHEs is perhaps best thought of as playing a bridging role, providing an attractive alternative to farming, but one that is less appealing than most wage-paying jobs. The unexpected finding for Vietnam is that the importance of NFHEs appears to have peaked already, although they remain a very important source of

Table 4.1. Labor Market Participation, by Residence and Gender

	Based on 1993 VLSS				
Labor market activity	*Total*	*Urban*	*Rural*	*Male*	*Female*
Wage employment	25.7	34.1	23.3	33.8	18.6
Farming	67.1	20.1	80.6	68.0	66.3
Nonfarm self-employment	25.7	36.6	22.6	25.1	26.3
Only activity	9.5	27.1	4.4	8.4	10.5
With farming only	12.3	5.4	14.3	11.5	12.9
With wage employment only	1.3	2.9	0.9	1.6	1.1
With farming and wage employment	2.7	1.2	3.1	3.7	1.7
Not employed	13.5	24.7	10.2	11.2	15.4
Number of observations	14,297	3,205	11,092	6,643	7,654
	Based on 1998 VLSS				
Labor market activity	*Total*	*Urban*	*Rural*	*Male*	*Female*
Wage employment	25.7	32.6	23.3	33.9	18.4
Farming	61.7	14.8	77.5	61.7	61.7
Nonfarm self-employment	24.2	34.1	20.8	23.7	24.6
Only activity	10.2	27.6	4.3	9.4	10.9
With farming only	11.3	3.8	13.8	10.7	11.8
With wage employment only	1.2	2.4	0.8	1.6	0.9
With farming and wage employment	1.4	0.3	1.8	1.9	1.0
Not employed	16.9	29.0	12.9	14.7	18.9
Number of observations	18,698	5,673	13,019	8,808	9,890

Source: Authors' calculations using the 1993 and 1998 VLSSs.

employment and income. With rapid growth in the formal sector (that is, wage employment and large-scale private enterprises), we speculate that employment in NFHEs will continue to lose ground over the coming decade.

Table 4.1 also shows that adults were much more likely to be employed in an NFHE in an urban area (36.6 percent in 1993, 34.1 percent in 1998) than a rural area (22.6 percent in 1993, 20.8 percent in 1998). Rural households are far more likely than urban ones to combine NFHE employment with other activities, particularly farming, and fewer than 5 percent of rural adults relied on an NFHE as their sole source of support. Women find employment in NFHEs as often as men do. Particularly low participation rates in NFHEs are found in the Central Highlands and Northern Uplands, as well as among ethnic minority (non-Kinh) households (see table 4.2),[3] which tend to be found in the more inaccessible parts of the country (see chapter 7 of this text).

Participation in an NFHE is associated with a higher standard of living, as the numbers in table 4.2 make clear. In the poorest quintile (as measured by expenditure per capita), just 15 percent of adults worked in an NFHE, compared with 32 percent in the richest quintile.

This raises the possibility that participation in an NFHE is associated with greater economic mobility. Table 4.3 is designed to explore this

Table 4.2. Labor Market Participation by Quintile, Region, and Ethnicity

	NFHE		*Wage employment*		*Farming*		*Number of observations*	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Expenditure per capita (quintile)								
Poor	17.8	14.9	24.6	27.3	81.9	80.3	2,396	2,844
Poor-middle	21.9	19.4	23.8	26.6	79.6	75.9	2,608	3,114
Middle	24.1	23.1	25.0	24.8	75.5	72.9	2,817	3,580
Middle-upper	27.7	27.9	26.1	22.8	67.8	60.4	3,114	4,171
Upper	34.0	32.1	28.2	27.3	39.0	28.6	3,362	4,983
Regions								
Northern Uplands	20.5	19.1	16.8	15.2	80.2	77.1	2,139	2,564
Red River Delta	28.4	28.3	24.4	23.5	71.2	66.8	3,203	3,268
North Central Coast	24.3	27.1	18.9	23.3	84.1	75.8	1,776	2,037
Central Coast	25.6	21.8	23.5	27.6	58.1	54.8	1,715	2,471
Central Highlands	9.9	10.8	24.5	22.8	85.7	86.0	384	1,143
Southeast	28.4	27.1	32.0	36.2	33.9	25.4	1,918	3,495
Mekong Delta	27.7	23.7	34.4	29.9	67.2	60.0	3,162	3,714
Ethnic group								
Kinh	27.4	26.0	26.5	26.2	66.2	59.6	12,186	15,962
Hoa (Chinese)	37.2	31.9	30.9	31.6	9.7	12.1	392	518
Other ethnic minorities	11.1	10.5	18.5	21.2	86.2	84.5	1,719	2,218

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Table 4.3. Percentage of Households with a Nonfarm Household Enterprise, 1993 and 1998

Expenditure per capita quintile in 1993	*Expenditure per capita quintile in 1998*					
	Poorest	*Low-middle*	*Middle*	*Middle-upper*	*Upper*	*Total*
	Percentage of households with an NFHE in 1993					
Poorest	30.6	30.8	39.5	37.7	25.0	778
Low-middle	34.6	38.1	38.9	34.4	52.6	851
Middle	41.8	37.4	41.6	44.4	47.7	848
Middle-upper	35.7	35.4	49.5	50.8	62.4	899
Upper	52.9	47.4	49.5	57.0	61.7	928
Total	730	828	908	947	891	4,304
	Percentage of households with an NFHE in 1998					
Poorest	26.4	35.1	40.3	28.3	62.5	778
Low-middle	31.4	38.1	42.0	45.0	50.0	851
Middle	39.8	39.0	42.8	45.3	52.3	848
Middle-upper	45.2	42.5	41.0	53.0	57.6	899
Upper	47.1	26.3	41.0	53.3	55.6	928
Total	730	828	908	947	891	4,304

Source: Authors' calculations using the 1993 and 1998 VLSSs.

possibility. It considers only the 4,304 households that were surveyed in both 1993 and 1998 and creates a matrix with expenditure per capita quintile in 1993 on one axis and the quintile in 1998 on the other. Each cell shows the percentage of households with an NFHE in 1993 or 1998 (table 4.3).

The first point that stands out in this table is that poor households are less likely than rich ones to participate in an NFHE in either year. There is another way to make this point more forcefully. Define a household as chronically poor if it fell into one of the bottom three quintiles in 1993 and one of the bottom two quintiles in 1998,[4] and define a household as affluent if it was in one of the top two quintiles in both years. Then, affluent households are seen as being far more likely to participate in NFHEs than chronically poor households; about one-third of chronically poor households had an NFHE, compared with more than half of affluent households. Specifically, the percentages of households with an NFHE in 1993 and 1998 are:

Household	*1993*	*1998*
Chronically poor	35.6 percent	35.0 percent
Affluent	58.0 percent	54.9 percent

Put another way, the persistently affluent are more likely to operate an NFHE. What is not clear is whether this result is because NFHEs make households better off or whether better-off households are more likely to start NFHEs (for instance, because they have better access to credit).

A review of table 4.3 helps one to understand the direction of causality: Households that *moved up* the income distribution were more likely to get involved in an NFHE. This, too, can be dramatized: Define households that rise at least two quintiles between 1993 and 1998 as "shooting stars" and those that fall at least two quintiles as "sinking stones" (this is the terminology used by D. Haughton and others [2001]). Table 4.3 demonstrates that sinking stones (who were more affluent to begin with) have reduced their involvement in NFHEs, while shooting stars (who were poorer at the start) have increased their participation. Specifically, the percentages of households with an NFHE in 1993 and 1998 are:

Household	*1993*	*1998*
Sinking stones	43.8 percent	40.3 percent
Shooting stars	39.5 percent	46.4 percent

This suggests that participating in an NFHE does, on balance, improve household expenditure levels. It then becomes important to explore why some households operate NFHEs and others do not, because it helps clarify the roots of both income distribution and income mobility in Vietnam. This issue is examined in detail in the next section.

The Dynamics of Nonfarm Household Enterprises

In seeking to understand the dynamics of NFHE creation and survival, it is natural to start by asking who operated households at the beginning of the period (that is, 1993); this is the question posed in box 1 in figure 4.1, and it is answered in the next section.

Some of the households surveyed in 1993 dropped out of the sample by 1998. This raises the possibility of attrition bias, an issue that must be tackled before moving on to two key questions. First, why did some of the enterprises that operated in 1993 survive to 1998, while others did not? Second, what factors led households to start an NFHE between 1993 and 1998?

To answer these two questions, a panel of enterprises must be constructed; this is possible because of the unique way in which the VLSSs are designed. The questions themselves are then addressed by estimating a series of logistic models.

Who Operates Nonfarm Household Enterprises?

What determines why some households operate NFHEs and others do not? Some basic numbers are set out in table 4.4. They show that adults are more likely to participate in NFHEs if they are moderately well educated (6–12 years of school) or at prime age (26–55). Employment in NFHEs appears to

Figure 4.1. Household Choices in 1993 and 1998

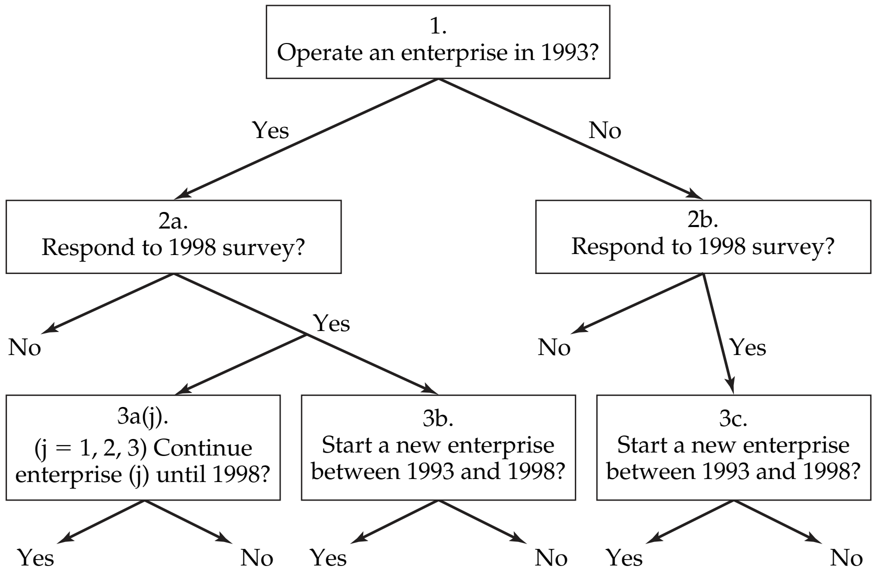

Table 4.4. Labor Market Participation, by Age and Schooling Level

	NFHE		*Wage employment*		*Farming*		*Number of observations*	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Age								
16–25	23.9	18.6	28.4	29.4	69.5	58.7	4,409	5,424
26–35	32.2	31.4	34.3	34.8	73.1	68.7	3,560	3,835
36–45	33.1	34.2	31.7	32.4	71.8	70.6	2,339	3,705
46–55	27.4	27.5	20.1	22.6	71.8	66.2	1,448	2,153
56–65	17.0	17.0	9.8	8.9	61.1	62.3	1,356	1,747
>65	6.9	8.1	2.9	2.4	31.9	32.5	1,185	1,834
Years of schooling								
0	12.6	7.5	14.2	11.9	56.5	42.7	1,888	3,222
1–5	24.2	23.3	22.1	21.8	71.7	68.7	4,667	6,078
6–9	29.5	29.4	27.0	31.9	71.8	67.2	2,474	2,715
10–12	30.8	31.5	28.4	31.8	69.3	65.5	4,479	6,101
>12	26.1	22.5	55.3	65.7	39.3	21.5	789	493

Note: NFHE = nonfarm household enterprise.
Source: Authors' calculations using the 1993 and 1998 VLSSs.

be less attractive to those with some university education, probably because this group is able to find wage employment more easily.

Between 1993 and 1998 there was a sharp drop in self-employment among two groups. Those with no schooling were working fewer jobs or stopping work, and were probably older workers, and those with more than 12 years of schooling were more likely to be working for a wage (and working at just one job). There was also a noticeable drop in self-employment, and jobs overall, among young workers (ages 15–25), primarily because more of them are staying in school longer.

Although tabulations of data, such as the one in table 4.4, are useful, they suffer from a limitation: It is possible to see the effects of only one variable at a time. A more rigorous answer to the question, which would allow measurement of the effect of a variable while holding all other influences constant, calls for the estimation of a logistic model. Here the dependent variable is set equal to one if a household operated an NFHE in 1993 and to zero otherwise. The estimation results are set out in table 4.5; a similar model is found in Vijverberg (1998b, p. 149). Several of the variables that are used in this model to capture the effects of the rural environment are innovative, and they are defined more fully in the appendix. In addition, the variable "local producer price of rice" in table 4.5 was constructed by Benjamin and Brandt (2004) and captures both the attractiveness of farming as a source of income and the level of income in the rural community that drives the demand for nonfarm commodities; these forces work in opposite directions.

The first two groups of variables in table 4.5—"regional variables" and "in rural areas"—work in tandem. There are seven regions in Vietnam, but there are no urban locales in the Central Highlands. Thus, the six urban dummy variables (such as urban Southeast) serve to compare each urban region against a baseline rural area, and because the urban dummy variables exhaust the regional alternatives, the south dummy offers a comparison between southern rural households and northern rural households. It is pertinent that the rural communities are differentiated by the variables in the second group according to their features, such as accessibility, electrification, and presence of market institutions. These data come from the community questionnaire and are available only for rural areas. Thus, the baseline rural area is one with zero values for all of these variables.[5]

To aid in the interpretation of the results, the final column in table 4.5 shows the probability that a household will operate an NFHE, assuming that the baseline probability is 0.45 and that the independent variable in question has increased by one unit.

A number of themes emerge. Perhaps the most important is that geography matters. Households in urban areas are more likely to engage in self-employment. Within rural areas, NFHEs are less common where agricultural extension programs are more active, perhaps a proxy for the greater profitability of farming in these areas. The presence and quality of local roads has an unexpected negative sign, although this variable is somewhat problematic: The 1993 VLSS questionnaire did not specify clearly what constitutes a viable road, and the model does not control for waterway access, which in some areas in Vietnam is important. The presence and frequent operation of a local market has a positive effect—if there is such a market, the probability that a household would operate a business increases from an (assumed)

Table 4.5. Logistic Model of Operation of an Enterprise, 1993

Variable	*Coefficient*	*t Statistic*	*New probability (base = 0.45)*
Dependent variable: "Household operated an enterprise in 1992–93"			
Intercept	–0.371	0.99	
Regional variables:			
South	–0.128	1.39	
Urban Northern Uplands	0.629	1.56	
Urban Red River Delta	0.552	1.41	
Urban North Central Coast	–0.377	0.87	
Urban Central Coast	0.630	1.61	
Urban Southeast	–0.010	0.03	
Urban Mekong Delta	0.429	1.13	
In rural areas			
Availability of lower and upper secondary schools	0.042	0.23	
Agricultural extension index	–0.442	6.25***	0.345
Presence and quality of roads	–0.578	2.71***	0.315
Availability of public transportation	0.000	0.09	
Use of electricity and piped water	0.201	1.16	
Presence and frequency of local market	0.491	2.80***	0.572
Presence of market in nearby community	0.194	0.96	
Local wage index	0.063	4.79***	0.466
Dummy, = 1 if local wage index unknown	2.003	5.48***	0.858
Local producer price of rice	0.050	1.11	
Dummy, = 1 if local price of rice unknown	–0.085	0.23	
Household characteristics			
Number of women ages 16 years and older	0.107	1.71*	
Persons ages 16–25 years	–0.143	2.17**	0.415
Persons ages 26–35 years	0.035	0.48	
Persons ages 36–45 years	0.029	0.37	
Persons ages 46–55 years	–0.039	0.44	
Persons ages 56–65 years	–0.217	2.65***	0.397
Persons ages >65 years	–0.399	5.02***	0.354
Persons with 1–3 years of schooling	0.215	3.37***	0.504
Persons with 4–5 years of schooling	0.282	4.55***	0.520
Persons with 6–9 years of schooling	0.334	5.90***	0.533
Persons with 10–12 years of schooling	0.369	5.47***	0.542
Persons with postsecondary schooling	–0.245	3.65***	0.390
Persons with technical training	0.047	0.50	
Persons with completed apprenticeships	0.275	4.39***	0.519

(table continues on following page)

Table 4.5. (*continued*)

Variable	*Coefficient*	*t Statistic*	*New probability (base = 0.45)*
Characteristics of parents of head of household			
Average years of schooling	0.023	1.99**	
Dummy, = 1 if years of schooling unknown	−0.021	0.20	
Major occupation: farmer	−0.792	6.37***	0.270
Major occupation: manager	0.558	0.73	
Major occupation: proprietor	1.165	3.19***	0.724
Major occupation: supervisor	−0.397	0.33	
Dummy, = 1 if major occupation unknown	−0.148	0.14	
Number of observations	4,800		
Proportion affirmative	0.451		
Average log-likelihood value	−0.6134		
Likelihood ratio test of slopes	717.79		

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.

Note: Final column shows probability of household operating an enterprise, given a baseline value of 0.45 and then assuming that the independent variable changes by one unit. These figures are shown only for variables with statistically significant coefficients. In this and other tables in this chapter, the omitted categories against which comparisons are made are a baseline rural area (see text), persons with zero years of schooling, and parents of the head of household who were laborers.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

baseline of 45 percent to 57 percent, a large 12 percentage point jump. The real price of rice is unrelated to the probability that a household operates an enterprise.

The second key theme is that the local wage rate is important and *raises* the likelihood of self-employment. A negative sign might have been expected here, on the grounds that when wage labor pays better, self-employment is relatively less attractive. A higher wage may well reflect a more dynamic nonagricultural sector, however, inviting more households to participate in it, or raising living standards with an attendant higher demand for items such as restaurants and retail services.

The third important theme is that family history is important. The children of proprietors are much more likely to be proprietors themselves. As expected, households are more likely to operate an NFHE if their members are better educated or of prime age.

Constructing a Panel of Enterprises

It is well known that NFHEs frequently do not survive for long. More than half of the enterprises reported by the 1998 VLSS had been founded during the previous five years, yet the number of enterprises per household was no higher in 1998 than in 1993. This essentially means that for every NFHE that was started during the five-year period, another one failed.

Why do enterprises succeed or fail? An answer to this question might facilitate the design of policies that would help enterprises stay in business. The VLSS data are unusual in that they allow the construction of a panel of enterprises, with information for each of these enterprises for 1993 and 1998.[6] This then allows a rigorous exploration of the determinants of success (or at least survival).

The construction of the panel proved to be more complex than expected. In both the 1993 and 1998 VLSSs, the interviewers collected information from the "most knowledgeable" household member on the age of each household enterprise and its area of activity. The interviewer also had a household roster for each year.

In principle, this allows matching of specific enterprises across survey years. In reality, the situation was more ambiguous. The 1998 round used a different set of industrial codes. The respondents were decidedly imprecise about the enterprise's age. There were changes in the identity of the "most knowledgeable" household member. It was also not uncommon for one household member to be the respondent for several household enterprises. Last but not least, a household could list up to three enterprises in 1993 and up to four in 1998.

For this study, the match of enterprises across survey years was made on the basis of the three most obvious pieces of information: enterprise age, industry code, and identity of the entrepreneur. Table 4.6 summarizes the outcome of the matching process. The 1993 round yielded 2,795 enterprises, of which 311 occurred in households that disappeared in the next round and 765 were located in households that did not report any enterprises in the next round. This left 1,719 enterprises in households that also reported NFHE activities in 1998. The 1998 round had a sample of 3,439 enterprises, of which 1,042 were operated by households that were not part of the earlier round and of which 697 occurred in households that did not have an enterprise in 1993. This left 1,700 enterprises that could possibly be matched with one in 1993 ("enterprises potentially in panel").

A problem arises: If the industry code must be identical, the identity of the entrepreneur must be the same, and the enterprise age must match within a margin of two years, then only 174 enterprises are matched from the 1993 VLSS to the 1998 VLSS. The criteria were relaxed, therefore, by requiring only that the entrepreneur and the industry code be the same; this change yielded 514 automatic matches. Cases where there was no match on any dimension were then eliminated, and the remaining cases were inspected manually. This turned up 455 cases where there was a reasonable

Table 4.6. Accounting for the Panel Enterprises

Indicator	*1993*	*1998*	*Type of enterprise*
Total enterprises surveyed	2,795	3,439	
Household was not included in 1998 sample	47		
Household was not included in 1993 sample		1,042	
Household dropped out of sample in 1998 (attrition)	264		Attrited
Enterprises potentially matchable	2,484	2,397	
Household had no enterprise in 1998	765		Terminated
Household had no enterprise in 1993		697	Start up
Enterprises potentially in panel	1,719	1,700	
Household had another enterprise in 1993 but not in 1998	83		Terminated
Household had another enterprise in 1998 but not in 1993		96	Startup
No match at all on industry code, entrepreneur, or age among 1998 enterprise	322		Terminated
No match at all on industry code, entrepreneur, or age among 1993 enterprises		309	Startup
Manual inspection found no possible match among 1998 enterprises	345		Terminated
Manual inspection found no possible match among 1993 enterprises		326	Startup
Matched	969	969	Panel
Of which			
Automatic match between 1993 and 1998 enterprise	514	514	
Manual match between 1993 and 1998 enterprise	455	455	

Source: Authors' calculations using the 1993 and 1998 VLSSs.

match between an enterprise in 1993 and another enterprise in 1998: Perhaps the entrepreneur was the same, but the industry code was slightly different, or the age and industry code were consistent but the entrepreneur was possibly different. The net result was a panel of 969 enterprises. This implies a survival rate of 39 percent (969/2,484).

To measure the survival rate satisfactorily, it is necessary to have panel data, obtained by observing the enterprise once and then a second time after a few years. Most of the available evidence on survival rates comes from industrial country studies. For example, Storey and Wynarczyk (1996) examine a sample of microenterprises from 1985 to 1994 in the United Kingdom, 60 percent of which had fewer than five employees. These enterprises were drawn from all sectors of the economy and from all age groups (rather than startups only). Of these, 70 percent survived until 1988 and 41 percent until 1994. Often, evidence on enterprise survival refers to newly established, larger firms (with at least 10 or even 20 employees) in the manufacturing sector in developed economies, and so it is not directly comparable to the Vietnamese numbers. For example, Audretsch (1995) reports a 35.4 percent 10-year survival rate among U.S. manufacturing firms during 1976–86. Baldwin and Gorecki (1991) report an annual 6.5 percent exit rate, suggesting a 71 percent five-year survival rate, in the Canadian manufacturing sector in the 1970s. Among manufacturing enterprises in the Netherlands in the 1980s, the five-year survival rate was approximately 64 percent (Audretsch, Houweling, and Thurik 2000). Littunen (2000) cites evidence that 45 percent of European firms close within the first five years of business and reports on Finnish data that show a survival rate of at least 55 percent after six years.

Panel data on enterprises in developing countries are rare; therefore, little comparable evidence on survival rates exists. There are indications that Vietnam's survival rate of 39 percent is typical for developing countries. First, indirect evidence comes from the age distribution of NFHEs in the VLSSs, which is very similar to those found, based on the living standard measurement surveys, for Peru in 1985, Côte d'Ivoire in 1985–86, and Ghana in 1987–89 (Vijverberg 1998b). This suggests, but does not prove, that enterprise survival rates in Vietnam are in line with those found elsewhere. Second, consider that a five-year survival rate of 39 percent implies an annual exit rate of about 17 percent. In the Dominican Republic, the exit rate was 29 percent in 1992 and 22 percent in 1992–93 (Cabal 1995; Mead and Liedholm 1998). In Zimbabwe, the exit rate was 11.5 percent in the early 1990s, but this was likely an underestimate because the whereabouts of almost half of the enterprises could not be verified in the second round of the survey (Daniels 1995; Mead and Liedholm 1998). Third, in a study of four countries in southern Africa, McPherson (1995) reported estimates that would imply a five-year survival rate of 81 percent, but this is based on cross-sectional data that most likely undersampled enterprises that had been closed. Fourth, Mead and Liedholm (1998) computed an average firm closure rate of 12.9 percent in five African countries in the early 1990s on the basis of retrospective questions in a cross-sectional survey.

Overall, therefore, the survival rate of NFHEs as recorded by the VLSSs is fairly comparable to that found in other studies of developing countries and below the rates recorded in industrial countries. However, it should be pointed out that the lack of comparability makes it difficult to conclude that the enterprise survival rate is particularly low. Vietnam's survival rate estimate may be too low if some enterprises were misclassified in the 1998 round as startups rather than as enterprises continuing in a different line of business. If there was, indeed, more enterprise turnover in Vietnam between 1993 and 1998 than in other developing countries, it would be consistent with Goreski's (1995) finding that in a turbulent economic environment, there are high rates of both firm entry and firm exit. Rapid growth yields many opportunities for new firms while making existing firms obsolete more quickly.

The characteristics of the panel of enterprises in 1993 and 1998 are summarized in table 4.7, where they are also compared with attrited enterprises (that is, those that had dropped out of the sample), terminated enterprises, and start-up businesses. When compared with the other enterprises that operated in 1993, the panel enterprises are older and better established. They were more likely to be open for business at the time of the interview, for more months a year and more days per month, and to operate from a fixed location. Panel B shows that enterprises in retail sales and in the hotel and restaurant business appear to survive longer; those in textiles, other manufacturing, services, and the "other" category are more likely to be terminated. Panel C of the table reveals small residence and regional differences. Panel D examines enterprise performance; by all definitions, panel enterprises are larger and more profitable. None of these findings are surprising, but they do attest to the reasonableness of the panel matching procedure.

In comparing panel enterprises between 1993 and 1998, three features are worth comment. Real household expenditures, or performance measures such as real sales revenue or enterprise income, rose less quickly than did expenditure in Vietnam as a whole—where real GDP grew 53 percent between 1993 and 1998 and per capita GDP increased by 40 percent.[7] The relatively slow growth of NFHE-related income is unexpected; one might have anticipated that dynamic NFHEs would lift their owners at least as quickly as the overall economic tide.

It is also surprising that the reported age of panel enterprises rose by just 3.8 years, on average, even though the two surveys were 5 years apart. This age variable is notoriously unreliable, particularly when the "most knowledgeable" household respondent changes between the two surveys.

The most curious figure relates to gender: In 1993, 81 percent of the panel enterprises were operated by women, but the 1998 survey indicated that only 57 percent of these same enterprises were operated by women. Note that the identity of the entrepreneur within the household is indicated by the response to the question, "Who among the household members is most knowledgeable about the activities of the enterprise?" Table 4.1 showed that there are a roughly equal number of men and women engaged in nonfarm self-employment. The increase in the number of male entrepreneurs shown in table 4.7 may reflect any of a number of phenomena: (a) the high number of women entrepreneurs in 1993 may be largely an artifact of the survey procedures used in 1993; (b) men "take over" successful household enterprises; or (c) over time, men have taken on a more prominent role in NFHEs. Of these, answer (a) is not entirely likely; Vijverberg (1998b) showed that women contributed many more hours of nonfarm self-employment than did men and thus may indeed be "more knowledgeable" about enterprise operations. (A similar comparison of hours of work in 1998 is difficult

Table 4.7. Comparison of Panel Enterprises, Nonpanel Enterprises, and Enterprises in Attrited Households

		1993			1998	
Indicator		*Enterprises in attrited households (N = 264)*	*Terminated enterprises (N = 1,515)*	*Panel enterprises (N = 969)*	*Panel enterprises (N = 969)*	*Start-up enterprises (N = 1,428)*
Panel A: Enterprise characteristics						
Age of enterprise	Mean	7.6	6.7	7.9	11.7	5.6
	Median	4.0	3.5	4.4	9.0	3.3
Years of schooling, entrepreneur	Mean	7.5	7.3	7.1	7.0	7.4
Female entrepreneur	Percent	71.0	67.3	81.2	58.1	49.6
Operating between two rounds	Percent	78.0	69.8	86.8	89.1	83.3
Months per year in operation	Mean	8.7	7.4	9.2	10.1	8.5
Days per month in operation	Mean	24.7	21.7	24.7	24.9	22.9
Operating from a fixed location	Percent	62.9	53.8	67.7	72.7	61.5
Real household expenditures per capita	Mean	2,962	2,403	2,604	3470	2,936
	Median	2,246	1,919	2,090	2776	2,381
Panel B: Industry						
Manufacturing: food/beverage	Percent	5.7	9.4	9.5	8.7	10.4
Manufacturing: textiles	Percent	5.3	9.1	7.2	5.8	7.6
Manufacturing: wood processing	Percent	4.6	3.2	3.7	6.4	7.2
Manufacturing: other	Percent	4.6	7.7	3.9	2.5	3.7
Construction	Percent	0.0	1.1	0.9	0.8	3.0
Wholesale	Percent	2.3	2.2	2.2	3.4	3.5
Retail sales	Percent	39.4	24.0	43.2	47.4	29.2
Hotel and restaurant	Percent	6.4	4.4	7.8	4.6	2.6
Road, railroad, pipeline transport	Percent	2.3	4.0	3.3	3.8	5.7

(table continues on following page)

Table 4.7. (*continued*)

		1993			*1998*	
Indicator		*Enterprises in attrited households (N = 264)*	*Terminated enterprises (N = 1,515)*	*Panel enterprises (N = 969)*	*Panel enterprises (N = 969)*	*Start-up enterprises (N = 1,428)*
Services	Percent	12.1	10.4	6.4	4.5	11.7
Aquaculture	Percent	0.0	0.0	0.0	7.3	7.5
Other: agriculture, mining, utilities	Percent	17.4	24.6	11.8	4.8	8.1
Panel C: Residence						
Urban	Percent	43.6	27.7	33.6	33.6	23.2
Northern Uplands	Percent	8.0	16.3	9.8	9.8	16.7
Red River Delta	Percent	22.0	23.9	25.3	25.3	23.0
North Central Coast	Percent	7.2	12.0	14.3	14.3	17.5
Central Coast	Percent	13.6	10.9	13.0	13.0	10.2
Central Highlands	Percent	3.0	0.9	1.6	1.6	1.1
Southeast	Percent	20.1	12.4	15.4	15.4	12.3
Mekong Delta	Percent	26.1	23.6	20.5	20.5	19.2
Panel D: Enterprise performance						
Total expenditures (monthly)	Mean	3,010	2,420	4,169	5,853	3,517
	Median	718	243	1,138	1,363	466
Sales revenue (monthly, current)	Mean	4,662	3,710	6,388	7,283	4,605
	Median	1,537	898	1,776	2,438	1,176
Sales revenue (monthly, whole year)	Mean	3,586	2,526	4,520	6,735	4,129
	Median	1,174	692	1,412	1,974	962
Enterprise income (monthly, current)[a,b]	Mean	1,371	907	2,053	1,245	1,647
	Median	441	433	555	728	539
Enterprise income (monthly, whole year)[a,c]	Mean	578	103	352	882	619

	Median	276	255	317	438	334
Net revenue (monthly, current)[b,d]	Mean	736	537	792	935	666
	Median	392	263	385	509	347
Net revenue (monthly, whole year)[c,d]	Mean	671	465	714	891	586
	Median	332	222	349	461	313
Hours of family labor (monthly)	Mean	282	220	280	271	213
	Median	213	183	243	243	183
Number of family workers	Mean	1.51	1.44	1.57	1.46	1.32
Number of paid workers	Mean	0.28	0.19	0.31	0.26	0.24
Number of workers	Mean	1.84	1.71	1.98	1.85	1.77
Value of capital stock (value, current)	Mean	8,594	3,800	8,287	10,899	6,367
	Median	220	160	300	487	419

Note: Dong values from 1993 are inflated by 1.5087 for comparability with 1998 values. Monetary values are deflated for price variations across regions and between sampling months. Statistics are unweighted.

a. Enterprise income is defined as sales revenue minus operating costs.

b. Current income (or revenue) is based on reported revenue during the two-week period between the first and second interviews.

c. Whole year income (or revenue) is based on reported "typical" monthly revenue over the year before the survey.

d. Net revenue is defined as the amount that entrepreneurs report having left over after expenses were paid, plus payments in kind and the value of home consumption.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

because of the structure of the new questionnaire.) Answer (c) is plausible in the light of the similar percentages in the columns for 1998 panel and start-up enterprises.

Explaining Attrition of Households with Nonfarm Household Enterprises

Ten percent of the households that operated enterprises in 1993 had dropped out of the sample by 1998. This attrition raises the possibility that the panel of enterprises may be biased and the households (and their enterprises) that dropped out of the sample were atypical.

Table 4.7 allows a comparison of the characteristics of the attrited enterprises with those that either went out of business or were part of the panel. The enterprises that dropped out of the sample were more likely to be in urban areas, in southern Vietnam, and operated by better-off households. The performance measures of attrited firms do not stand out from those of other businesses, however.

The determinants of attrition have also been captured in a logistic model, where the dependent variable is one if the household also responds in 1998 and zero otherwise. The results of estimating this model, which is conditional on the presence of an enterprise, are shown in the middle columns of table 4.8. A similar approach can also be used to model attrition among households that did not operate a business in 1993 (that is, answered "no" to question 2B in figure 4.1); these results are shown in the last two columns of table 4.8.

The estimates show that, overall, urban households were less likely to remain in the sample, and households with older members were more cooperative. Other determinants are more sporadic. By and large, households in the north were less likely than households in the south to drop out of the sample between 1993 and 1998. Human capital variables matter little. There is a suggestion that better-off households are more cooperative, all other things being equal, and that those with higher-earning enterprises are less responsive, but the effect of the financial variables, which are in logarithmic form to reduce the impact of outliers,[8] is not statistically significant.

For all practical purposes, attrition is sufficiently small, and its correlation with enterprise performance so minimal, that attrition bias is unlikely to be a serious concern. Thus, the observed sample of enterprises in panel households may be viewed as representative of the population of panel enterprises.

Which Enterprises Survived?

It is now possible to address the first of the two key questions mentioned in "The Dynamics of NFHEs": Why did some of the enterprises that operated in 1993 survive to 1998, while others did not?

Note that the unit of observation is the enterprise, not the household. Some households operate more than one business, and one might surmise that the survival of one household enterprise might depend on the existence and performance of the other enterprises within that household.

Table 4.8. Determinants of the Attrition Process: A Logistic Model

Variable	Households with enterprise in 1993		Households without enterprise in 1993	
	Coefficient	*t statistic*	*Coefficient*	*t statistic*
Dependent variable: "Household responds to 1998 survey"				
Intercept	−0.601	0.43	−0.774	0.59
Regional variables:				
Urban residence	−0.708	3.93***	−1.235	6.03***
Northern Uplands	1.767	3.21***	0.196	0.41
Red River Delta	1.156	2.32**	0.600	1.25
North Central Coast	1.439	2.66***	1.654	2.91***
Central Coast	0.897	1.74*	0.868	1.68*
Southeast	0.708	1.40	−0.140	0.28
Mekong Delta	0.806	1.65*	−0.553	1.21
Household characteristics				
Number of women ages 16 years and older	0.019	0.13	−0.205	1.19
Persons ages 16–25 years	−0.043	0.25	0.500	2.67***
Persons ages 26–35 years	0.161	0.86	0.526	2.63***
Persons ages 36–45 years	0.268	1.35	0.721	3.32***
Persons ages 46–55 years	0.395	1.75*	0.551	2.29**
Persons ages 56–65 years	0.388	1.87*	0.914	3.88***
Persons ages >65 years	0.229	1.11	0.321	1.61
Persons with 1–3 years of schooling	0.158	0.89	−0.065	0.38
Persons with 4–5 years of schooling	0.119	0.72	0.083	0.46
Persons with 6–9 years of schooling	0.148	0.99	−0.051	0.33
Persons with 10–12 years of schooling	0.073	0.45	−0.369	2.02**
Persons with postsecondary schooling	−0.146	1.00	0.107	0.65
Persons with technical training	−0.236	1.45	−0.253	1.14
Persons with completed apprenticeships	−0.055	0.49	−0.158	0.95
Financial performance				
Log (real household expenditures)	0.210	1.22	0.279	1.76*
Log (total enterprise income)	−0.097	1.37		
Number of observations	2,128		2,576	
Proportion affirmative	0.905		0.924	
Average log-likelihood value	−0.2980		−0.2374	
Likelihood ratio test of slopes	62.4		163.2	

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Involvement in several activities diversifies risk, however. The simplest approach, and the one that is followed here, is to stay with the maintained hypothesis that the observations on enterprises are independent of one another.

Table 4.9 presents the results of estimating a logistic model, where the binary dependent variable is set equal to one if the enterprise survived from 1993 to 1998. The empirical specification parallels that of other studies on firm survival, such as Littunen (2000), McPherson (1995), and Storey and Wynarczyk (1996). There are two versions of the model: one that relies on the community characteristics from 1993 and one that uses the community characteristics from 1998. The estimates of the two models are similar in most respects, but there are some notable differences in the community and regional effects. Judging by the likelihood ratio, the model with the 1993 community characteristics fits marginally better than the 1998 model.

Table 4.9. Enterprise Survival: A Logistic Model

	Using community characteristics from			
	1993		*1998*	
Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Dependent variable: "1993 enterprise is surveyed again in 1998"				
Intercept	–2.590	4.73***	–2.963	7.03***
Regional variables:				
South	–0.454	3.23***	–0.256	1.91*
Urban Northern Uplands	0.040	0.08	–0.077	0.27
Urban Red River Delta	–0.004	0.01	0.125	0.43
Urban North Central Coast	0.686	1.21	0.479	1.20
Urban Central Coast	0.846	1.71*	0.451	1.65*
Urban Southeast	–0.076	0.15	–0.139	0.45
Urban Mekong Delta	0.351	0.73	–0.025	0.11
In rural areas:				
Presence and quality of roads	0.021	0.07	0.237	0.90
Presence and quality of waterways			–0.039	0.27
Availability of public transportation	–0.006	1.59	–0.009	1.28
Presence and frequency of local market	0.944	2.85***	0.128	0.86
Presence of market in nearby community	0.593	1.49	–0.181	0.63
Use of electricity and piped water	–0.330	1.29	–0.123	0.78
Local wage index	–0.023	1.04	0.001	0.13
Dummy, = 1 if local wage index unknown	–0.210	0.71	0.207	1.04
Local producer price of rice	–0.015	0.21	0.175	2.28**
Dummy, = 1 if local price of rice unknown	–0.237	0.49	0.232	1.24

Entrepreneur's characteristics				
Female	0.294	2.28**	0.293	2.29**
Age <16 years	−0.100	0.30	−0.111	0.33
Age between 26 and 35 years	0.620	4.41***	0.639	4.53***
Age between 36 and 45 years	0.461	2.87***	0.473	2.94***
Age between 46 and 55 years	0.227	1.14	0.234	1.17
Age between 56 and 65 years	0.048	0.20	0.041	0.17
Age >65 years	−0.304	0.81	−0.274	0.72
Years of schooling	−0.019	1.37	−0.018	1.29
Years of apprenticeship	−0.032	0.34	−0.034	0.36
Chinese ethnicity	0.189	0.70	0.108	0.39
Other ethnicity (non-Kinh, non-Chinese)	−0.226	0.96	−0.404	1.70*
Former enterprise characteristics				
Operating from a fixed location	0.433	3.74***	0.469	4.03***
1993 enterprise age between 1.42 and 3.00 years	0.331	2.24**	0.343	2.31**
1993 enterprise age between 3.00 and 5.00 years	0.458	3.00***	0.462	3.02***
1993 enterprise age between 5.00 and 11.00 years	0.436	2.78***	0.448	2.86***
1993 enterprise age >11.00 years	0.759	4.65***	0.736	4.51***
Fishery	−0.955	5.19***	−0.949	5.19***
Food manufacturing	−1.089	5.77***	−1.087	5.76***
Textiles manufacturing	−0.790	4.27***	−0.792	4.29***
Other manufacturing	−0.916	4.79***	−0.923	4.80***
Food/hotel commerce	−0.345	1.87*	−0.342	1.84*
Transportation/communication	−0.510	2.13**	−0.544	2.26**
Services	−1.170	5.59***	−1.160	5.54***
Other industries	−1.208	5.72***	−1.239	5.87***
Former scale of operation:				
Log(1993 enterprise income + 1)	0.251	5.45***	0.259	5.61***
Log(1993 value of capital stock + 1)	0.066	3.73***	0.062	3.47***
Log(1993 value of inventories + 1)	0.043	2.26**	0.046	2.41**
Number of observations	2,376		2,368	
Proportion affirmative	0.392		0.393	
Average log-likelihood value	−0.5908		−0.5926	
Likelihood ratio test of slopes	374.22		367.21	

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.

Note: In this table, the omitted categories against which comparisons are made are urban Central Highlands, an entrepreneur between 16 and 25 years of age of Kinh heritage, and an enterprise operating from a variable location that has been in existence less than 1.42 years in the retail trade sector.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

NFHEs were *less* likely to survive in the south of Vietnam, particularly in the Southeast region, which is dominated by Ho Chi Minh City. This is surprising at first sight because Ho Chi Minh City is the richest and most economically dynamic part of the country. Presumably the area is so dynamic that it is pulling people into wage employment, leaving fewer of them to operate NFHEs. Dynamism does not always have this effect, because firms are more likely to survive in rural areas where there is a nearby market (presumably a sign of vigor, or at least of high population density).

Of the firms surveyed in 1993, 39 percent survived in the sense that they were surveyed again in 1998. For enterprises operated by women, the estimated survival probability rises by a further 9 percentage points. This higher survival probability is not due to women being disproportionately concentrated in certain fields, because the equation holds other factors constant, including the activity in which the business operates (for example, food manufacturing, transportation, and so on). Enterprises operated by prime-age entrepreneurs were also more likely to survive, but it is surprising that the survival rate was not influenced by the educational levels of the owners or by the owners' ethnicity.

As is found in many other studies (Agarwal and Audretsch 2001; Goreski 1995), there is an important size effect. This is clear from table 4.10, which uses the estimated parameters from table 4.9 to compute the probability that a firm survived from 1993 to 1998. Larger businesses, whether measured by the size of income or capital stock, were also more likely to still be in operation in 1998. If there is a lesson here, it might be that firms must grow to survive.

The strongest predictor of future success is past success. Firms that had survived for three years or more by the start of the period were more likely to survive, a clear case of duration dependence. When combined with size, the effect is striking: A firm that was small and young in 1993 had a

Table 4.10. Probability That a 1993 Enterprise Survived until 1998

	Size of enterprise		
Enterprise age in 1993	*Small*	*Medium*	*Large*
Between 0 and 1.42 years	0.21	0.28	0.38
Between 1.42 and 3.00 years	0.27	0.35	0.46
Between 3.00 and 5.00 years	0.30	0.38	0.49
Between 5.00 and 11.00 years	0.30	0.38	0.49
>11.00 years	0.36	0.45	0.56

Note: A "small" enterprise had a monthly enterprise income of Vietnam dong (D) 83,400 (US$6.78, using an exchange rate of US$1.00 = D 12,300), used D 10,000 (US$0.81) worth of capital, and had no inventories. The income and capital stock of a "medium" enterprise were D 178,700 (US$14.53) and D 143,200 (US$11.64), but again there are no inventories. A "large" enterprise had an income of D 376,100 (US$30.57) and a capital and inventory stock of D 771,100 (US$62.69) and D 40,200 (US$3.27), respectively. These values are chosen on the basis of the quartile values of the variables among the 1993 enterprises in panel households.

Source: Based on calculations from the first column of table 4.9.

21 percent chance of surviving to 1998 (see table 4.10), and a large and old firm had a 56 percent probability of staying in business. The magnitude of this age effect is similar to the estimates reported by many other studies. Of course, this comparison assumes that other factors are held constant. However, these other factors do matter. For example, compared with the retail sector (the excluded category among the industry dummy variables), enterprises in the manufacturing and service sectors are more likely to be terminated, and enterprises near local markets or operating from a fixed location are more likely to survive.

What Explains Startups?

Between 1993 and 1998, households started 1,428 new NFHEs, which means that it is now possible to address the second key question, "What factors led households to start an NFHE between 1993 and 1998?"

Conceptually, there are two distinct groups involved—those that operated an enterprise in 1993 and started another business between 1993 and 1998 (box 3b in figure 4.1) and those that did not operate an NFHE in 1993 but had started one by 1998 (box 3c in figure 4.1). For households without an enterprise in 1993, the motives for starting a business may not be the same as for those that already had experience operating a business. To allow for this possible difference, separate logistic models are estimated for the two groups, as shown in table 4.11. The subsamples are statistically distinct, as witnessed by the p value of 0.0087 on the log-likelihood ratio test of parameter equality.

A familiar pattern emerges. Startup is less likely in the south, particularly the Mekong Delta region, and rural areas throughout Vietnam. If there is a secondary school nearby, fewer enterprises are expected to set up operations—presumably because the school reduces the availability of family labor. For new startups in inexperienced households, it greatly helps if the parents of the head were skilled manual workers or, perhaps, managers during their working lives. The same is no help in explaining whether households with established firms initiate another enterprise; but recall from table 4.5 that a history of proprietorship in the head's parental background was a strong determining factor in whether the household already operated an enterprise in 1993. Startups are also more likely if the household members are at least moderately well educated or have completed apprenticeships.

There is a policy implication here, perhaps. Efforts to boost the level of worker skills appear to have an unexpected side effect of leading to the establishment of new firms. Although a useful result, it is hardly surprising, because skilled and semiskilled workers such as carpenters and masons are often the ones who decide to go into business on their own.

Performance of Nonfarm Household Enterprises over Time

Survival is a minimalist measure of performance. It is at least as important to ask whether those firms that survived between 1993 and 1998 also

Table 4.11. Enterprise Startup: A Logistic Model

	All households		*Households with a 1993 enterprise*		*Households without a 1993 enterprise*	
Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Dependent variable: "Household started a new enterprise between 1993 and 1998"						
Intercept	−1.922	7.55***	−1.475	4.20***	−2.140	5.44***
Regional variables:						
South	−0.536	5.10***	−0.604	3.83***	−0.541	3.63***
Urban Northern Uplands	0.265	1.01	−0.233	0.69	0.477	0.99
Urban Red River Delta	0.279	1.25	−0.106	0.34	0.312	0.90
Urban North Central Coast	0.492	1.39	−0.785	1.24	1.038	2.20**
Urban Central Coast	0.695	3.13***	0.333	1.14	1.109	2.97***
Urban Southeast	0.967	3.78***	0.721	2.14**	0.787	1.82*
Urban Mekong Delta	0.505	2.53**	0.329	1.28	0.676	1.97**
In rural areas						
Availability of lower and upper secondary schools	−0.475	2.83***	−0.462	1.91*	−0.696	2.80***
Agricultural extension index	−0.116	0.87	−0.059	0.29	−0.160	0.86
Presence and quality of roads	0.064	0.32	0.341	1.14	−0.154	0.55
Presence and quality of waterways	0.321	2.93***	0.258	1.59	0.320	2.06**
Availability of public transportation	0.001	0.11	0.015	1.85*	−0.010	1.33
Use of electricity and piped water	0.302	2.73***	0.344	1.97**	0.228	1.50
Presence and frequency of local market	0.442	1.89*	−0.103	0.34	1.123	2.84***
Presence of market in nearby community	−0.002	0.01	−0.004	0.02	0.006	0.03
Local wage index	0.021	3.40***	0.020	2.52**	0.022	2.00**
Dummy, = 1 if local wage index is missing	0.281	1.70*	0.420	1.84*	0.064	0.24
Local producer price of rice	0.038	0.82	−0.052	0.81	0.110	1.61
Dummy, = 1 if local price of rice unknown	−0.457	1.03	−0.521	0.88	−0.305	0.44

Household characteristics						
Number of women ages 16 and older	0.014	0.22	0.051	0.57	0.018	0.19
Persons ages 16–25 years	−0.037	0.46	0.057	0.47	−0.092	0.81
Persons ages 26–35 years	0.246	2.77***	0.276	2.10**	0.235	1.84*
Persons ages 36–45 years	0.133	1.41	0.173	1.24	0.107	0.79
Persons ages 46–55 years	−0.070	0.67	−0.028	0.18	−0.097	0.66
Persons ages 56–65 years	−0.077	0.77	0.076	0.53	−0.224	1.54
Persons ages >65 years	−0.228	2.23**	−0.042	0.28	−0.364	2.49**
Persons with 1–3 years of schooling	0.183	2.38**	0.143	1.19	0.199	1.88*
Persons with 4–5 years of schooling	0.326	4.42***	0.306	2.65***	0.280	2.73***
Persons with 6–9 years of schooling	0.214	3.10***	0.095	0.87	0.271	2.83***
Persons with 10–12 years of schooling	0.089	1.14	0.014	0.12	0.102	0.91
Persons with postsecondary schooling	−0.135	1.25	−0.272	1.87*	0.062	0.37
Persons with technical training	0.111	1.66*	0.126	1.41	0.087	0.83
Persons with completed apprenticeships	0.160	2.58***	0.111	1.36	0.230	2.34**
Characteristics of parents of head						
Average years of schooling	0.008	0.73	0.010	0.60	0.006	0.37
Years of schooling unknown	0.023	0.16	−0.014	0.07	0.001	0.00
Major occupation: farmer	−0.109	0.75	−0.099	0.51	0.025	0.11
Major occupation: manager	0.707	1.05	−0.227	0.22	1.669	1.83*
Major occupation: skilled manual	0.950	3.19***	0.354	0.97	2.404	4.32***
Major occupation unknown	−0.288	1.17	−0.597	1.68*	0.024	0.07
Number of observations	4,289		1,919		2,370	
Proportion affirmative	0.286		0.328		0.252	
Average log-likelihood value	−0.5661		−0.5994		−0.5261	
Likelihood ratio test of slopes	276.67		127.45		181.67	
Likelihood ratio test of sample difference	61.79					
p value	0.0087					

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

thrived. Are the most profitable NFHEs in 1993 still among the high-performing firms in 1998, or was 1993 just their lucky year?

The simplest way to address this question is with the transition matrices that are presented in table 4.12. The columns of table 4.12, panel A, split the 1993 enterprises into quintiles according to their reported adjusted net revenue (that is, sales minus operating costs plus purchases of durable goods). The rows reflect where enterprises ended up—either in various income quintiles, as a terminated case, or as an enterprise that disappeared when the household attrited. Thus, each column adds up to 100 percent and contains one-fifth of the 1993 enterprise sample.

Three conclusions follow from this table. First, there is clearly some stability in the distribution of enterprise income. The best-performing enterprises in 1993 are much more likely to be near the top in 1998, the middle-class remains in the middle, and the poor have difficulty rising from the bottom, although it is not impossible for them to do so. For most households, the probability of building up a highly profitable enterprise in just a few years is very low.

The second important finding is that enterprise termination is clearly related to past enterprise performance, with the low performers being the most likely to go out of business. However, even in the highest quintiles, 40 percent or more of the enterprises do not survive until the fifth year. As noted, attrition is again seen as not strongly related to the recent performance of the enterprise.

Part B of table 4.12 expands on this analysis by asking where the 1998 enterprises—distinguished by their quintile of 1998 performance—were in 1993. Here, the rows add up to 100 percent, and the columns describe the origin. The first five columns (with quintile headings) once again contain the panel enterprises and again demonstrate the stability in income that was seen in panel A. The next column provides evidence that start-up enterprises are more likely to be among the poor performers, which is to be expected given that they have not yet been winnowed out to the same degree as the more established firms. The "enterprise in new sample" column describes the position of the enterprises in households that were not part of the 1993 VLSS sample but were added in 1998 (see also table 4.6). Enterprises in this subsample tended to perform relatively well.

Table 4.13 goes a step further and asks what the sources of growth in enterprise net revenue (that is, sales less expenses) might be. Regressions that explain the level of enterprise income have appeared elsewhere, both for 1993 (Vijverberg 1998b) and for 1998 (Tran 2000).[9] The average value of the proportional difference in income is 0.418, which means that the average enterprise collected 41.8 percent more income in 1998 than in 1993.

The independent variables refer to conditions in 1993, so the regression attempts to find determinants of future income growth. The middle two columns ("without selectivity correction") of table 4.13 show the results of estimating an ordinary least squares regression on enterprises that were included in the panel; it is thus conditional on the enterprise surviving from

Table 4.12. Dynamics in Enterprise Income

Quintile of 1998 enterprise income:	Quintile of 1993 enterprise income: Low	Low-middle	Middle	Middle-upper	Upper
Panel A: What happened to the 1993 enterprises in 1998?					
Low	6.44	6.80	6.62	3.58	1.25
Low-middle	4.83	7.87	8.77	7.33	3.04
Middle	4.47	6.08	10.73	9.84	6.62
Middle-upper	2.68	3.58	7.33	12.88	10.91
Upper	0.89	2.50	5.01	7.87	25.40
Enterprise terminated	69.23	63.86	52.06	44.90	40.97
Household attrited	8.05	8.23	8.05	11.63	11.09
Household dropped	3.22	1.07	1.43	1.97	0.72
Total (%)	100.00	100.00	100.00	100.00	100.00
No. of observations	559	559	559	559	559

Quintile of 1998 enterprise income:	Quintile of 1993 enterprise income: Low	Low-middle	Middle	Middle-upper	Upper	Enterprises started up	Enterprises in new sample	Total (%)	No. of observations
Panel B: Where were the 1998 enterprises in 1993?									
Low	5.27	5.56	5.42	2.93	1.02	60.18	19.62	100.00	683
Low-middle	3.95	6.43	7.16	5.99	2.49	51.46	22.51	100.00	684
Middle	3.65	4.97	8.77	8.04	5.41	39.18	29.97	100.00	684
Middle-upper	2.19	2.92	5.99	10.53	8.92	31.87	37.57	100.00	684
Upper	0.73	2.05	4.10	6.44	20.79	24.45	41.43	100.00	683

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Table 4.13. Determinants of Growth in Enterprise Income

	Without selectivity correction		*With selectivity correction*	
Variable	*Parameter estimate*	*t statistic*	*Parameter estimate*	*t statistic*
Dependent variable: "Log(Annual 1998 enterprise income + 1) − Log(Annual 1993 enterprise income + 1)"				
Intercept	1.332	2.77***	0.235	0.13
Enterprise inputs:				
ln(Capital + 1)	−0.053	−3.06***	−0.027	−0.64
ln(Inventory + 1)	−0.018	−0.96	−0.004	−0.12
Enterprise characteristics				
Operating from a fixed location	−0.121	−1.00	0.009	0.04
Enterprise age between 1.42 and 3.00 years	−0.343	−2.16**	−0.238	−1.05
Enterprise age between 3.00 and 5.00 years	−0.433	−2.68***	−0.287	−1.03
Enterprise age between 5.00 and 11.00 years	−0.664	−4.02***	−0.521	−1.88*
Enterprise age >11.00 years	−0.540	−3.20***	−0.302	−0.74
Fishery	−0.203	−1.00	−0.464	−1.03
Food manufacturing	0.085	0.45	−0.143	−0.36
Textiles manufacturing	0.123	0.61	−0.164	−0.34
Other manufacturing	−0.127	−0.62	−0.447	−0.84
Food/hotel commerce	−0.237	−1.32	−0.306	−1.45
Transportation/communication	−0.352	−1.39	−0.474	−1.49
Services	−0.063	−0.26	−0.427	−0.70
Other enterprises	−0.331	−1.36	−0.654	−1.18
Family worker characteristics				
Years of schooling	0.021	1.41	0.015	0.88
Age <15 years	0.248	0.68	0.204	0.55

Age between 25 and 35 years	0.228	1.49	0.397	1.31
Age between 35 and 45 years	0.110	0.64	0.240	0.90
Age between 45 and 55 years	0.134	0.63	0.176	0.78
Age between 55 and 65 years	−0.232	−0.90	−0.239	−0.91
Age >65 years	−0.438	−1.02	−0.569	−1.19
Female	0.011	0.08	0.063	0.38
Chinese	−0.286	−1.10	−0.245	−0.90
Non-Kinh, non-Chinese	−0.186	−0.70	−0.252	−0.89
Regional characteristics				
South	0.187	1.46	0.083	0.40
Urban Northern Uplands	0.061	0.12	0.193	0.36
Urban Red River Delta	−0.332	−0.70	−0.165	−0.30
Urban North Central Coast	0.551	0.98	0.868	1.15
Urban Central Coast	−0.081	−0.17	0.264	0.37
Urban Southeast	−0.176	−0.37	−0.027	−0.05
Urban Mekong Delta	−0.445	−0.95	−0.217	−0.37
Presence and frequency of local market	0.127	0.37	0.384	0.73
Presence of market in nearby community	0.294	0.69	0.465	0.93
Presence and quality of roads	−0.494	−1.42	−0.457	−1.28
Use of electricity and piped water	−0.357	−1.46	−0.435	−1.58
Selectivity correction term				
Heckman's lambda	n.a.		0.698	0.65
R^2	0.087		0.088	
Number of observations	931		931	

n.a. Not applicable.

*Significant at 10 percent level.
**Significant at 5 percent level.
***Significant at 1 percent level.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

1993 to 1998. This does not, however, reflect the experience of all firms, because more than 60 percent of firms that existed in 1993 were no longer in existence in 1998 (that is, they had no profit in 1998). The two right-hand columns ("with selectivity correction") show estimates that, in principle, apply to all firms, using a Heckman adjustment (which means, first, estimate a probit regression of a model that tries to explain which enterprises survive, then use the conditional mean of the disturbance term, also called "Heckman's lambda," as an additional explanatory variable in the initial regression).[10]

The regression models do not have much explanatory power: The R^2 values are around 0.088. Thus, less than 10 percent of the variation in enterprise growth is explained by the model. This is in line with previous research showing that regression models of enterprise earnings leave most of the variation unexplained (for example, Tran [2000], Vijverberg [1998a, 1998b]). Because the dependent variable here refers to the difference in income between two periods, the noise that one typically must deal with in enterprise earnings models is essentially doubled. Furthermore, whereas there are around 3,000 enterprises in each annual sample (see table 4.6), the requirement that income be observed in both 1993 and 1998 lowers the sample size to only 931 enterprises. This further reduces the precision of the parameter estimates. All this suggests that a more adequate answer about the determinants of enterprise income growth can be derived only from much larger datasets.

A number of interesting conclusions emerge from these estimates, although they are tentative, given the low levels of statistical significance. First, the size of the enterprise, as measured by the capital and inventory stocks, has little impact on enterprise income growth. Second, the youngest enterprises seem to grow the fastest, although this should be seen more as a learning effect than as an inherent, long-term productivity determinant. Third, the highest income growth rates are in retail trade (the excluded category among the market sectors). Fourth, there is a hint that educated and prime-age workers generate more growth. Differences across regions are minor, and the presence of markets appears to help.

Conclusions

Almost one-quarter of all adults worked in NFHEs in 1998, typically in combination with farming or another occupation. About 1 worker in 10 relied on NFHEs as his or her sole source of earnings. These averages hide more than they reveal, because participation in an NFHE is strongly related to living standards: Just 35 percent of chronically poor households operated such an enterprise in 1998, compared with 55 percent of solidly affluent households.

It is difficult to identify the direction of causality, but it is probably bidirectional. Some evidence can be found to support the finding that operating an enterprise leads to affluence: Those households that jumped at least two expenditure quintiles between 1993 and 1998 ("shooting stars") began poor and ended up relatively rich; they also were more likely to be operating an enterprise in 1998 than they were in 1993. Conversely, households whose relative expenditure level fell sharply ("sinking stones") were less likely to operate a business in 1998 than in 1993. To the extent that operating a business boosts a household's standard of living, it makes sense to encourage the establishment of such enterprises if the goal is faster economic growth.

But what determines who operates a business? A formal analysis shows that geography matters, although perhaps not in the way that would be expected. Households in urban areas are more likely to engage in self-employment, but this effect is relatively weak in Ho Chi Minh City. Family history is also important, and the children of proprietors are much more likely to be proprietors themselves. Education helps, but only up to a point, and university graduates are less likely to operate a family enterprise than are those with just a high school diploma.[11]

Perhaps more interesting is the information on enterprise survival and formation. There is little published work on this subject, primarily because household survey data do not usually allow for the construction of the requisite panel of enterprises. NFHEs were found to be less likely to survive between 1993 and 1998 in southern Vietnam, particularly in and around Ho Chi Minh City, than were NFHEs in the north. Older and larger firms were more than twice as likely to survive during this period as their smaller, younger peers. Startups were less common in the south of Vietnam, but were more common in households in which there was a skilled manual worker.

An interesting pattern emerges from the analysis. As one moves from poor rural areas, through middle-income cities, to the most affluent part of the country (Ho Chi Minh City), the importance of NFHEs first rises and then falls. In poor areas, there is often a lack of education, credit, and effective demand for the products of household enterprises. In rich areas, there are better alternatives to family business, typically in the form of wage labor. NFHEs thus play an important role in the period of transition, when agriculture is declining in importance but before the formal industrial sector and service sector are large enough to take up all of the slack.

For lack of data, this analysis of household enterprises in Vietnam has not been able to determine the impact of investment climate factors such as credit availability, regulations, permit requirements, health and safety inspections, harassment by government officials, crime, and so forth. The VLSS did include (but only in rural areas) a number of relevant factors such as road and waterways infrastructure, community-level use rates of electricity and piped water, availability of public transportation, agricultural extension services, and access to marketplaces. For enterprise startup, infrastructure, availability of utilities, and market access matter. Survival is clearly related only to market access. Income growth does not clearly depend on any of these variables, but then again, income growth is such a noisy variable that the empirical model in this study was not able to explain much of its variation at all. Overall, therefore, the impact of investment climate variables is still an open question.

As Vietnam seeks to double GDP over the decade ahead, what role will NFHEs play? This chapter's findings are not particularly encouraging. The number of enterprise terminations is high, at 60 percent between 1993 and 1998. During the same period, the proportion of adults working in NFHEs fell, as did the proportion of households with such an enterprise. The growth in NFHE sales, expenditures, and income lagged behind GDP growth. This is not to argue that NFHEs should be neglected, but rather that, based on recent history, NFHEs play only a modest supporting role in fostering rapid economic growth in Vietnam.

These findings should be qualified by noting that the economic environment surrounding the private sector enterprises changed after the VLSS data were collected. Household enterprises can register quite easily now: They are required to file only the name and address of the business owner, the location of the business, the line of operation of the business, and the amount of business capital (Phan 2000a). Rural enterprises receive more support than before in access to credit, assistance with marketing, and favorable tax treatment (Nguyen 2000). It is quite possible that these policies induce capable entrepreneurs to enter the private sector, but it still appears that private (household) enterprises start up with only one-third of the capital that typical enterprises (such as limited companies, joint stock companies, partnerships, or state-owned enterprises) begin with.[12] Of course, it may be that, for purely financial reasons, successful NFHEs reregister under a more protected organizational form (Phan 2000b), which the VLSS does not capture. But this was not yet an issue when the VLSS data were collected. If the only thrust of the new policy direction lies in the facilitation of enterprise registration, it is quite likely that the main conclusions of this study are still valid under the new economic conditions, because such policies do not address the long-term survival and success of small enterprises. However, given the rural policy initiative, it is certainly worth reexamining the issues with new data in the future.

Appendix 4A Constructing Community Variables

A number of rural infrastructure indexes are constructed from the rural community questionnaires. Here each index is defined; comments follow each.

$$\text{Road index} = \left(1 - \frac{\text{Km. to nearest road}}{10}\right) \times \left(1 - \frac{\text{Months with impassable road}}{12}\right).$$

This measures the availability of a viable road system. Distances greater than 10 are truncated at 10. The index declines if the nearest road that a car can travel on is farther away or impassable for longer periods.[13] The expectation is that a higher value of the road index, by opening up opportunities for business, will be associated with more involvement in NFHEs.

$$\text{Waterways index} = \left(1 - \frac{\text{Km. to nearest waterway}}{10}\right)$$

This measure is available only for the 1998 sample and is computed only if the respondent indicated that waterways were an important means of transportation for the community. Whenever the distance exceeds 10 kilometers or waterways are not deemed important, the index takes on a value of zero.

$$\text{Public transport index} = \left(1 - \frac{\text{Km. to nearest train, bus, or water transport}}{50}\right) \times \text{Daily frequency}$$

The distance is truncated at 50 kilometers. The index is an indicator of connectedness.

$$\text{Daily market index} = \left(1 - \frac{\text{Distance to nearest daily market}}{72}\right)$$

$$\text{Periodic market index} = \left(1 - \frac{\text{Distance to nearest periodic market}}{50}\right) \times \text{Daily frequency}$$

For both market indexes, the truncation points are chosen according to values indicated in the survey. The daily frequency is a proportion, so a market that operates once a week has a daily frequency of 1/7. It is hypothesized that the presence of frequently operating markets enhances the viability of NFHEs.

$$\text{School index} = \left(2 - \frac{\text{Km. to lower secondary school}}{10} - \frac{\text{Km. to upper secondary school}}{10}\right)$$

Again, the distances are truncated at 10. A commune with both a lower and an upper secondary school in its center would have a school index value of 2. A larger school index may reflect higher levels of educational attainment locally, which should enhance enterprise performance. A larger school index also means that children stay at school longer, reducing the supply of labor.

$$\text{Agricultural extension index} = \left(1 - \frac{\text{Distance to nearest extension center}}{50} + \frac{\text{Number of extension visits per year}}{40}\right).$$

The truncation points are once again selected on the basis of values in the sample. The visits component on the second line contributes a maximum value of one to the index. Thus, the maximum possible value for this index equals two.

$$\text{Utilities index (1998)} = (\text{Proportion of households using electricity} \times \text{Usability factor})$$

The usability factor measures the proportion of the day that there is no utility outage. It is assumed that if the respondent indicates that outages occur, a daily outage lasts two hours on average or that weekly (or monthly) outages happen twice per week (or month) for two hours at a time.

$$\text{Utilities index (1993)} = (\text{Proportion of households with electricity} + \text{Proportion of households with piped water})$$

The 1993 questionnaire did not provide information on electricity outages, so this simpler measure is used. The proportions take on values of zero, one-third, and two-thirds, depending on whether no, a few, or most households have the specified access. The objective of this index is to measure productive opportunities offered to the enterprise through access to electricity and water. Higher values of this index should benefit the enterprise.

$$\text{Wage index} = (\text{Average male and female wages for agricultural tasks})$$

For a substantial number of communities in the 1998 survey, this average could not be computed with a reasonable level of confidence; in these cases, a dummy variable is added. The effect of this index on NFHE employment is ambiguous; higher wages imply that there are good alternative sources of income, making it less attractive to operate a business and more expensive to hire workers. Higher wages indicate greater affluence, however, and a higher demand for small-business services such as shops and restaurants.

Notes

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1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. The figures in table 4.1 come from section 4A of the VLSS questionnaires, which asks whether someone was working in an NFHE. It would have been preferable to provide a breakdown of the hours worked, but unfortunately the relevant sections of the 1993 and 1998 questionnaires are not strictly comparable on this

matter. However, in 1993, the two breakdowns—by hours and by participation—give broadly similar results (see Vijverberg [1998a]).

3. Here, "ethnic minority" is taken to refer to ethnic groups other than Kinh or Hoa (Chinese).

4. The official headcount poverty rate was 55 percent in 1993 and 37 percent in 1998 (General Statistical Office 2000).

5. The coefficients on the urban or region dummy variables compare these areas with a baseline rural region with zero values for all the rural indexes (including the wage dummy). Using the average values for rural areas, one would find that the baseline parameter for a "typical" rural area would be –0.031. This is the number with which (for instance) the urban Red River Delta figure of 0.552 should be compared.

6. There have been several living standards surveys with a rolling panel design, most notably in Côte d'Ivoire and Ghana (Glewwe and Jacoby 2000). That is, one-half of the households in one year were visited again in the following year. There has been no attempt to create a panel of enterprises from the household panel information, as far as is known as of this writing.

7. Because the distribution of the financial performance variables is so highly skewed, the mean values are extremely sensitive to outliers and difficult to compare over time. Therefore, the table also reports median values, which are known to be less sensitive.

8. Before taking the logarithm, a value of one is added to the household's total enterprise income because some households report zero incomes. This transformation has little impact on the measurement of the effect of enterprise income on attrition.

9. The dependent variable is the difference in the natural logarithm of enterprise income, which gives the proportional difference in income. However, because of the zero-valued incomes that a few enterprises report, a value of one has been added to the argument under the log function, so the dependent variable measures the proportional change relative to (enterprise income + one). Income values are expressed in thousands of dong, measured in 1998 prices, and deflated for differences in prices across regions and survey months.

10. As is well known, it is highly recommended that the first-stage probit analysis incorporate some variables that are unique to the selection process and are not part of the explanatory variable set that is used in the second stage. This helps identify the explanatory influence of the added Heckman's lambda. In this case, the first-stage probit equation is the survival model reported in table 4.9 (estimated with probit instead of logit in line with the standard selectivity correction protocol). The identifying first-stage variables are availability of public transportation, local wage index, local producer price of rice, and the dummy variables indicating whether the latter two variables are missing (all pertaining to 1993 community characteristics). None of these are theorized to have a direct impact on the growth in enterprise income. Unfortunately, as was shown in table 4.9, they also lack a strong impact on enterprise survival. As a result, adding the Heckman's lambda variable to the model raises the degree of multicollinearity among the explanatory variables in a regression equation that already has low explanatory power. This is one more reason why the two right-hand columns show low *t* values.

11. As discussed in Edmonds and Turk (2004), the presence of NFHEs affects the likelihood of child labor in the household. However, our analysis shows that the impact of the presence of children on the incidence and performance of household enterprises is, to the degree analyzed, negligible.

12. Ministry of Planning and Investment. 2001. "Data on Registered Enterprises in 2000; Data on Registered Enterprises in the First Half of 2001." Unpublished tables. Hanoi.

13. The 1993 community survey did not specify that the road must be accessible by car.

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5

Agriculture and Income Distribution in Rural Vietnam under Economic Reforms: A Tale of Two Regions

Dwayne Benjamin and Loren Brandt

The period between 1993 and 1998 marked a continuation of the reforms of Vietnam's rural sector that began in earnest in 1988 with the implementation of Resolution 10, Vietnam's own version of the Chinese Household Responsibility System. Over this five-year period, new policies were implemented that provided households with better and more secure land use rights, expanded domestic and international marketing opportunities, and relaxed input supply constraints. These reforms, especially the relaxation of trade restrictions on rice and fertilizer, reinforced the incentive-enhancing effects of the earlier decentralization of decisionmaking in 1988 to farm households and, in the process, influenced supply and marketing decisions in agriculture, incomes, and welfare.

This chapter aims to provide a description of the main changes occurring in agriculture in Vietnam during this five-year window, especially as they pertain to the distribution of incomes in the countryside. In particular, the panel dimension of the Vietnam Living Standard Survey (VLSS)[1] is exploited to track households as they adjusted to the changes in the agricultural sector precipitated by ongoing economic reforms. This includes an assortment of adjustments in agricultural production and marketing, as well as in consumption.

The chapter's chief concern is the analysis of the regional dimensions of these changes and the differential effect of these reforms on growth and distribution in northern and southern Vietnam.[2] The focus will be on the impact of two main policy changes: first, the increase in the rice export quota and the significant increase in the price of rice, especially in the south; second, liberalization of the fertilizer market and the sharp drop in the price of fertilizer. Most of the changes in agriculture are expected to center on rice production, and the south is expected to gain more than the north. Differences between the north and the south in terms of their historical comparative advantage in rice production suggest that these marketing reforms may have accelerated a return to earlier production patterns. In addition to the differences across regions, the focus here will be on the possibly uneven impact of the reforms on households within regions. In short, this chapter investigates the linkages between the price policy changes and the associated (possible) efficiency and equity consequences in the countryside.

In the first section, the major institutional reforms affecting the rural sector over this period are highlighted, and then their potential implications for agriculture and incomes are discussed. This is followed by a section giving a brief look at the changing structure of household incomes and changes in income inequality over this period. The discussion documents the continuing important role of agriculture in rural incomes, important changes in income distribution, and contrasts between the north and the south.

The next section examines the empirically observable institutional environment and explores changes in rice and other crop prices, as well as in fertilizer prices. The authors believe that these changes are at the center of the changes in Vietnam's rural sector. With this as background, the next section explores changes in rice production, consumption, and marketing. Questions addressed in this section are: Which regions saw increases in the production and consumption of rice? Were there declines? Moreover, do these changes line up with the patterns of price adjustment? This section also provides a detailed look at the impact of rising household incomes on the level and pattern of food demand.

Next, these changes in rice farming are placed in the broader context of agricultural production, and changes in cropping patterns across Vietnam are described. Given the significant increase in rice production and farm output, more generally, this section also investigates the extent to which these increases can be explained by increases in inputs such as fertilizer, cropping intensity, and increased yields. Finally, in the section titled "Agriculture and Inequality," the focus is on the distributional impacts of these changes, including a detailed examination of the linkages between rice marketing and income distribution, and on a summary of the role of agricultural incomes more generally as they pertain to income inequality.

Throughout the chapter, north-south regional breakdowns are provided. Differences between urban and rural Vietnamese households are also presented. Urban households are of some interest, not only because a small fraction of them is made up of farmers, but also because the welfare consequences of changes in agriculture may have opposite implications for urban and rural households. That said, to keep the dimension of the tables to a reasonable level, the focus is primarily on those households classified as rural.

Institutional Changes and Potential Implications

Several important institutional changes occurred between 1993 and 1998 that might be expected to affect agricultural incomes.[3] Some of these changes represented a continuation of the move toward market-based production, and others concerned (implicit) taxes and rice marketing policy:

- Between 1992 and 1998, key agricultural markets were gradually liberalized. Relaxation of restrictions on rice exports was the most important. The export quota was increased from less than 1 million metric tons in 1992 to 4.5 million metric tons by 1998. Similarly, there was a relaxation of internal barriers to trade in rice that had restricted the flow of rice from the south to the north. Especially important in this regard was Decree Number 140/TTg, implemented in March 1997, which lifted internal trade restrictions on rice and eliminated some licenses and controls on transports. The combination of export quotas and internal trade restrictions, which restricted the movement of rice from south to north, had severely depressed the price of rice in the south. For example, in 1995, the export value of a ton of rice was US$269, but farmers in the Mekong Delta received only US$205 per ton, yielding an implicit tax of more than 30 percent.[4] Clearly, an increase in the rice export quota would be expected to increase the price of rice, especially in the south.
- Fertilizer supply constraints were reduced, with new freedoms to import fertilizer. In 1991, central and provincial state-owned enterprises that earned foreign exchange were allowed to import fertilizer directly. Vietnam does not have much of a domestic fertilizer industry and therefore is heavily dependent on imports. Over the 1993–98 period fertilizer imports tripled in quantity terms. Although there are no tariffs on imports, there may still be a wedge between the domestic and international prices of fertilizer. Still, a sharp drop in fertilizer prices because of the liberalization of this key input market is anticipated.
- Resolution 5, passed in 1993, aimed to enhance households' land use rights. Tenure security was extended to 20 years for annuals cropland and 50 years for perennials. Households were extended rights to exchange, transfer, lease, inherit, and mortgage land. A land titling process was also begun. In the long run, these changes can be expected to affect investment incentives in agriculture, including irrigation, drainage, perennials, and so on, and they are also expected to affect the efficiency with which land is allocated across households. Although titling programs encountered a variety of administrative difficulties, by 1997 half of all land had been titled, affecting two-thirds of all households. Most of the changes occurred toward the end of the period in question; thus, this increase in property rights security will probably not have had enough time to be reflected in production behavior and output.
- Improved development of market infrastructure and the continued integration of Vietnam with world agricultural markets would possibly have made it easier for households to start growing exportable cash crops.

In summary, the most important changes in farmers' economic environment concerned prices: increases in crop prices and reductions in fertilizer prices. Changes in these markets are likely to have affected households in a variety of ways. First, ignoring production adjustments, changes in the price of rice (and fertilizer) will have direct effects on the well-being of rice producers and consumers through their farm balance sheets. This impact is quite likely to vary across the different regions of Vietnam (urban versus rural, north versus south, rice surplus versus rice deficit) and across different parts of the income distribution. Second, households are expected to make production adjustments. It may no longer be worthwhile for some households to grow rice, or it may be more profitable for them to move into the production of cash crops. For other households, rice may be a more lucrative crop and may merit even deeper investments and specialization. Indeed, one of the most interesting questions pertaining to rice market liberalization concerns the extent to which crop production adjusts across regions. Through trade, rice-deficit regions move into other crops in which farmers have a comparative advantage, while rice-surplus areas cultivate rice more intensively. The reduced cost of fertilizer may induce farmers to substitute chemical for organic fertilizer, possibly increasing yields. At the household level, increased commercialization means that households are more engaged in—and affected by—markets. An important question is how this increase in market development affects household welfare and efficiency.

In addition to responses to the specific price changes that resulted from government policy in the 1993–98 period, other factors are expected to affect agriculture. First, a continued adjustment to the market reforms that were begun in the late 1980s is expected. The decentralization of household decisionmaking, which was at the center of the reforms, is anticipated to improve farm efficiencies and possibly permit greater specialization within farming. An important question concerns whether some of the initial success of the market reforms was maintained through the 1990s.[5]

Second, increases in urban and rural incomes can be expected to increase the demand for food, especially for crops other than rice. This may have encouraged farmers to diversify their crop portfolios, especially encouraging them to move into more lucrative perennials. The movement of farmers out of rice also suggests the importance of the codevelopment of rice markets and commercialization, which permits some farmers to stop growing their own food. Finally, combined with economic development, economic reforms may have permitted a diminished role for agriculture, because households increasingly participate in nonagricultural pursuits.[6] In assessing the impact of changes in agriculture, it is important to see how nonagricultural pursuits may offset the impact on household welfare of changes in agricultural income.

This chapter's focus is on agricultural income—crop revenue minus expenses—and its place in the context of overall household income. Preliminary evidence on the bottom line of the possible impact of these changes is provided by Glewwe, Gragnolati, and Zaman (2002), who look at changes in consumption levels between 1993 and 1998. They document a sharp drop in poverty, from 58.2 percent to 38.4 percent, which suggests that incomes rose significantly. Most of the decline in poverty that they find is concentrated in urban areas. However, among rural households, they find the most pronounced drops in poverty for households that live in the south, had more irrigated land, and experienced greater increases in rice productivity. This suggests that changes in rice and fertilizer prices, or at least increases in the returns to rice farming, may have been responsible for improved living standards. Direct examination of agricultural incomes is necessary to draw the link between agriculture and living standards.

Agriculture and the Structure of Income

This section documents changes in the structure of household income and consumption from 1993 to 1998 using the 1993 and 1998 VLSSs.[7] This serves two purposes. First, it enables any changes in the role of agriculture in the portfolio of household income to become apparent; second, it provides useful background information on patterns of changes in living standards. As households become wealthier, their demand for agricultural goods is expected to change, with implications for agricultural prices and, possibly, cropping patterns.

Throughout, this chapter focuses only on the "panel households"—those households that can be tracked across the two survey periods. The VLSS in 1998 was expected to include a total of 6,000 households, including a resurvey of the 4,800 households originally surveyed in 1993. As typically happens, it was not possible to recontact some of the original households, so only 4,306 households can be precisely followed between the two surveys. The analysis is therefore based on the 3,496 rural and 810 urban households panel (or longitudinal) households that could be accurately matched across the 1993 and 1998 surveys.

To the extent that these households are not representative of the entire population, there may be some limitations on applying conclusions from this analysis to the entire country. However, similar tables over the entire set of nonpanel households have also been calculated, and basically the same results were obtained. By focusing on the panel, the changes in outcomes for a specific group of households can be tracked with some confidence that initial conditions are being held constant. This will be particularly helpful when changes (as opposed to levels) of outcomes are studied. One caveat, however, is that the members of any panel dataset age in the panel, so some of the observed changes may be a function of aging, in addition to any changes in aggregate economic conditions.

Levels of Income

Table 5.1 shows mean incomes for households by various sources, partitioned into a variety of subsamples.[8] A few conventions are worth noting. First, all values are expressed in terms of 1998 prices, using the

Table 5.1. Household Incomes by Source
(thousand dong)

	1993					
	Urban			*Rural*		
Indicator	*North*	*South*	*Total*	*North*	*South*	*Total*
Total income (1)	12,801.5	17,993.6	15,852.7	7,613.0	8,779.3	8,110.8
Total income (2)	10,625.1	14,021.8	12,621.2	6,914.3	7,782.1	7,284.7
By components						
Wages	2,456.5	4,261.8	3,517.4	475.1	1,355.7	850.9
Family business	3,163.8	4,876.4	4,170.3	1,081.1	1,548.2	1,280.4
Farming	733.5	414.8	546.2	3,529.1	3,779.7	3,636.0
Livestock	221.7	−29.2	74.3	807.8	246.8	568.3
Other	4,049.6	4,497.9	4,313.1	1,021.2	851.8	948.9
Services, durables	2,176.3	3,971.8	3,231.5	698.7	997.2	826.1
Household size	4.2	5.7	5.1	4.8	5.5	5.1
Per capita income (1)	3,062.9	3,234.0	3,174.8	1,604.9	1,629.7	1,616.3
Per capita income (2)	2,547.9	2,533.4	2,538.4	1,458.3	1,449.7	1,454.3
Per capita consumption (1)	2,503.5	2,789.0	2,690.2	1,387.2	1,612.0	1,490.3
Per capita consumption (2)	1,988.6	2,088.4	2,053.8	1,240.6	1,432.0	1,328.4
Gini, per capita income (1)	0.49	0.50	0.50	0.37	0.46	0.41
Gini, per capita income (2)	0.51	0.52	0.52	0.37	0.48	0.42
Gini, per capita consumption (1)	0.32	0.34	0.34	0.24	0.29	0.27
Gini, per capita consumption (2)	0.29	0.29	0.29	0.22	0.27	0.25

	1998					
	Urban			*Rural*		
Indicator	*North*	*South*	*Total*	*North*	*South*	*Total*
Total income (1)	23,505.3	29,598.6	27,086.1	11,798.4	17,092.1	14,057.6
Total income (2)	19,314.9	23,845.0	21,977.0	10,244.7	15,186.6	12,353.8
By components						
Wages	5,058.5	6,759.5	6,058.1	1,057.2	2,784.3	1,794.3
Family business	5,607.5	11,055.1	8,808.8	2,103.4	3,453.7	2,679.7
Farming	1,052.9	654.3	818.7	3,924.6	6,425.1	4,991.8
Livestock	453.3	136.3	267.0	1,433.2	1,032.4	1,262.1
Other	7,142.6	5,239.9	6,024.5	1,726.4	1,491.1	1,625.9
Services, durables	4,190.4	5,753.6	5,109.0	1,553.6	1,905.5	1,703.8
Household size	4.0	4.9	4.5	4.6	5.2	4.8
Per capita income (1)	5,871.9	6,115.5	6,026.1	2,597.1	3,305.7	2,922.0
Per capita income (2)	4,825.1	4,931.5	4,892.5	2,256.5	2,939.1	2,569.5
Per capita consumption (1)	4,360.3	4,685.6	4,566.2	2,219.1	2,530.0	2,361.6
Per capita consumption (2)	3,313.5	3,501.5	3,432.5	1,878.5	2,163.4	2,009.1
Gini, per capita income (1)	0.42	0.44	0.43	0.39	0.42	0.41
Gini, per capita income (2)	0.44	0.43	0.44	0.39	0.42	0.41
Gini, per capita consumption (1)	0.32	0.35	0.34	0.27	0.29	0.28
Gini, per capita consumption (2)	0.30	0.29	0.30	0.25	0.27	0.26

Note: All values are in 1998 currency and are deflated by regional and monthly price indexes. Income (1) is total income from all components listed in the table, and income (2) is the same measure, excluding imputed income from durables and owner-occupied housing. The same distinction holds for consumption (1) and consumption (2). Means are calculated over the panel households. The means for the per capita variables (consumption and income) are weighted by household size. Gini coefficients are calculated over those households with positive income and are weighted by household size.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

recommended 1.456 deflator. Second, when discussing incomes for use in welfare analysis (as in table 5.1), the monthly and regional consumer price deflators are also used, so that regional incomes are adjusted for regional differences in purchasing power.[9] Third, two measures of income (and consumption) are presented, with and without the imputed value of capital services. Imputed capital services, which measure the flow of services from durables and owner-occupied housing, are very difficult to estimate, and the authors would like to evaluate the robustness of their conclusions to this "made-up," but important, component of income. Finally, the per capita household-level variables are also weighted by household size to reflect individual-level averages. Two main conclusions follow from table 5.1. First, average incomes increased dramatically over this period, and, second, income growth was highest in the rural south and lowest in the rural north.

The first category in table 5.1 to assess is overall household incomes from all sources (including capital services). Although urban households are not the focus of this chapter, it is still informative to examine urban income levels and growth rates, if only as a benchmark for the rural households. In 1993, urban households in the north had average income of dong (D) 12,802,000 compared with D 17,994,000 in the south, implying a ratio of 0.71 for north to south.[10] Urban households in the north experienced income growth of 84 percent between 1993 and 1998, corresponding to average annual (compounded) growth of 13 percent. Urban household income growth was lower in the south, at 65 percent (10.5 percent a year) for this period. By comparison, rural households in the north had average income of D 7,613,000 in 1993. This was 59 percent as high as urban households in the north and 87 percent as high as rural dwellers in the south. Rural household incomes grew by 55 percent (9.2 percent a year) in the north and by an astounding 95 percent (14.3 percent a year) in the south. By 1998, the north-south rural income ratio had fallen to 0.69. This pattern of growth is similar to using "Total income (2)" in table 5.1, which excludes housing and durables services. The main difference that emerges in using this alternative income measure is that the rural-urban gap is slightly attenuated, reflecting the higher value of housing services in cities.

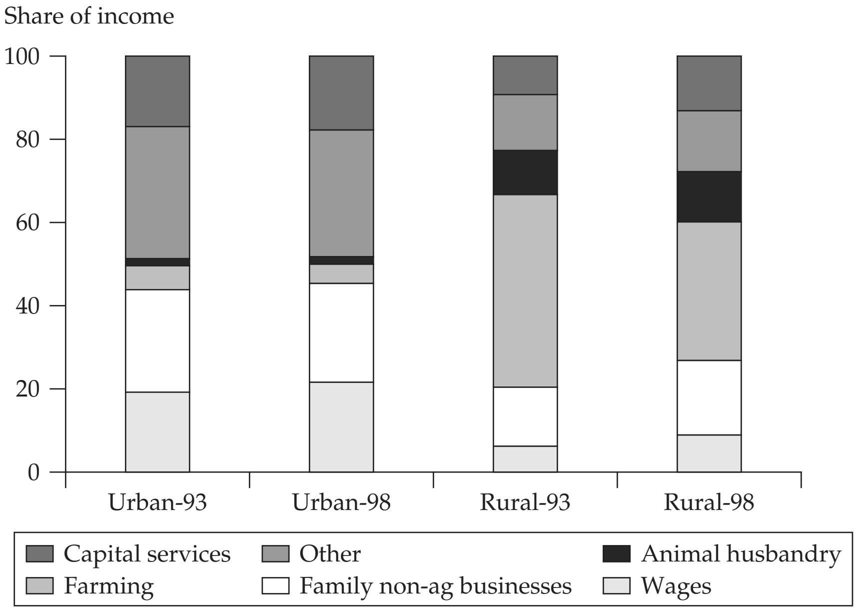
These numbers do not take into account the differences in household sizes across regions and periods. In addition, household size fell in all regions, but not uniformly. For example, household size fell from 4.2 to 4.0 in the urban north, but from 5.7 to 4.9 in the urban south, from 4.8 to 4.6 in the rural north, and from 5.5 to 5.2 in the rural south. These differences and changes in household size are reflected in the per capita income figures, and they generate important nuances to the conclusions based on household income. First, per capita income differences are much smaller across regions. The ratio of northern to southern urban incomes is 0.95 in 1993 and 0.96 in 1998. Per capita income growth in the north and south is 92 percent (13.9 percent a year) and 89 percent (13.6 percent a year), respectively. At the same time, however, the gap between north and south is more pronounced in rural areas: growth was 62 percent (10.1 percent a year) in the north and 103 percent (15.2 percent a year) in the south. The ratio of northern to southern rural per capita incomes fell from 0.99 in 1993 to 0.79 in 1998. Finally, adjustments for household size slightly widen the urban-rural gap.

In addition to changes in levels, there were changes in the composition of incomes over this period. This can be seen directly in the numbers reported in table 5.1, as well as in the implied income shares illustrated in figure 5.1. Clearly, the levels of all types of income rose in all regions. In urban areas, wages and family-run businesses contribute the most income; in 1993 they together accounted for almost 45 percent of incomes in the north and 50 percent of incomes in the south. In 1998, in the south, this share rises to 60 percent. Agriculture is not a very important income source in urban areas, though the category "other income" is especially important. This category comprises remittances, government transfers, interest, and rental income. Government transfers, such as military pensions, are higher in the north. Turning to rural areas, agriculture is clearly the most important category. In the north, the share of agriculture falls from 46 percent in 1993 to 33 percent in 1998, while in the south, the share of agriculture falls from 43 percent to 38 percent. Animal husbandry grew slightly in importance and is a higher share of income in the north. Finally, income from wages and family-run businesses increased in importance in both the south and north, where they now make up about one-third of household income. In summary, broadly defined agricultural sources of income remain very important in the Vietnamese countryside, though agriculture was a slightly smaller share of income in 1998 than in 1993.

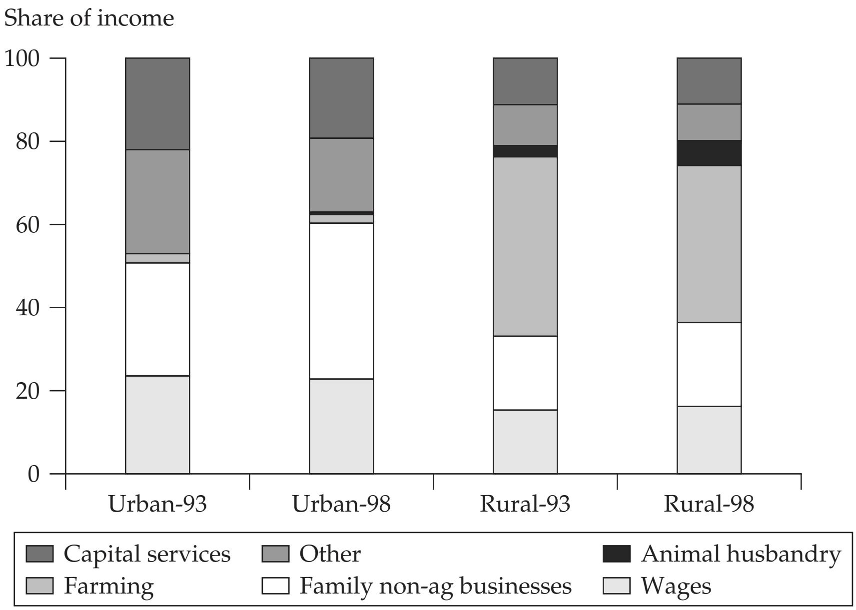
Finally, mean per capita consumption levels are shown for each region. The consumption numbers paint a slightly different picture from income. Certainly, they indicate significant improvements in living standards, especially in the cities, and suggest a sharp drop in poverty.[11] The ratios of 1998 to 1993 consumption range from 1.57 in the rural south to 1.74 in the urban north. But unlike the income figures, the consumption numbers do not suggest a widening gap between regions: Consumption in urban areas in the north increased from 90 percent to 93 percent of the levels in the south (similar to the per capita income figures), while consumption in the rural north was 83 percent of that in the south in both years (in contrast to the income results). One possible explanation for this finding is that the income numbers are "noisier" and are more sensitive to year-to-year variation. In fact, evidence is presented below that suggests that incomes were unusually high in the north in 1993, which would yield lower growth rates in subsequent years (mean reversion). However, it is also possible that consumption responds more slowly than income to changes in economic fundamentals and increased saving, not consumption, is the response to higher incomes. If this is the case, then the income numbers may point accurately to long-run trends in living standards that are not yet reflected in annual consumption.[12]

Figure 5.1. Composition of Income, Vietnam

a. North



b. South



Note: Based on data reported in table 5.1.

Source: Authors' calculations from 1992–93 and 1997–98 VLSSs.

Income Inequality

The Gini coefficients for the same subsamples are also presented in table 5.1. The income-based Gini coefficients suggest that income inequality dropped significantly in urban areas, declining from 0.50 to 0.43. This decline arises primarily from reductions in income inequality *within* the two regions, because there was only a small closing of the gap *between* regions (which was small to begin with). The consumption-based Gini coefficients paint a slightly different picture: They suggest that there has been no change in urban inequality. The income- and consumption-based Gini coefficients could both be correct if savings differences between rich and poor households are narrowing. Alternatively, the different picture could arise from some differential degree-of-measurement error in the income and consumption data.

The rural Gini coefficients also show differences in the income- and consumption-based measures. The income-based Gini coefficients show no change in overall inequality, with a Gini of 0.41 in both years, but this hides a steep drop in income inequality in the south (0.46 to 0.42) and a slight increase in the north (from 0.37 to 0.39), as well as the higher between-region gap in 1998. Clearly, pooling of rural households from the north and south hides considerable variation in the evolution of the income distribution. The consumption-based inequality measures, however, suggest slight increases in inequality, both within the regions and between the north and south.

Agricultural Prices

One of the primary avenues by which changes in agricultural policy are expected to affect household behavior and welfare is through changes in agricultural prices. Probably the most important set of policy changes concerns rice pricing. During most of the early reform period (including 1992–93), rice prices were not directly set by the government, but there were many marketing restrictions. In particular, as part of a broader policy of promoting rice self-sufficiency and possibly protecting northern farmers, there were strongly binding restrictions on the export of rice, and the movement of rice from south to north was impeded. These restrictions had the effect of severely distorting producer and consumer rice prices. More recently (including before 1997), the export quota was increased; thus, the implicit export tax was reduced. Furthermore, internal trade restrictions have been reduced, especially since 1996, and private traders have become a more important part of the rice marketing system. Nonrice prices are also expected to have changed over this period, as a possible consequence of changing food demand patterns (see "Food Demand Patterns" section) and increased integration of the Vietnamese economy into world agricultural markets.

The VLSSs can be used—albeit indirectly—to explore the impact of liberalization on prices. This chapter explores two dimensions. First, evidence on the broad changes in crop prices is presented, looking separately at the north and south. For this exercise, the household and community parts of the VLSS are used. In the second exercise, the focus is on rice prices (unit values) and the extent to which rice prices have converged across the regions of Vietnam. Finally, the chapter looks at how rice producer and rice consumer prices changed over 1993–98.

An Overview of Price Indexes for 1993 and 1998

Table 5.2 shows the results of the "big picture" of crop prices. In the first section of the table, crop prices (unit values) estimated from the cropping section of the household survey are used. Prices have been calculated on the basis of the revenue and quantity of each crop sold by households, and a

Table 5.2. Selected Price Indexes for 1998 Relative to 1993, Rural

Price index	*North*	*South*
Crop producer prices		
Rice	1.62	1.83
Nonrice	1.97	2.26
All crops	1.83	2.05
Other staples	2.07	1.73
Vegetables	2.36	1.86
Annual industrial crops	1.45	1.74
Perennial industrial	2.63	3.19
Fruit	1.93	1.88
Selected foods (consumer)		
Rice	1.85	2.13
Pork	1.54	1.54
Beef	2.06	1.73
Chicken	1.61	1.60
Tofu	1.46	1.35
Cabbage	2.33	1.76
Tomatoes	2.94	1.73
Oranges	1.80	1.63
Bananas	1.74	1.66
Fertilizers		
Urea	1.13	1.14
Potassium sulfate	1.62	1.12
Phosphates	1.41	1.13
NPK	0.48	0.51

Note: NPK = nitrogen-potassium-phosphate compound fertilizer. Each index represents the price in the 1998 sample relative to the 1993 sample. The crop prices are calculated from unit values in the crop sales part of the household surveys. The indexes are based on weighted averages of price changes for the commodity group, where the base year weights are calculated in 1993. The crop unit values are calculated for all panel households. The constituent price ratios are calculated on the basis of sales-weighted average prices. The selected foods and fertilizer prices are taken from the community price surveys and are the simple ratio of average prices in the two VLSSs.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

price index for 1998 relative to 1993 has been created using the crop shares (of sales) from 1993 as base weights. In reading the numbers, recall that the overall consumer price index (CPI) for this period is 1.46, which serves as a useful benchmark. The two columns look separately at the north and south, because the degree of market integration between the regions is pertinent, as are the possibly different price signals being sent to farmers. Looking first at rice, it is clear that producer prices rose by factors of 1.62 and 1.83 in the north and south, respectively. Thus, the real price of rice (relative to the CPI) rose in both areas, with prices increasing more in the south. Nonrice crop prices increased even more, especially in the south. Almost all types of crop prices increased, but the increase was most pronounced for the exportable perennial industrial crops, especially in the south.

The next section of table 5.2 corroborates these numbers with a selection of food prices drawn from the community questionnaires. Note that these are theoretical consumer prices, not realized producer prices (unit values), as in the first section.[13] Here it is clear that consumer rice prices rose faster than the CPI and—at least with these numbers—also faster than producer prices. Consistent with the results for producer prices, rice prices also increased more in the south. The prices across the various goods confirm that food prices, and thus probably agricultural prices, have generally risen faster than the CPI.

In the last section of the table, fertilizer prices are shown, again drawn from the community questionnaire. Fertilizer represents the largest component of farm input cash expenses, and this is especially true for rice. The fertilizer market, especially as it relates to imports, was increasingly liberalized over this period, and declines in fertilizer prices should occur concurrently with the increase in supply. Even if farmers had no response to fertilizer price changes, lower fertilizer costs would directly increase farm incomes. To the extent that lower prices also encouraged more use of fertilizer and enabled higher yields, the lower prices are also expected to lead to higher crop output and revenues. The results emphatically demonstrate declining real prices of fertilizer. For urea, potassium sulfate, and phosphate-based fertilizers, prices rose by less than the CPI (that is, real prices fell), especially in the south. Most dramatically, the nominal price of Nitrogen-Potassium-Phosphate (NPK) compound fertilizer fell by one-half in both the north and the south. The possible impact of these price changes on fertilizer use is explored in "Cropping Patterns" below.

Rice Prices

Table 5.3 examines rice prices more specifically, looking at the degree of market integration between north and south. First, the unit values of rice, both purchased and sold, are calculated, as estimates of the prices paid to farmers and by consumers. In table 5.3, consumer and producer prices of rice by region for 1993 and 1998 are documented. The prices are adjusted for overall changes in the CPI (that is, the 1993 prices are converted to 1998

Table 5.3. Rice Prices across Time and over Space

Indicator	*Consumer prices* 1993	*Consumer prices* 1998	*Producer prices* 1993	*Producer prices* 1998
Prices in 1998 (thousand dong)				
Rural north	2.71	3.35	2.55	2.83
Rural south	2.58	3.45	1.92	2.43
Rural Vietnam	2.63	3.42	2.03	2.50
Urban north	2.91	3.29	n.a.	n.a.
Urban south	2.81	3.65	n.a.	n.a.
Urban Vietnam	2.85	3.50	n.a.	n.a.
ANOVA				
Variation of logs	48.40	78.42	108.83	52.29
Explained by region	7.09	4.43	28.78	5.19
(F statistic)	(80.5)	(30.2)	(105.4)	(41.01)
R^2	0.22	0.25	0.39	0.36
Unit value income elasticities (t values)				
Urban north	0.03 (3.5)	0.10 (6.0)	n.a.	n.a.
Urban south	0.08 (8.8)	0.14 (11.1)	n.a.	n.a.
Rural north	0.02 (2.0)	0.04 (3.4)	n.a.	n.a.
Rural south	0.05 (6.0)	0.10 (10.9)	n.a.	n.a.
Rural Vietnam				

n.a. Not applicable.

Note: ANOVA = analysis of variance. All "prices" are really unit values, taken as the ratio of the value to the quantity of rice purchased or sold. Consumer prices are expressed as 1,000 dong per kilogram of purchased rice. The average unit values (prices) are weighted by the value of purchases. Prices for 1993 are expressed in 1998 values, inflated by 1.456. Producer prices are expressed as 1,000 dong per kilogram of sold rice (paddy converted to rice by a factor of 0.66). The average unit values (prices) are weighted by the value of sales. The variation of logs is the total variation of log prices. The variation explained by region is the total explained variation (by region) in an ANOVA decomposition, including monthly dummies. The F statistic is that for the significance of the region effects, and the R^2 is the fraction of total variation explained by month and region. Income elasticities are the estimated coefficients from a regression of log unit value on log per capita total expenditures and month dummies for each year and region. The t values are in parentheses.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

currency by the factor 1.456). The paddy-to-rice prices are also converted, by a factor of 0.66. The first column shows mean consumer prices by region in 1993. Urban prices are (not surprisingly) higher than rural prices and are slightly higher in the north.

An analysis of price variances (ANOVA) has been performed to see how much of the total variation can be accounted for by region. The total variation in log consumer prices is 48.4. Of this variation, 7.09 is explained by region (controlling for the month of survey). The F statistic on region is 80.5, so region is an undeniably important predictor of rice consumer prices in 1993. The fraction of total variation in log prices explained by region—and month—in 1993 is 22 percent. If rice markets become more integrated across regions, a reduction in price variability across regions in 1998 would be expected, and this is what has occurred. First, real rice prices were significantly higher in 1998 than they were in 1993—30 percent higher in rural areas and 23 percent higher in urban areas. There is only a small gap between north and south (the south being higher), and urban prices remain slightly higher. As far as explaining price variation, while the total variation in log prices increased, both the absolute and relative variation explained by region declined, as would be expected as rice markets become more integrated across regions.

Changes in the regional price structure are more dramatic for producer prices. First, note the north-south price divide in 1993: Prices were D 2,550 per kilogram in the north versus D 1,920 in the south. Producer prices are especially low in the Mekong Delta, at D 1,860. This is exactly what would be expected, given the trading restrictions, which primarily affected Mekong Delta rice farmers. In 1993, they were receiving only 70 percent of the price for the same kilogram of rice as a farmer in the Red River Delta (in the north). In the ANOVA exercise, it is clear that 39 percent of the total variation in log producer prices is explained by region and month. Thus, producer prices vary much more across regions than do consumer prices. By 1998, most of this regional dimension disappears. Rice prices are still higher in the north (D 2,830 versus D 2,430), but the percentage gap is much smaller. Furthermore, the real price of rice rose across Vietnam, especially in the south, and in particular in the Mekong Delta. As the ANOVA shows, total variation in rice producer prices declined (from 108.83 to 52.29), and the portion of that variation that can be explained by region falls from 28.78 to 5.19. Thus, producer price dispersion has decreased, and region is a poorer predictor of rice prices—both of which are expected with improving market integration. It thus appears that the marketing reforms, which allowed increased exports internationally as well as domestically, have led to increases in rice prices, especially in the main rice-producing region of the Mekong Delta. An obvious set of questions then follows as to who benefited or was hurt most by these price changes.

Finally, a note of caution in interpreting unit values as "prices," especially for consumers, is warranted. Consumers can choose to some extent how much to pay for their food, and, as incomes rise, they tend to substitute toward higher qualities, even for goods as standardized as rice. As incomes rise, some of the extra income is spent on more expensive rice, which explains some of the increased dispersion in rice consumer prices. In the lower section of table 5.3, estimates of the price-expenditure elasticities for ordinary rice by region and survey year are given. These are estimated by the coefficients from a regression of the log unit values on log per capita household expenditures, with controls for the month of the survey. As can be seen in table 5.3, the higher the average income levels, the more income elastic is the unit value of rice. For example, in 1993, southern urban dwellers had the highest elasticity of 0.08. By 1998, the urban elasticities had risen to 0.14 in the south and 0.1 in the north. Even in rural areas in the south, the expenditure elasticity is 0.1. This correlation between consumer rice prices and household income must be kept in mind when the welfare consequences of higher consumer prices are reviewed in the section titled "Changing Rice Prices and Inequality."

Changes in Agriculture

The various economic reforms and increased liberalization would be expected to impact directly agricultural activity through the prices described in tables 5.2 and 5.3. Similarly, increased integration of the Vietnamese economy into world agricultural markets, and the corresponding evolution of market infrastructure, should make it easier for farmers to move into exportable cash crops and away from rice.

Food Demand Patterns

The most important catalyst for change in agricultural production probably comes from an increased and changing domestic food demand. For example, an increase in incomes of 50–80 percent (as reported in table 5.1) will typically lead to increased food demand and movement along Engel curves toward more "luxurious" foods.[14] However, it is also true that relative food prices changed over the five-year period—perhaps as a consequence of shifting demand in the face of relatively inelastic supply—and certainly some of these price changes also affected the food demand patterns. In this section, rather than focus on links from agriculture to income, the reverse causality is explored, describing the changing demand patterns and evaluating to what extent they are driven by increased affluence. To the extent that income growth is driving food demand changes, the impact of rising incomes on future demand for agricultural output may be extrapolated.[15]

Tables 5.4 and 5.5 report the estimated food expenditures and food shares for 10 types of food, for north and south and divided by urban and rural. As is true elsewhere in this chapter, the calculations are only over the panel households. The first two columns list the levels of household per capita expenditures for each food group, in addition to total food and nondurables consumption, expressed in 1998 prices. The next two columns show the corresponding budget shares. For total food, the share of the total budget that is devoted to food is used; for each individual food group, its share of the food budget is reported. Of interest here is the extent to which the observed changes lie on a simple Engel curve—that is, whether the change in demand from 1993 to 1998 can be explained by the increase in incomes from 1993 to 1998.

To formally determine the extent to which the changes lie on a simple Engel curve, the panel structure of the data is exploited, and a standard Engel curve of the form is estimated:

$$w_{ijt} = \beta_{j0} + \beta_{j1}\ \ln(pcx_{it}) + \beta_{j2}\ \ln n_{it} + \sum_{d=1}^{D-1} \beta_{j2+d} \frac{n_{dit}}{n_{it}} + \beta'_{j3} C_{it} + \varepsilon_{ijt}$$

Table 5.4. Urban Food Demand Patterns and Expenditure Elasticities

Indicator	*Per capita real expenditures* *1993*	*1998*	*Shares* *1993*	*1998*	*Expenditure elasticity*	*Unexplained (change from 1993 to 1998)*
			Urban north			
Per capita consumption	2,279.1	3,587.3	n.a.	n.a.	n.a.	
Food expenditures	1,490.9	2,050.5	0.67	0.62	0.82	
Rice	380.6	433.3	0.32	0.25	0.49	
Other grains	69.5	98.1	0.04	0.05	0.96	
Meat	352.9	473.5	0.22	0.23	1.27	–
Oils	20.7	47.3	0.01	0.03	0.83	+
Fish	100.5	141.6	0.07	0.07	1.00	
Other protein	72.7	88.3	0.05	0.05	0.85	
Vegetables	70.0	96.1	0.05	0.05	0.56	+
Fruit	68.5	97.6	0.04	0.04	1.32	
Other foods	208.2	314.9	0.13	0.14	1.28	–
Food consumed away from home	144.9	254.5	0.06	0.10	1.86	
			Urban south			
Per capita consumption	2,605.7	4,248.0	n.a.	n.a.	n.a.	
Food expenditures	1,503.0	2,264.6	0.59	0.57	0.82	+
Rice	294.8	421.9	0.25	0.23	0.41	+
Other grains	93.9	83.7	0.06	0.04	1.11	–
Meat	286.1	409.3	0.17	0.17	1.41	–
Oils	36.5	46.3	0.03	0.02	0.75	–
Fish	166.0	248.9	0.11	0.11	0.94	
Other protein	58.2	60.2	0.04	0.03	0.64	–
Vegetables	75.3	121.0	0.05	0.06	0.63	+
Fruit	68.8	101.4	0.05	0.04	1.16	–
Other foods	202.3	265.5	0.13	0.12	1.15	–
Food consumed away from home	221.1	504.7	0.10	0.19	1.59	+

n.a. Not applicable.

Note: All values are reported in thousands of dong, in 1998 values (deflated by the CPI). The first two columns show the average household per capita expenditures on a specific food group, in addition to total food and nondurables consumption, expressed in 1998 prices. The third and fourth columns give the budget shares of each food group as a share of total food expenditures. Total per capita expenditure is total nondurable expenditures. The fifth column reports the estimated expenditure elasticity, estimated at the average budget share, from a regression of the budget share on the log per capita expenditure, demographic controls, and commune fixed effects (FEs). The regression is estimated over all panel households, is pooled over the sample years, and includes a year dummy. The last column reports the result of a test of whether the food share in 1998 is statistically significantly higher than predicted from the Engel curve (that is, the *t* statistic on a year dummy in the Engel curve regression). If the food share in 1998 is higher than predicted by income and demographics, the cell contains "+," and if the food share in 1998 is less than predicted, the cell contains "–."

Source: Authors' calculations from the 1993 and 1998 VLSSs.

Table 5.5. Rural Food Demand Patterns and Expenditure Elasticities

Indicator	*Per capita real expenditures* 1993	*Per capita real expenditures* 1998	*Shares* 1993	*Shares* 1998	*Expenditure elasticity*	*Unexplained (change from 1993 to 1998)*
				Rural north		
Per capita consumption	1,225.6	2,001.1	n.a.	n.a.	n.a.	
Food expenditures	872.8	1,277.3	0.73	0.68	0.78	+
Rice	421.9	518.1	0.51	0.44	0.64	
Other grains	42.7	50.6	0.05	0.04	1.00	–
Meat	139.8	245.0	0.15	0.18	1.48	–
Oils	8.5	32.1	0.01	0.03	1.12	+
Fish	56.8	92.1	0.06	0.07	1.25	
Other protein	24.4	43.6	0.02	0.03	1.48	+
Vegetables	43.0	58.1	0.05	0.05	0.87	
Fruit	17.9	37.5	0.02	0.03	1.59	+
Other foods	104.0	157.5	0.12	0.12	1.24	–
Food consumed away from home	9.1	36.0	0.01	0.02	2.71	
				Rural south		
Per capita consumption	1,605.0	2,396.8	n.a.	n.a.		
Food expenditures	971.0	1,405.5	0.63	0.62	0.80	+
Rice	374.6	500.9	0.43	0.40	0.63	+
Other grains	45.0	40.5	0.04	0.03	1.35	–
Meat	143.1	240.5	0.13	0.16	1.50	
Oils	23.8	34.2	0.03	0.02	0.80	
Fish	113.9	161.4	0.11	0.11	0.99	
Other protein	20.1	31.3	0.02	0.02	1.19	
Vegetables	44.3	80.1	0.05	0.06	0.85	+
Fruit	35.3	48.9	0.03	0.03	1.40	–
Other foods	137.9	172.4	0.13	0.12	1.15	–
Food consumed away from home	32.0	94.4	0.02	0.05	2.35	+

n.a. Not applicable.

Note: All values are reported in thousands of dong in 1998 values (deflated by the CPI). The first two columns show the average household per capita expenditures on a specific food group, in addition to total food and nondurables consumption, expressed in 1998 prices. The third and fourth columns give the budget shares of each food group as a share of total food expenditures. Total per capita expenditure is total nondurable expenditures. The fifth column reports the estimated expenditure elasticity, estimated at the average budget share, from a regression of the budget share on the log per capita expenditure, demographic controls, and commune FEs. The regression is estimated over all panel households, is pooled over the sample years, and includes a year dummy. The last column reports the result of a test of whether the food share in 1998 is statistically significantly higher than predicted from the Engel curve (that is, the *t* statistic on a year dummy in the Engel curve regression). If the food share in 1998 is higher than predicted by income and demographics, the cell contains "+," and if the food share in 1998 is less than predicted, the cell contains "−."

Source: Authors' calculations from the 1993 and 1998 VLSSs.

where w_{ijt} is the food share of food type j, for household i, in year t (1993 or 1998). The control variables are ln(*pcx*), or log per capita expenditures, household demographic variables (household size, n_{it}, plus the ratios of each of D demographic groups), and commune indicators, C_{it}, which should account for spatial differences in preferences and long-run prices. To test whether the food share in 1998 is statistically higher or lower than expected, given the control variables [especially ln(*pcx*)], a dummy variable for 1998 has been included. In the fifth column of the tables, the estimated expenditure elasticity (β_{j1}) from this exercise is reported, and in the sixth column, the result of the hypothesis test of whether the 1998 budget share is out of line with the estimated Engel curve is reported. Tables 5.4 and 5.5 use a "+" if the 1998 share is statistically significantly higher than predicted and a "−" if the share is significantly lower.

The results for urban areas are reported in table 5.4. Expenditures on virtually every food group increased, and total per capita food expenditures increased in the north by 38 percent and in the south by 51 percent. In terms of shares, the food share declined from 67 percent to 62 percent in the south and from 59 percent to 57 percent in the richer south. The food expenditure elasticities were estimated at 0.82 for both north and south (consistent with Engel's Law). For the north, the increased level of food expenditures and corresponding declines in the food budget share are estimated to be fully in line with the estimated Engel curve and the given income changes: This is one of those rare instances where the cross-section parameters explain changes over time. These results confirm that rising urban incomes alone have important ramifications for agricultural income. In the north, the food budget itself shifted away from rice (0.32 to 0.25) and toward other foods, notably toward meat, oils, and food consumed away from home. Expenditure on oils and vegetables increased more than predicted, given the increases in income, while demand for meat and other foods increased less. In the south, the rice share declined from 0.25 to 0.23, but the decline is significantly smaller than predicted, given the increase in incomes. This is possibly due to the higher relative increase in the price of rice combined with a relatively low price elasticity of demand. Alternatively, some of this may represent a substitution toward higher-quality, more expensive rice, as suggested in table 5.3. Whatever the explanation, these households are spending more on rice than predicted. The tilt toward rice spills over to other food demands: A smaller than anticipated shift toward meat, other grains, and fruit was observed. Vegetable demand, however, is higher than expected.

Table 5.5 reports the corresponding rural results. In the north, real per capita food expenditures increased by 46.4 percent, while they increased a similar amount (44.6 percent) in the south. The matching food shares declined from 0.73 to 0.68 in the north and 0.63 to 0.62 in the south. Both declines are less than had been predicted, given the expenditure elasticities, which were estimated to be 0.78 and 0.80 for north and south, respectively. In fact, while the demand patterns shift in the direction expected, given the income increases, most are out of line with the Engel curve. As before, much of this is driven by rice. The rice share of food declined from 0.51 to 0.44 in the north and from 0.43 to 0.40 in the south. Given the increase in income, both shares should have been lower in 1998 (assuming that the estimated rice expenditure elasticity of 0.6 is not too high). As was the case in the urban south, the explanation is not obvious, but increasing rice prices may have played a role in tilting expenditures toward rice. That said, demand shifted toward meat, oils, fish, fruit, and vegetables, even if less than expected, given the increase in incomes.

In summary, increased incomes have generated a significant increase in the demand for all types of food, including rice. There has been a significant shift toward nonrice foods, however, which should be reflected in cropping patterns.

Cropping Patterns

The broad changes occurring in agriculture discussed above are more directly illustrated in tables 5.6 and 5.7, which focus on production. Table 5.6 reports summary data for all of Vietnam and for the north and south separately on the composition of output (value of production, deflated by a crop price index), sales, and acreage for the two panel years, 1993 and 1998. For Vietnam as a whole, fairly rapid growth has been observed in agriculture, averaging more than 6 percent a year. Rice production grew at a rate of slightly more than 5 percent a year, and nonrice crops (including annual industrial crops and perennials) grew in excess of 8 percent. There are stark regional differences in the performance of the agricultural sector. Household production in the south grew faster than in the north for both rice and nonrice production, with growth rates almost three times that observed in the north.[16] Overall, the more rapid growth in cash crop production, combined with a decline in the price of rice relative to cash crops, contributed to a marked decline in the role of rice, as rice production fell from 64.3 percent to 53.3 percent of crop output. This is not to diminish the still important role of rice, because it represents more than half of farm output and 40 percent of net farm income for rural households.

Note that the reduction in rice's share of total output is much steeper than the reduction in acreage, which fell only from 67.5 percent to 64.1 percent. The much sharper decline in output reflects differences in the value of output per unit of land, which is much higher for cash crops, and the decline in the price of rice relative to cash crops between 1993 and 1998. Coffee, a key component of nonfood crops, provides a useful illustration. Coffee is grown almost entirely in the south, representing less than 1 percent of the value of output in the north. For the south, it accounted for 5.7 percent of the value of output and 10.4 percent of sales in 1993. By 1998, these figures had risen to 16.2 percent and 21.1 percent. Over the five-year period, coffee's share of agricultural production in the south nearly tripled. The increase in share was driven by the combination of a threefold increase in output and a sharp rise in the world price of coffee. Remarkably, the nominal value of

Table 5.6. Crop Output, Acreage, and Sales: Shares

Crop	Output		Acreage		Sales	
	1993	1998	1993	1998	1993	1998
Vietnam						
Rice	0.643	0.533	0.665	0.641	0.464	0.409
Other staples	0.055	0.044	0.098	0.068	0.039	0.019
Vegetables	0.066	0.064	0.045	0.039	0.095	0.067
Nonfood crops	0.149	0.239	0.099	0.145	0.260	0.342
Fruits and perennials	0.087	0.120	0.093	0.107	0.142	0.163
Total (thousand dong)	3,143.9	4,421.1	9,622.9	10,951.4	1,275.3	2,654.5
Percentage of output sold	n.a.	n.a.	n.a.	n.a.	40.6	59.6
North						
Rice	0.653	0.576	0.591	0.576	0.383	0.379
Other staples	0.097	0.093	0.184	0.132	0.106	0.054
Vegetables	0.080	0.101	0.053	0.048	0.155	0.153
Nonfood crops	0.107	0.135	0.088	0.106	0.211	0.232
Fruits and perennials	0.063	0.095	0.084	0.138	0.145	0.182
Total (thousand dong)	2,418.0	2,857.6	7,025.0	7,499.6	544.9	949.9
Percentage of output sold	n.a.	n.a.	n.a.	n.a.	22.5	33.2
South						
Rice	0.635	0.508	0.722	0.684	0.492	0.417
Other staples	0.020	0.016	0.030	0.026	0.016	0.011
Vegetables	0.053	0.043	0.040	0.033	0.074	0.045
Nonfood crops	0.185	0.300	0.108	0.171	0.276	0.369
Fruits and perennials	0.108	0.134	0.100	0.086	0.142	0.158
Total (thousand dong)	4,229.2	6,625.8	13,507.2	15,885.5	2,367.2	4,979.1
Percentage of output sold	n.a.	n.a.	n.a.	n.a.	56.0	75.1

n.a. Not applicable.

Note: The value of crop output is expressed in both years in terms of 1998 dong, using regional price deflators based on prices received by farming households as reported in the VLSSs. The value of crop sales in both years is expressed in 1998 dong, using the same regional price deflators used to deflate the value of crop output.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

coffee output increased by a factor of eight. Virtually all of this is exported, so the increased involvement of Vietnam in world coffee markets has had a significant impact on cropping patterns and incomes in the south.[17]

The high growth in output for all crops was accompanied by even more rapid commercialization of the farm sector. The percentage of output that

Table 5.7. Changes in Crop Output, Land Use, and Fertilizer Use Per Household

	Vietnam			North			South		
Indicator	*1993*	*1998*	*Annual growth (percent)*	*1993*	*1998*	*Annual growth (percent)*	*1993*	*1998*	*Annual growth (percent)*
Agricultural output									
Crop production (thousand dong)	3,317.9	4,502.0	6.29	2,518.1	2,871.4	2.66	4,512.4	6,912.6	8.90
Paddy (kg)	2,033.5	2,633.4	5.28	1,436.3	1,646.4	2.71	2,931.0	4,108.4	6.99
Nonrice production (thousand dong)			8.16			2.44			14.60
Land									
Cultivated area (m^2)									
Total	5,890.0	6,048.7	0.53	3,878.5	3,710.3	−0.89	8,896.5	9,543.6	1.42
Paddy	n.a.	3,841.5			2,540.3			5,786.3	
Irrigated	2,207.1	3,264.8	8.15	1,654.1	1,960.7	3.46	3,033.5	5,213.8	11.4
Sown area (m^2)									
Total	10,021.8	11,058.9	1.99	7,224.40	7,440.1	0.59	14,202.6	16,466.4	3.46
Rice	6,722.6	7,126.0	1.15	4,381.50	4,345.6	−0.16	10,221.5	11,263.6	1.96
MCI									
Total	1.70	1.83		1.86	2.00		1.60	1.73	

Fertilizer input									
In rice production:									
Organic (kg)	1,510.4	1,297.9	−2.99	1,996.4	1,808.7	−1.96	742.1	514.7	−7.06
Expenditure (thousand dong)	380.1	597.5	9.47	220.6	310.8	7.10	632.3	1,043.6	10.54
Nitrogen (kg)	119.8	131.2	1.83	75.8	86.0	2.56	189.3	200.1	1.12
Phosphates (kg)	64.9	86.2	5.84	79.8	107.8	6.20	41.3	53.0	5.12
Potassium (kg)	7.8	22.4	23.49	3.9	20.4	39.22	14.1	25.5	12.58
NPK (kg)	22.1	52.1	18.71	4.8	13.0	22.05	49.8	112.0	17.60
In nonrice production:									
Organic (kg)	494.6	569.1	2.85	696.5	744.7	1.35	175.3	300.9	11.41
Expenditure (thousand dong)	109.0	402.7	29.87	52.6	121.7	18.27	198.1	858.3	34.08
Nitrogen (kg)	34.8	66.0	13.66	18.7	34.4	12.96	60.3	114.3	13.64
Phosphates (kg)	13.8	42.4	25.17	13.7	34.0	19.94	14.0	55.4	31.67
Potassium (kg)	8.4	13.5	9.95	0.5	4.1	52.32	20.8	27.8	5.97
NPK (kg)	6.2	63.6	59.30	1.0	9.5	56.87	14.4	146.3	58.99

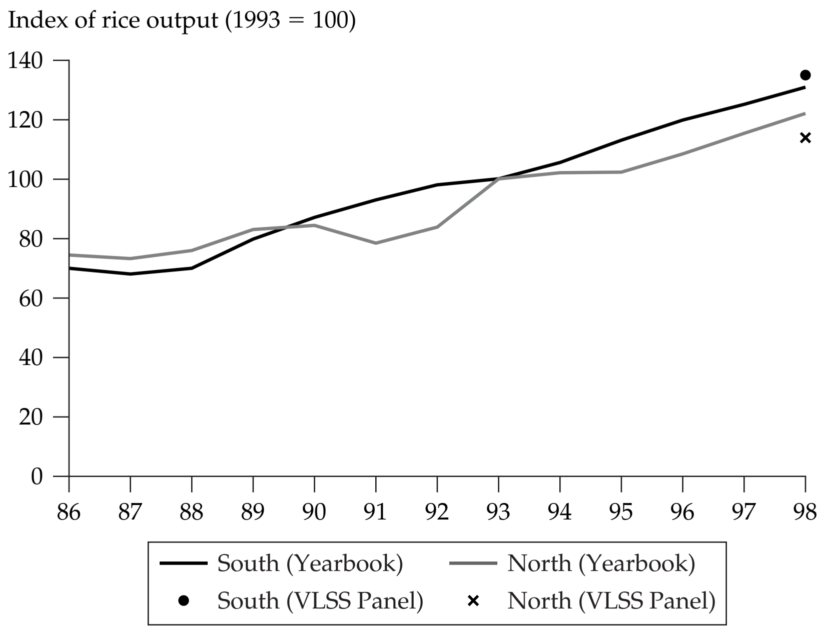
Note: kg = kilogram. m^2 = square meters. MCI = multiple cropping index (calculated as the average number of crops per unit of land). Table based on panel households in the 1993 and 1998 surveys that farmed in both years. The value of crop output in both years is expressed in terms of 1998 dong, using regional price deflators based on prices received by farming households as reported in the VLSSs. No paddy information is available for 1993, and is marked "n.a." Fertilizer expenditure in 1998 is deflated using separate fertilizer price indexes for northern and southern Vietnam. Growth rates are calculated as the implied annual average compounded growth rate between 1993 and 1998.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

was sold increased from 41 percent to 60 percent over the period. This increase is not only a product of the increase in cash cropping, for which marketing ratios are higher, but also an increase in the marketing of rice, which increased significantly over this period. Although the percentage of total farm sales of rice declined, it still accounted for 41 percent of sales revenue in 1998. Furthermore, although the south was more commercialized at the outset, this period still saw greater gains in commercialization in the south. By 1998, more than three-fourths of all farm output in the south was being marketed; by comparison, in the north, only one-third was marketed.

How do these results, based on VLSS household survey data, compare with aggregate administrative statistics? Actually, they compare quite well. Figures 5.2 and 5.3 plot indexes of the real value of rice production and the real value of agricultural output, respectively, based on data reported in the agricultural yearbooks. Superimposed on the figures are the corresponding indexes based on the VLSS data. A few methodological points are worth emphasizing before turning to the comparison, because the data sources are not perfectly comparable. First, the reported VLSS indexes are recalculated on

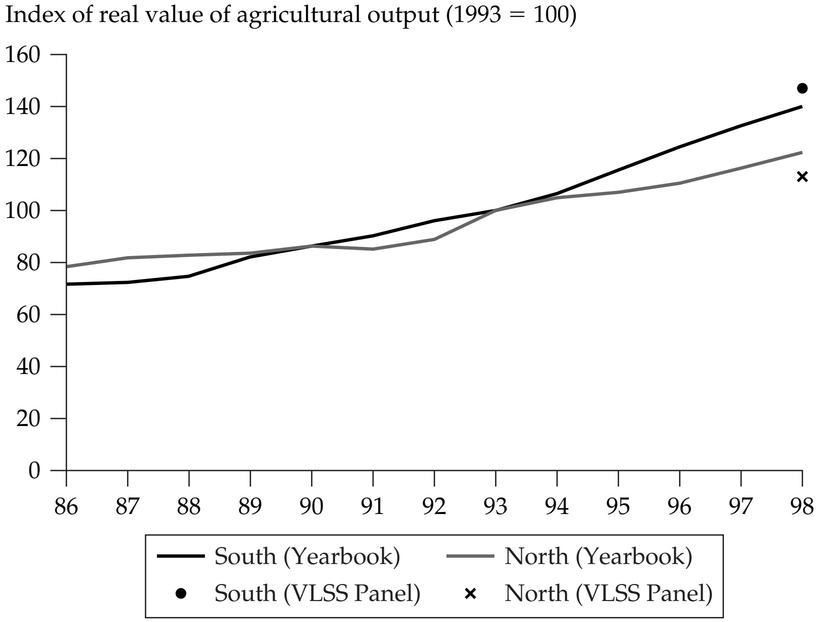
Figure 5.2. Trends in Rice Production



Note: The figure shows an index for agricultural output in the given crop year, relative to the base year of 1993. Each crop year's output is based on a moving average of output in that year and the previous one (analogous to the VLSS). These aggregate data are drawn from the yearbook (GSO 2000). Superimposed on each graph is relative output in 1998 versus 1993, based on the VLSS panel households.

Source: Authors' calculations from 1992–93 and 1997–98 VLSSs.

Figure 5.3. Trends in Total Agricultural Output



Note: The figure shows an index for agricultural output in the given crop year, relative to the base year of 1993. Each crop year's output is based on a moving average of output in that year and the previous one (analogous to the VLSS). These aggregate data are drawn from the yearbook (GSO 2000). Superimposed on each graph is relative output in 1998 versus 1993, based on the VLSS panel households.

Source: Authors' calculations from 1992–93 and 1997–98 VLSSs.

the basis of all households in the north and south (including urban and rural, as opposed to rural only, as was reported in table 5.6). Second, the rice output index (from both data sources) is based on physical output of paddy, as opposed to the value of rice deflated by the rice price index (as was done in table 5.6). Third, the real value of agricultural output reported in the yearbook includes animal husbandry, whereas this index is based only on crop output. This does not make much difference, given the trends in animal husbandry income reported in table 5.1, in addition to its small share in output.[18] Finally, the most difficult issue in comparing the data concerns the timing of the VLSS and the corresponding crop year in the yearbook. Households report output over the preceding 365 days (that is, the prior year). Given that survey interviews were spread evenly, more or less, over the survey year, most households report output from crops harvested in two calendar years. As an approximation, the yearbook data are thus converted to a typical VLSS household "reporting horizon," by averaging output between the current and past years. For example, 1993 output equals the average of 1993 and 1992 output. The plotted yearbook data are thus a moving average.

As shown in figures 5.2 and 5.3, the two data sources line up remarkably well, especially if north and south are pooled. The two regions' growth rates are also similar, although the VLSSs show slightly more divergence between north and south. More specifically, for rice the yearbook data imply a rice index for 1998 relative to 1993 of 122 for the north and 131 for the south. This compares with 114 for the north and 135 for the south, based on the VLSS data. The indexes for total output, which is dominated by rice, are 122 for the north and 140 for the south, based on the yearbook, compared with 113 and 147 in the VLSS, for the respective regions. Given especially the different sampling frames for these data, the series paint similar pictures: Growth is significantly higher in the south, and growth in total output is higher than rice alone, especially in the south.

Although figures 5.2 and 5.3 provide strong corroboration for the agricultural data in the VLSSs, they also provide a strong source of caution about the representativeness of the two sample years, 1993 and 1998. The year 1993 was an especially good year for agriculture in the north and a slightly off year in the south. This means that mean reversion alone would generate higher growth rates in the south than in the north. The yearbook data do imply a divergence of north-south agricultural output, especially in nonrice; focusing on 1993–98 alone will exaggerate the trends.[19] Of course, at this time, only VLSS data from 1993 and 1998 are available, so a full evaluation of the robustness of the conclusions to the choice of survey years is not possible. That said, the conclusions that follow, based on the VLSSs, must be placed in the broader context of the trends shown in figures 5.2 and 5.3.

Although causal relationships must be approached with caution, the growth in output and farm sales appears to be correlated with the reform and liberalization of both input and output markets. As reported in table 5.2, over this short period, a marked increase (decrease) in the relative price of farm outputs (farm inputs) was observed. Overall, agricultural prices rose by 80–90 percent, compared with an increase of 45.6 percent in the CPI; fertilizer prices, on the other hand, rose only 10 percent. The behavior of these prices increased the returns to farming and provided farmers with powerful incentives for increasing output and sales. The more rapid growth in output in the south appears partially tied to more favorable movement in prices, as farm prices rose more and fertilizer prices rose less than in the north.

Rice Output, Land, and Fertilizer Inputs

Table 5.7 provides a breakdown for all of Vietnam, and by north and south, of the growth in crop output and inputs, most notably land and fertilizers. The eventual objective is to see to what extent changes in output can be explained by changes in inputs. The estimates in this table are based on the panel of households, restricted to those who farmed in both 1993 and 1998. Some of these numbers are not exactly comparable to those in table 5.6 because of a reduction between 1993 and 1998 in the number of households that were farming. Altogether, a reduction of nearly 10 percent in the number of households farming can be seen over this period.[20] Differences in samples give rise to modest differences between the two tables.

The focus here is on rice production and total crop production, as well as on highlighting the differences between the north and the south. In the north, rice production measured in physical terms grew 2.8 percent a year. This is less than half the rate of growth of rice production in the south, which was nearly 7 percent. The overall rate of growth of crop production was 8.9 percent a year in the south, compared with 2.7 percent in the north. A likely explanation for these patterns is the differential effect of liberalization of rice marketing on the two regions, with the low-cost south taking advantage of the expanded export and domestic marketing opportunities for rice. The increase in rice production in the south did not seriously handicap the production of cash crops, however, which grew nearly 75 percent faster than rice output. In the north, relative price shifts also affected cropping decisions (see table 5.6), but output growth of nonrice production was actually slightly lower than that for rice. One potential explanation is that in the north, much of the shift was into perennials and fruits, both of which have three- to five-year lags in revenue generation.

Data on acreage and fertilizer input provide important initial clues as to the margins on which output in agriculture was able to expand. Over this five-year period, cultivated area increased slightly, averaging less than one-half of 1 percent a year. This occurred largely in the south. In the north, cultivated area actually declined, largely because of the decision of households to take swidden land (land where the vegetation has been cut back or burned off) out of production. Sown area also increased slightly—2 percent per year nationwide—again largely because of increases in the south. In both regions, there was a modest increase in the cropping intensity as measured by the multiple cropping index. In the north, however, this increase occurred largely because of a slight increase in sown area and a larger reduction in cultivated area; in the south, it occurred because of growth in sown area that was more than double growth in cultivated area.

With output in the aggregate growing at a rate in excess of 6 percent, and with sown area increasing only 2 percent nationwide, it would appear that much of the increase in output is coming from increases in cropping intensity and higher yields. Here the panel provides some insight into the role of increases in fertilizer inputs. The general tendency in both the north and south was a reduction in the role of organic fertilizers in rice and an increase in the use of commercial chemical fertilizers, largely consisting of urea, potassium sulfate, phosphates, and NPK. In real terms, commercial fertilizer use by the panel households increased slightly—less than 10 percent a year. For nonrice crops, there was some increase in the use of organic fertilizers, especially in the south, and even larger increases in the growth rate in chemical fertilizer use, as would be expected, given the liberalization of the fertilizer market. For the entire sample, the application of commercial fertilizers on nonrice production grew nearly 30 percent a year, with the annual growth in the south almost twice as high as in the north (34.1 percent versus 18.3 percent). As long as the increases in chemical fertilizer use are not being offset by the reduction in the application of organic fertilizers, real increases in the north and south in chemical fertilizer use are an important source of sown area yields.

Decomposition of Output Growth

To analyze the sources of output growth between 1993 and 1998, table 5.8 reports the results of a more formal decomposition exercise. The primary objective is to estimate the contribution to the output growth of increases in input use versus increases in total factor productivity. Estimating production functions for agriculture and dealing with a host of econometric issues, including the endogeneity and measurement error of inputs, would be a chapter in themselves. This chapter stops short of carrying out this full-blown exercise, but the results presented here are still highly informative.

The basic idea of the exercise is straightforward. Assume that the production function for agricultural output, Y_{it}, is known for household i in year t:

$$\ln Y_{it} \equiv y_{it} = X_{it}\beta + u_{it}$$

where X_{it} is a vector of inputs, β is a vector of production function parameters, and u_{it} captures the impact of unobservables. The change in output between two periods can be decomposed as:

$$\bar{g} \equiv \Delta\bar{y}_{it} = \beta\Delta\bar{X}_{it} + \Delta\bar{u}_{it}$$

where $\bar{g}$ is the growth rate, defined as the difference in log output between the two years, $\Delta y_{it} = \ln Y_{1998} - \ln Y_{1993}$. To execute this decomposition, estimates of the change in input use are needed, ΔX_{it}, as well as the parameters of the production function. It is also necessary to make some assumptions regarding the unobservables, u_{it}. For example, it could be assumed that the unobservables are the same (on average) each year and so force the $\Delta\bar{u}_{it}$ term to equal zero. More plausibly, it could be imagined that u_{it} has the following structure:

$$u_{it} = \theta_t + \varepsilon_{it}$$

where θ_t is a time effect and ε_{it} represents a mean-zero error term. The time effect θ_t will capture improvements in productivity that allow all farmers (on average) to obtain more output from their inputs in period t. This is commonly labeled "total factor productivity." Of course, the source of the time effect is not directly observable, and it could as easily reflect differences in "luck" between periods. For example, figures 5.2 and 5.3 prove that output in the north was unusually high in 1993, and this "blip" was unlikely due entirely to productivity differences in 1993.

The following functional form demonstrates the production function:

$$\begin{aligned} y_{it} = {} & \beta_0 + \beta_1 SA_{it} + \beta_2 IRR_{it} + \beta_3 L_{it} + \beta_4 DK_{it} + \beta_5 K_{it} + \beta_6 DOF_{it} \\ & + \beta_7 OF_{it} + \sum_{f=1}^{4} \beta_{8f} DCFERT_{fit} + \sum_{f=1}^{4} \beta_{9f} CFERT_{fit} + \beta_{10} Y98_{it} + \varepsilon_{it}. \end{aligned}$$

Table 5.8. Decompositions of Output Growth

	Vietnam		*North*		*South*	
Indicator	*OLS*	*OLS-FEs*	*OLS*	*OLS-FEs*	*OLS*	*OLS-FEs*
			Rice production			
Rice						
Output growth	21.00	21.00	15.70	15.70	30.90	30.90
Contribution to output growth (percent)						
Sown area	8.86	8.38	−0.83	−.89	17.57	15.53
Labor	—	—	—	—	—	—
Capital	0.09	2.10	−0.47	2.80	3.53	0.97
Fertilizers	40.15	17.33	65.41	32.17	22.04	12.56
Chemical	43.67	21.62	70.70	36.31	22.20	15.21
Organic	−3.52	−4.29	−5.29	−4.14	−0.16	−2.65
Land quality	12.27	1.40	16.37	−1.53	6.95	1.60
Residual	38.63	70.79	19.52	67.45	49.94	69.34
			Total crop output			
Gross value of crops						
Output growth	17.10	17.10	8.00	8.00	32.40	32.40
Contribution to output growth (percent)						
Sown area	16.37	16.78	20.13	17.25	14.78	16.98
Labor	1.11	0.47	6.50	8.75	−5.03	−1.26
Capital	7.60	5.56	4.75	4.54	10.49	3.86
Fertilizers	92.08	49.82	155.25	120.88	58.74	34.65
Chemical	93.57	52.39	163.38	103.63	57.72	34.57
Organic	−1.49	−2.57	−8.13	−9.75	1.02	0.08
Land quality	3.00	−0.78	4.75	−6.25	−1.85	−0.20
Residual	−20.16	28.15	−98.64	−45.17	22.87	45.97

— Not available.

Note: FEs = fixed effects. OLS = ordinary least squares. These decompositions estimate the fraction of output growth explained or accounted for by changes in input use, based on production functions estimated for each subsample, pooled across years, and based on the panel households in 1993 and 1998 that farmed in both years. The residual is the coefficient on an indicator variable for 1998. The OLS-FEs decompositions are based on production functions estimated with household FEs. For rice, output is measured in physical units (kilograms), and total crop output is the value of crop output expressed in terms of 1998 dong, using regional price deflators based on prices received by farming households as reported in the VLSSs. The output growth rates used in the decomposition and reported here are computed by taking the difference mean ($\log Y_{98}$) − mean ($\log Y_{93}$), where Y is either rice output, measured in physical terms, or the deflated value of crop output. Labor input is not provided separately for rice production and thus is not included in the rice decomposition. The capital stock in agriculture is measured by the deflated current market value of farm machinery and draft animals. The capital stock is deflated by a national deflator constructed on the basis of prices paid for capital machinery and draft animals in 1993 and 1998 as reported in the VLSSs. The contribution of fertilizer is the sum of the contribution of urea, phosphates, potassium sulfate, and NPK. Land quality is measured by the percentage of land irrigated.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

Essentially, this functional form specifies (log) output (y_{it}) as a function of log inputs, dummy variables (D) of whether the farmer uses the input, a time dummy to capture θ_t ($Y98_{it}$), and the error term, ε_{it}.[21] The inputs that have been included are sown acreage (SA_{it}), the percentage of land that is irrigated (IRR_{it}), labor (L_{it}), the real value of farm capital (K_{it}), and the quantities of various types of fertilizer (organic [OF_{it}] and the four chemical fertilizers—$CFERT_{fit}$—urea, potassium sulfate, phosphorus, and NPK). This particular functional form accommodates the fact that there are households for whom either farm capital (machinery or draft animal) or fertilizer use is zero.

To estimate the parameters of this production function, the data for the panel of households that farmed in both years have been pooled. The production functions for rice and for the gross value of crop output are estimated separately, measured in constant 1998 dong. The separate production functions have also been estimated for northern and southern Vietnam to allow for potential differences in technology and the productivity of the individual factors of production. Finally, two sets of results are reported: ordinary least squares (OLS) and fixed effects (FEs). The motivation for using FEs is standard: Farmer's unobserved managerial ability, λ_i, may be correlated with input use.[22] In this case, the error term $\varepsilon_{it} = \lambda_i + v_{it}$ and OLS will yield inconsistent estimates of β. This is a distinct possibility in this application, and it may affect the attribution of increases in output to increased fertilizer use. For example, if only the best farmers use chemical fertilizers, then the estimate of the coefficient on chemical fertilizer will be overstated. In that case, it will appear in the decompositions that the increased use of fertilizer explains most of the increase in output. The FEs specification has its own possible problems, especially in exaggerating measurement error in inputs. For this reason, both the OLS and OLS-FEs results are reported here.

The results for rice are reported in the first half of table 5.8. On the basis of the OLS parameters for the pooled sample, sown area, land quality, and chemical fertilizer use explain nearly 60 percent of the growth in rice output; the residual (time effect) represents the remaining 40 percent. The latter includes the effect of new seed varieties, unmeasured labor effort, improvements in productivity, or better luck (for instance, rainfall). Decompositions based on separate parameter estimates for the north and south reveal a much larger role of the unexplained component for the south than for the north. In the north, increased chemical fertilizer use explains more than two-thirds of the growth in paddy production, with the residual the source of 20 percent of the growth. By contrast, in the south, increased fertilizer use explains only 20 percent, and the residual (time effect) is almost one-half. This sharp contrast between north and south disappears with the use of household FEs: In both regions, more than two-thirds of the increase in output can now be attributed to the residual. As suspected, the use of household FEs especially affects the estimated coefficients on chemical fertilizer, and thus the role of fertilizer, in explaining growth. In general, the parameter estimates for fertilizer are smaller using OLS-FEs, with the OLS parameter differences greatest in the north.[23]

A similar exercise for the gross value of crop output is shown in the bottom half of table 5.8. The only difference with the decomposition for rice is that labor is now included as an input (which turns out to be a minor factor).[24] The OLS estimates suggest that almost all of the growth in output is coming from the tremendous increase in chemical fertilizer use. The increase in total input use actually overexplains output growth, generating a negative residual. The contrast between the north and south here is particularly stark. There is a huge negative residual in the north, and in the south, slightly more than one-fifth of the increase can still be attributed to the residual. As in the case of rice, using parameters from OLS-FEs reduces the contribution of increases in input use (largely fertilizer) in explaining growth and increases the size of the residual. However, there remains a significant negative residual in the north, and in the south, the residual is equal to nearly one-half of output growth over the period. For the north, some of this negative residual may be coming from the shift into perennials and tree crops observed in table 5.6; these crops will not generate income for several more years. That would explain why inputs went up proportionately more than output. Some of the difference in relative performance in the north and south may be due to mean reversion, as was suggested by figures 5.2 and 5.3.

The main conclusions from this exercise are:

- Most of the increase in rice output cannot be explained by increased inputs. Of the part that can be explained, increased use of chemical fertilizer is an important component of the explanation.
- More of the increase in total output can be explained by increased inputs. Nonrice output increased significantly because of increased acreage (sown area) and especially because of the increase in chemical fertilizers. The unexplained component (perhaps productivity?) is positive in the south and negative in the north. This pattern is suggestive, and it could reflect differences in incentives generated by liberalization and the returns to increasing specialization, but there is no way these data alone can be used to confirm this hypothesis.

Agriculture and Inequality

In this section, some of the changes in income distribution over the period from 1993 to 1998 are explored, with a focus on the potential impact of changing rice prices. Clearly, increased rice prices will benefit rice producers while hurting consumers. On a regional level, rice-surplus regions will gain while rice-deficit regions lose. Moreover, to the extent that there are supply and demand responses to the price changes, there may be changes in the pattern of rice marketing.

Rice Marketing

This section begins with an exploration of the impact of rice price changes on regional rice marketing and cropping patterns. Various indicators of rice production, sales, and consumption indicators are presented in tables 5.9 and 5.10. Table 5.9 shows the breakdown by urban and rural and by north and south. Table 5.10 provides a more detailed regional breakdown for rural areas.

Table 5.9. Rice Marketing, per Household

	Urban north		*Urban south*		*Urban Vietnam*	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Value of rice produced (thousand dong, 1998 prices)	132.63	97.07	406.61	734.82	293.64	471.85
Produced rice?	0.12	0.07	0.13	0.12	0.13	0.10
Quantity of rice produced (kg)	58.08	40.49	194.11	312.47	138.02	200.32
Value of rice sold (thousand dong, 1998 prices)	11.36	3.65	161.68	508.15	99.69	300.12
Sold rice?	0.03	0.01	0.08	0.09	0.06	0.06
Value of rice consumed (thousand dong, 1998 prices)	1,591.94	1,683.72	1,609.15	1,998.98	1,602.05	1,868.98
Quantity of rice consumed (kg)	552.13	519.57	579.59	549.58	568.27	537.21
Value of rice purchased (thousand dong, 1998 prices)	1,469.00	1,576.60	1,374.21	1,788.07	1,413.29	1,700.87
Purchased rice?	0.99	0.99	0.97	0.97	0.98	0.98
Quantity of rice purchased (kg)	504.71	479.66	489.33	489.62	495.67	485.51
Value of home-produced rice (thousand dong, 1998 prices)	122.94	107.12	234.94	210.90	188.76	168.11
Consumed home-produced rice?	0.17	0.25	0.16	0.20	0.17	0.22
Quantity of home-produced rice (kg)	47.42	39.91	90.27	59.96	72.60	51.69
Rice budget share	0.22	0.16	0.15	0.13	0.18	0.14
Net rice sales (thousand dong, 1998 prices)	–1,457.64	–1,572.95	–1,212.53	–1,279.93	–1,313.60	–1,400.75
Net seller?	0.02	0.01	0.06	0.08	0.05	0.05
Value of rice surplus (thousand dong, 1998 prices)	–1,459.31	–1,586.65	–1,202.54	–1,264.16	–1,308.42	–1,397.13
Surplus?	0.04	0.04	0.07	0.08	0.06	0.06

Indicator	Rural north		Rural south		Rural Vietnam	
	1993	1998	1993	1998	1993	1998
Value of rice produced (thousand dong, 1998 prices)	2,225.64	2,643.49	3,389.70	5,171.44	2,722.43	3,722.35
Produced rice?	0.93	0.89	0.75	0.64	0.85	0.79
Quantity of rice produced (kg)	895.24	1,021.22	1,605.90	2,154.24	1,198.53	1,504.76
Value of rice sold (thousand dong, 1998 prices)	305.58	569.40	1,365.79	3,162.05	758.05	1,675.87
Sold rice?	0.42	0.45	0.42	0.47	0.42	0.46
Value of rice consumed (thousand dong, 1998 prices)	1,998.07	2,341.61	1,991.67	2,576.40	1,995.34	2,441.82
Quantity of rice consumed (kg)	743.55	742.19	789.20	793.23	763.04	763.97
Value of rice purchased (thousand dong, 1998 prices)	443.97	453.06	733.44	1,152.97	567.51	751.76
Purchased rice?	0.65	0.56	0.85	0.88	0.74	0.70
Quantity of rice purchased (kg)	163.89	135.29	284.64	333.80	215.43	220.01
Value of home-produced rice (thousand dong, 1998 prices)	1,554.10	1,888.56	1,258.23	1,423.43	1,427.83	1,690.05
Consumed home-produced rice?	0.93	0.91	0.76	0.66	0.86	0.81
Quantity of home-produced rice (kg)	579.66	606.90	504.56	459.43	547.61	543.96
Rice budget share	0.38	0.30	0.28	0.25	0.33	0.28
Net rice sales (thousand dong, 1998 prices)	−138.39	116.34	632.35	2,009.08	190.54	924.11
Net seller?	0.36	0.40	0.36	0.44	0.36	0.42
Value of rice surplus (thousand dong, 1998 prices)	227.57	301.87	1,398.03	2,595.04	727.09	1,280.53
Surplus?	0.54	0.48	0.47	0.45	0.51	0.47

Note: Value of rice produced is valued at producer prices, either that reported by the household on the basis of its sales or the nearest estimate (cluster or region). Value of consumed rice is valued at consumer unit values in the same way. Value of rice produced is valued at producer prices, either that reported by the household on the basis of its sales or the nearest estimate (cluster or region). Value of consumed rice is valued at consumer unit values in the same way. Value of rice produced is valued at producer prices, either that reported by the household on the basis of its sales or the nearest estimate (cluster or region). Value of consumed rice is valued at consumer unit values in the same way. The rice budget share is the share of nondurable consumption. The rice surplus is the difference in the value of rice produced and consumed (valued at the respective producer and consumer prices). Paddy is converted to rice by the usual factor of 0.66, and 1993 prices are converted to 1998 prices by 1.456.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

Table 5.10. Rice Marketing Per Household, by Region, Rural Only

	Northern Uplands		*Red River Delta*		*North Central Coast*	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Value of rice produced (thousand dong, 1998 prices)	1,962.93	2,386.22	2,648.45	3,137.01	1,900.69	2,207.29
Produced rice?	0.93	0.91	0.96	0.93	0.87	0.8
Quantity of rice produced (kg)	767.91	975.78	1,037.63	1,124.00	830.58	921.01
Value of rice sold (thousand dong, 1998 prices)	204.38	320.61	425.17	809.70	244.66	499.36
Sold rice?	0.31	0.36	0.56	0.56	0.36	0.37
Value of rice consumed (thousand dong, 1998 prices)	2,197.18	2,770.22	1,969.90	2,047.14	1,810.42	2,284.83
Quantity of rice consumed (kg)	784.56	856.39	730.28	672.28	716.01	714.35
Value of rice purchased (thousand dong, 1998 prices)	485.57	533.56	287.42	274.90	628.43	624.78
Purchased rice?	0.67	0.59	0.56	0.47	0.76	0.66
Quantity of rice purchased (kg)	176.43	158.11	104.66	85.24	237.38	183.30
Value of home-produced rice (thousand dong, 1998 prices)	1,711.61	2,236.66	1,682.49	1,772.24	1,181.99	1,660.06
Consumed home-produced rice?	0.94	0.93	0.96	0.95	0.87	0.85
Quantity of home-produced rice (kg)	608.13	698.28	625.61	587.05	478.63	531.05
Rice budget share	0.37	0.35	0.40	0.27	0.35	0.29
Net rice sales (thousand dong, 1998 prices)	–281.19	–212.94	137.75	534.80	–383.77	–125.41
Net seller?	0.25	0.28	0.50	0.54	0.28	0.34
Value of rice surplus (thousand dong, 1998 prices)	–234.25	–383.99	678.55	1,089.87	90.27	–77.54
Surplus?	0.39	0.30	0.69	0.68	0.48	0.38

Indicator	Central Coast		Central Highlands		Southeast		Mekong Delta	
	1993	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Value of rice produced (thousand dong, 1998 prices)	1,953.54	2,857.84	1,030.89	1,115.41	2,199.23	3,569.37	5,035.53	7,731.70
Produced rice?	0.83	0.84	0.83	0.43	0.59	0.46	0.76	0.64
Quantity of rice produced (kg)	893.47	1,100.12	525.18	396.43	928.98	1,347.19	2,444.10	3,338.49
Value of rice sold (thousand dong, 1998 prices)	205.51	848.84	56.40	107.33	877.24	2,163.35	2,399.26	5,305.18
Sold rice?	0.28	0.50	0.12	0.12	0.35	0.34	0.58	0.56
Value of rice consumed (thousand dong, 1998 prices)	1,904.44	2,322.43	2,337.84	3,185.89	1,891.02	2,715.72	2,023.84	2,553.06
Quantity of rice consumed (kg)	702.83	713.14	841.83	994.29	723.49	766.40	854.04	814.18
Value of rice purchased (thousand dong, 1998 prices)	539.34	536.29	981.10	2,174.82	864.15	1,637.76	740.95	1,109.27
Purchased rice?	0.81	0.85	0.85	0.90	0.84	0.87	0.88	0.89
Quantity of rice purchased (kg)	191.65	157.68	355.11	675.79	328.04	433.28	304.17	329.53
Value of home-produced rice (thousand dong, 1998 prices)	1,365.10	1,786.14	1,356.75	1,011.07	1,026.87	1,077.96	1,282.90	1,443.79
Consumed home-produced rice?	0.84	0.85	0.83	0.49	0.59	0.52	0.78	0.65
Quantity of home-produced rice (kg)	511.18	555.47	486.72	318.50	395.45	333.12	549.87	484.65
Rice budget share	0.31	0.27	0.35	0.30	0.24	0.20	0.26	0.25
Net rice sales (thousand dong, 1998 prices)	−333.83	312.56	−924.70	−2,067.49	13.09	525.59	1,658.31	4,195.91
Net seller?	0.22	0.48	0.10	0.07	0.28	0.31	0.51	0.53
Value of rice surplus (thousand dong, 1998 prices)	49.10	535.41	−1,306.95	−2,070.48	308.21	853.64	3,011.69	5,178.64
Surplus?	0.42	0.47	0.10	0.09	0.37	0.34	0.60	0.55

Note: Value of rice produced is valued at producer prices, either that reported by the household on the basis of its sales or the nearest estimate (cluster or region). Value of consumed rice is valued at consumer unit values in the same way. The value of home-produced or -consumed rice is valued as self-reported by the household. The rice budget share is the share of nondurable consumption. The rice surplus is the difference in the value of rice produced and consumed (valued at the respective producer and consumer prices). Paddy is converted to rice by the usual factor of 0.66, while 1993 prices are converted to 1998 prices by 1.456.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

The urban patterns can be quickly summarized. First, there are very few producers in urban areas. In 1998, 10 percent of urban households grew rice, a decline of 3 percentage points from 1993. Thus, slightly less than 25 percent of the urban rice growers in 1993 stopped farming rice (this was even more true in the north). Deflating by the CPI, real consumption expenditures on rice increased from D 1,602,000 to D 1,869,000 per household. Most of the increased expenditure comes from the higher relative rice prices, because household physical consumption of rice declined slightly, from 568 to 537 kilograms per household. Recall, however, that household size fell, so per capita rice consumption actually increased slightly in urban areas. Finally, the share of rice in nondurable expenditures declined from 0.18 to 0.14. This decline is in line with what is expected from the Engel curve for rice, given that incomes almost doubled in urban areas (see tables 5.4 and 5.5).

Looking at the combined rural areas for north and south, the value of rice produced increased by almost one-third. This is due partially to the increase in relative rice prices, but it also reflects an increase in rice production from 1,119 to 1,505 kilograms per household. Given that the percentage of households growing rice declined from 85 to 79, this means that rice farmers were producing about 35 percent more rice per producing household. Comparison of north and south shows that both areas experienced increases in output, but the largest increase by far was in the south, where prices increased the most. Most of the extra rice produced was sold to the market; household rice consumption stayed the same in both north and south. In the two regions combined, 46 percent of farmers sold rice in 1998, compared with 42 percent in 1993. At the same time, farmers in the south also purchased more rice in 1998 than in 1993, so that commercial involvement in rice markets was more important on both the production and consumption sides of the market, at least in the south. Rice expenditure shares remained much higher than in urban areas, but they did decline from 0.33 to 0.28 over the five-year period.

Interesting regional patterns emerge in evaluating the changes in the rice surpluses. Looking at the rural north and south alone, the northern surplus rose only slightly, from D 228,000 to D 302,000, where surplus is defined as the per household difference in value of production and consumption. Although households produced more rice in the north, they increased their purchases just as much. The rice surplus position of southern households increased dramatically, from D 1,398,000 in 1993 to D 2,595,000 in 1998. The extra production went to exports, as well as to increased purchases by households in the north and in urban areas. Thus, at least at this coarse level, changes in marketing patterns match expectations, given the changes in relative producer prices.[25]

Table 5.10 shows detail by subregions. Even stronger patterns of specialization in rice can be seen here. The Northern Uplands go from a rice deficit of D 234,000 in 1993 to a deficit of D 384,000 (per household) in 1998. The Red River Delta, the main rice-growing region of the north, saw its surplus increase from D 679,000 to D 1,090,000, while the North Central Coast region went from small surplus to small deficit. It is also true, however, that the apparent lack of change in this region hides largely offsetting increases in production and consumption.

More pronounced specialization can be seen in the southern regions. In the Central Highlands, the rice deficit increased from D 1,307,000 to D 2,070,000 per household. There are sizable increases, however, in the surplus produced in the Central Coast (D 49,000 to D 535,000) and Southeast (D 308,000 to D 853,000) regions. Certainly the most dramatic change is in the Mekong Delta, though, where the household surplus goes from D 3,012,000 to D 5,179,000, despite an increase in rice consumption of almost D 500,000. It appears that at the household level, more households are relying on the market for their rice, while at the national level, more regions are becoming "rice importers," with the Mekong Delta producing a growing share of national rice output.

Changing Rice Prices and Inequality

It is clear that, in total, rural income inequality declined in the south, while income differences widened between north and south. Is this fact linked to rice? To address this question, the position in the income distribution of winners and losers from rice price changes must be identified within each region. If rice farmers were concentrated at the bottom or middle of the income distribution in the south, reported price changes could lead to changes in line with those just described. Alternatively, the changes in income inequality may have nothing to do with rice. Many factors in addition to increases in rice prices changed over the period.

In this section, the methodology outlined by Deaton (1989, 1997) is used to explore the association between benefits of rice price changes and a household's position in the income distribution. A brief review of the theoretical motivation underlying the empirical analysis is helpful, even though the intuition is straightforward. Following Deaton's notation, household welfare can be summarized by the indirect utility function:

$$u_h = \psi(wT + b + \pi, \bar{p})$$

where household "full income" is the sum of the value of the labor endowment, wT, unearned income, b, and farm profits, π; and $\bar{p}$ is a vector of consumption prices. Assuming that the producer and consumer prices of rice are the same (which is not the case), then the change in household welfare associated with change in rice prices is:

$$\frac{\partial u_h}{\partial p} = \frac{\partial \psi}{\partial b} \times \frac{\partial \pi}{\partial p} + \frac{\partial \psi}{\partial p} = \frac{\partial \psi}{\partial b} \times (y - q)$$

that is, the effect of a change in income on household welfare, scaled by the difference between production (y) and consumption (q) of rice. Not surprisingly, welfare increases for those households that are in a surplus position and decreases for net consumers of rice. Note that the assumption in this formula (as simplified here) is that there is no supply or demand response. This gives a first-order approximation of the welfare change associated with a small price change. Clearly, households adjust their behavior to larger price changes, and this will add additional terms to the formula as producers produce more rice and consumers reduce rice consumption. These changes will attenuate the potentially adverse impact of an increase in producer prices while compounding the benefits.

Using the equation above, the amount of income that should be given to households to restore them to the original level of welfare is:

$$dB = (q - y)dp = p(q - y)d \ln p$$

so that the amount of compensation depends on the net consumption position of the household, scaled by the price change. The marginal compensation, dB, is expressed as a share of household expenditures:

$$\frac{dB}{x} = \left(\frac{pq - py}{x}\right) d \ln p$$

which Deaton calls the "net consumption ratio." The focus is on the negative of this expression, the net benefit ratio: the value of production minus the value of consumption, relative to household expenditures. Clearly, households should be relatively better off with an increase in rice prices if they are net sellers of rice. Because of the divergence between producer and consumer rice prices, however, it also makes sense to look at the components of this expression separately. The production ratio can be defined as the ratio of the value of rice production to total expenditures, and the consumption ratio can be defined as the ratio of the value of rice consumption to total expenditures (which is just the rice budget share).

This chapter is specifically interested in the correlation of the benefit ratio with the position of the household in the income distribution, as summarized by log of household per capita expenditures (ln*pcx*). A useful starting point for this discussion is the results reported by Minot and Goletti (1998). They use the 1993 VLSS to calibrate a structural spatial model of rice markets in Vietnam to simulate the distributional impact of a relaxation of the rice export quota. Their focus, like ours, is on the impact of the change in rice prices on household welfare as summarized by the net benefit ratio. Their main conclusions are:

- Higher rice prices will exacerbate regional income inequality.
- Higher rice prices will worsen the within-region inequality, because the rural poor would be hurt more than the urban poor.
- Higher rice prices will still yield net benefits to the poor, through higher incomes, and therefore reduce poverty.

This chapter does not directly address their second point, because urban and rural households have not been pooled in the welfare analysis. However, these results using the 1998 data directly address Minot and Goletti's other predictions.

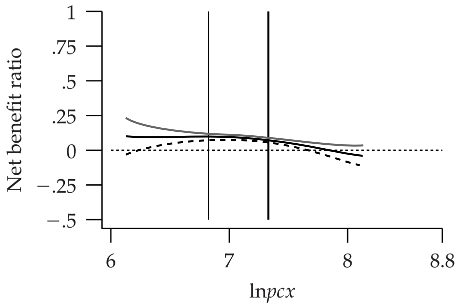
In addition to the benefit of having more data, which allows for estimation rather than simulation of the impact of the price increase, it is clear that some of the assumptions in their analysis do not ultimately hold true. For example, consumer prices actually rose more than producer prices. (Minot and Goletti assume the reverse.) The divergence of consumer and producer prices provides an interpretation challenge to both their conclusions and this chapter's approach. Most important, and perhaps not surprisingly, many other factors that Minot and Goletti hold constant changed, notably the increase in incomes and the decrease in fertilizer prices. Both of these factors lead to rice supply and demand responses that are not easily anticipated.

Following Deaton, nonparametric regressions of the association between rice benefit ratios and income ln*pcx* have been estimated.[26] The resulting graphs provide a clear picture of who are the relative winners and losers from price changes. Because there are very few rice producers in urban areas, these households' net benefit ratios are essentially their rice budget shares. The welfare losses associated with rice price increases will thus be in direct proportion to rice consumption. Because rice expenditure shares are higher for lower-income households (as the Engel curve clearly shows), then in relative terms the poor will be most adversely affected by the price increase, and the price increase will worsen inequality of welfare (all else being equal). This chapter does not show the results of this exercise, but focuses instead on the rural households, where the story is more complicated.

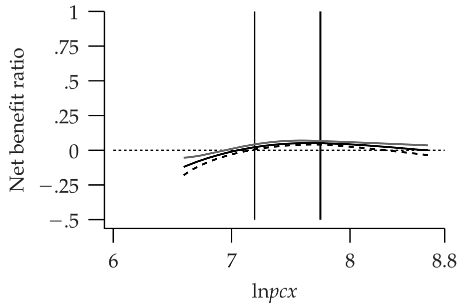
The results are presented in figure 5.4 (rural north) and figure 5.5 (rural south). Three sets of graphs are shown: the net benefit ratio, the production ratio, and the consumption ratio. These variables are shown separately for 1993 and 1998, because it is unrealistic to imagine that the results from a single time point will apply over the entire five-year period, given all of the other changes in rice production, consumption, and household incomes. Indeed, the theory outlined above refers to the impact of marginal changes in prices on household welfare, holding everything constant. Over the five-year period, the rice price changes were far from marginal, and little was constant. The figures also show changes in the rice variables over the period and how these changes relate to a household's position in the original 1993 income distribution. This set of graphs allows review of relative improvements in living standards associated with changes in rice marketing. Two reference bars are presented in each figure, corresponding to the 25th and 75th percentiles of the ln*pcx* distribution. Note that although the domain of ln*pcx* includes all of the ln*pcx*-axis, most of the observations are concentrated in the middle of the figures; thus, most inferences should be drawn from the shapes of the estimated functions in the middle of the graphs. Finally, the dashed lines represent the bootstrapped 95 percent confidence intervals for the regression line.

First consider results from the north. Panel A shows the net benefit ratio for 1993, and panel B presents the corresponding figure for 1998. Panel A shows that the net benefit of a rice price increase (given the values of variables in 1993) was positive, in the 0.10 range. This means (approximately) that the difference in value between rice production and consumption is

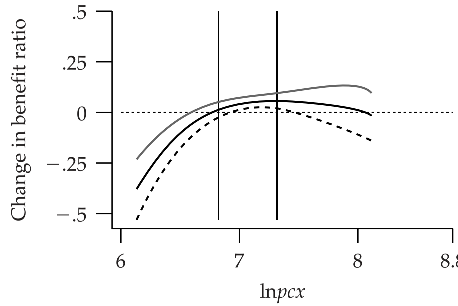
Figure 5.4. The Distributional Impact of Changes in Rice Prices, Rural North
(estimated regression and 95 percent confidence interval)



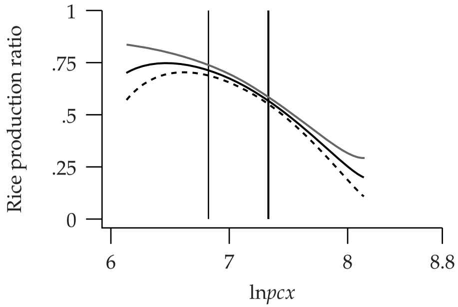
Panel A: Net benefit ratio, 1993



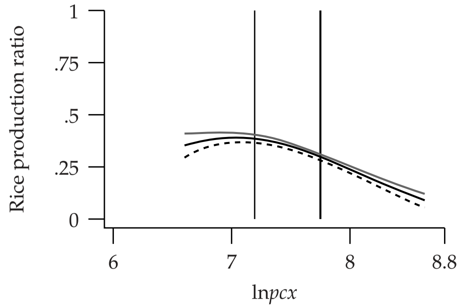
Panel B: Net benefit ratio, 1998



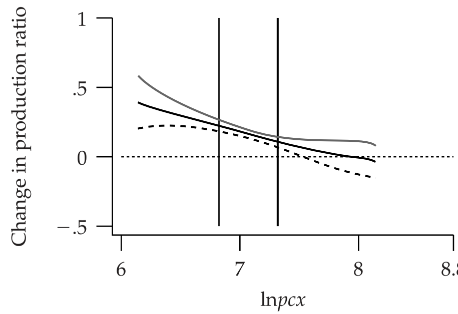
Panel C: Change in benefit ratio, 1998 to 1993



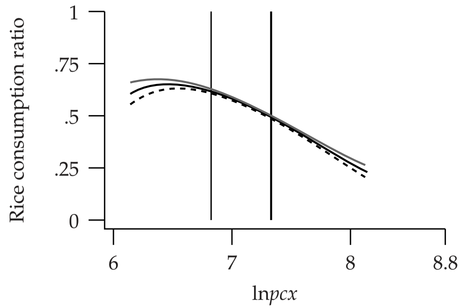
Panel D: Rice production ratio, 1993



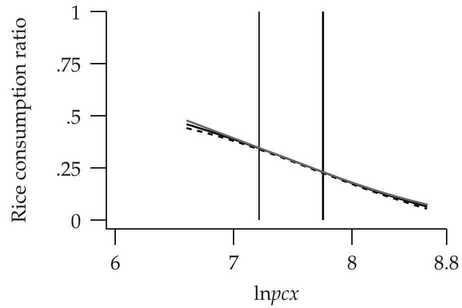
Panel E: Rice production ratio, 1998



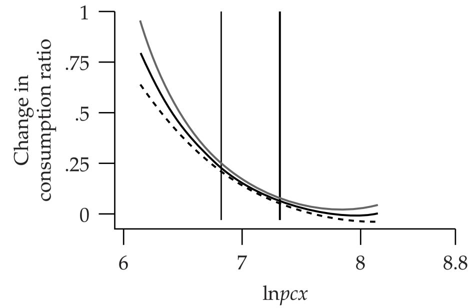
Panel F: Change in production ratio, 1998 to 1993



Panel G: Rice consumption ratio, 1993



Panel H: Rice consumption ratio, 1998



Panel I: Change in consumption ratio, 1998 to 1993

Note: Each graph illustrates the estimated nonparametric regression, plus 95 percent confidence interval, based on bootstrapped standard errors.

Vertical bars are provided for reference, at the 25th and 75th percentiles of the ln*pcx* distribution.

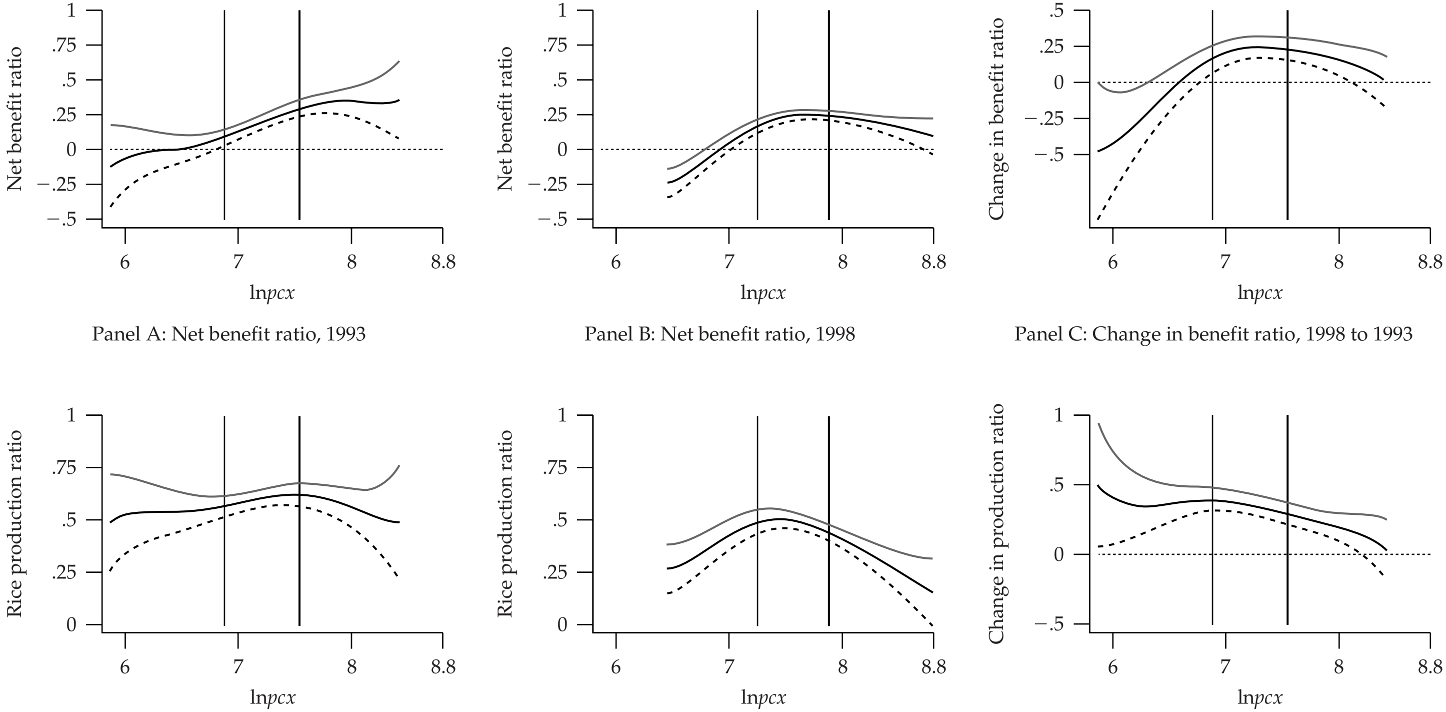
The benefit ratio is plotted for each of 1993 and 1998 (relative to each year's ln*pcx*), while the change in benefit ratio is defined as the difference in surplus (production minus consumption) between 1998 and 1993, relative to 1992 consumption.

The production and consumption ratios, as well as their changes, are analogously defined. For example, the production ratio is the ratio of rice production to total consumption.

All of the "changes" are relative to 1993 consumption.

Source: Authors' calculations from 1992–93 and 1997–98 VLSSs.

Figure 5.5. The Distributional Impact of Changes in Rice Prices, Rural South
(estimated regression and 95 percent confidence interval)



Panel A: Net benefit ratio, 1993

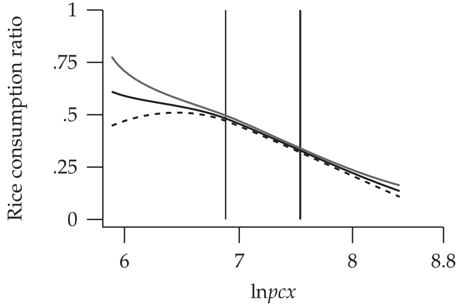
Panel B: Net benefit ratio, 1998

Panel C: Change in benefit ratio, 1998 to 1993

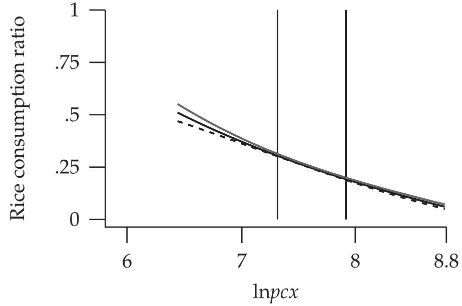
Panel D: Rice production ratio, 1993

Panel E: Rice production ratio, 1998

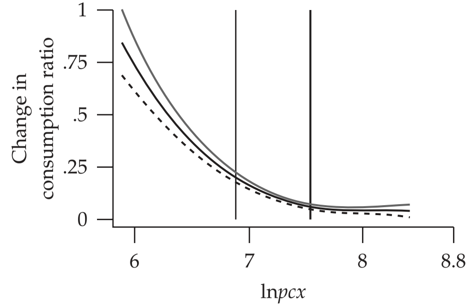
Panel F: Change in production ratio, 1998 to 1993



Panel G: Rice consumption ratio, 1993



Panel H: Rice consumption ratio, 1998



Panel I: Change in consumption ratio, 1998 to 1993

Note: Each graph illustrates the estimated nonparametric regression, plus 95 percent confidence interval, based on bootstrapped standard errors.

Vertical bars are provided for reference, at the 25th and 75th percentiles of the ln*pcx* distribution.

The benefit ratio is plotted for each of 1993 and 1998 (relative to each year's ln*pcx*), while the change in benefit ratio is defined as the difference in surplus (production minus consumption) between 1998 and 1993, relative to 1992 consumption.

The production and consumption ratios, as well as their changes, are analogously defined. For example, the production ratio is the ratio of rice production to total consumption.

All of the "changes" are relative to 1993 consumption.

Source: Authors' calculations from 1992–93 and 1997–98 VLSSs.

10 percent of income. The net benefits declined slightly with ln*pcx*, suggesting that the benefits were proportionately concentrated among lower-income households. Panel B suggests that, by 1998, the net benefits were lower, especially at the lower end of the income distribution. In fact, the net benefits were negative for the poorest households. This can occur, for example, because consumption prices have risen faster than producer prices, and rice consumption remains especially important in the consumption basket of the poor. Panel C looks at the change in the net benefit ratio. This is the change in the household rice surplus as a percentage of 1993 income (consumption). Clearly, households in the bottom 25 percent saw declines in their rice surplus position. For the majority of households in the north, the change in rice surplus was barely positive and was slightly more so for richer households.

A slightly clearer understanding of what was happening can be obtained by splitting the net benefit ratio into its production and consumption components. Panels D, E, and F demonstrate that revenue from rice production represents a significant fraction of household income, and the importance of rice declines with household income (ln*pcx*). On the income side, then, increases in rice prices are strongly pro-poor. This relationship shifts down somewhat between 1993 and 1998. Still, as can be seen in panel F, the combined impact of higher rice prices and greater rice output yielded benefits that were concentrated among lower-income households. Whatever else was going on in terms of income generation, the liberalization of rice markets seems to have unambiguously served to reduce income inequality. Income does not translate directly into welfare, however (as the net benefit ratios show). In panels G, H, and I, higher rice prices for consumers offset most of the gains to income. The consumption ratios are essentially Engel curves, and they have the expected negative slope (as seen in the regressions reported in tables 5.4 and 5.5). Panel I demonstrates the very steep relationship between changes in rice expenditures and a household's ln*pcx*. Poor households increased their rice expenditures significantly more (as a percentage of consumption) than rich households. As a result, the burden of the consumer rice price increases fell disproportionately on the poor. As shown in panel C, for the poorest households, the increase in consumer prices far outweighed the gains from higher producer prices.

Figure 5.5 reports the results for the south. The patterns are similar to those in figure 5.4 with one important difference: The net benefits are much higher in the south. Across panels A to C, the net benefits in the south are higher each year than they are in the north, and they are also positive for most households in the income distribution. In fact, panel C shows that there were many more winners from liberalization in the south, because most households saw an increase in their rice surpluses. Furthermore, if anything, these net benefits were concentrated in the middle of the distribution. Whether this reduced the inequality of welfare depends on the social welfare function used to weigh the social benefits of income to rich and poor households, as well as the associated inequality index. Still, it does not appear that benefits accrued disproportionately to the better-off, which would have unambiguously increased inequality.

The disaggregated figures are also informative. The consumption pictures are similar to those for the north, but the production figures are striking and tell most of the story. Although the benefits to rice revenue of higher rice prices are more evenly spread out in 1993, the distributional impact of higher prices in 1998 may still have served to equalize incomes, especially increasing incomes in the middle of the ln*pcx* distribution. In general, the change in the rice production ratio shows that households in the south benefited proportionately more than those in the north, and the increases in income from higher rice output and higher prices were shared relatively equally. This goes some way toward explaining why income inequality fell in the rural south.

Liberalization of rice prices has been a double-edged sword, increasing the incomes of the poor, especially in the south, but also increasing the cost of food, which falls most heavily on the poor. On balance, except for the very poorest farmers, southern farmers across the income distribution benefited from the changes, while most northern households were slightly better off, except at the bottom of the income distribution. Note, however, that these conclusions ignore the fact that overall incomes in both the north and south have increased, and rice price liberalization may have facilitated the movement of northern farmers out of rice and into other crops. It is also not obvious why such a gap has emerged between the producer and consumer prices. If people are voluntarily choosing to buy better-quality rice, for example, some of the adverse impact of the increase in rice consumer prices will be overstated. The results suggest, however, that in terms of rural welfare, there remains room for further liberalization in rice marketing.

The Contribution of Agriculture to Income Inequality

In this final exercise, the degree to which agriculture (and possibly increasing inequality of agricultural income) contributes to overall inequality will be examined by decomposing total income inequality by income source, using a method developed by Shorrocks (1982, 1983) and applied by Benjamin and others (2002). Shorrocks shows that, under reasonable assumptions, a decomposition of total inequality by source of income can be calculated whereby the decomposition applies to any inequality index. Basically, the decomposition allows an answer to this question: What fraction of total income inequality is generated by inequality of income from income source k? Assuming that there are k sources of income—for instance, income from farming, wages, and other sources—the proportion of total inequality in S_k, deriving from y_k, is given by:

$$S_k = \frac{\operatorname{cov}(y_k, y)}{\operatorname{var}(y)}$$

where y_k is the income derived from source k, and y is total household income. S_k can easily be estimated by the following regression:

$$y_{kh} = \beta_0 + \beta_k y_h + \varepsilon_h.$$

The coefficient β_k yields the estimate of S_k.

The key question is how to interpret S_k (that is, when is it "big" or "small"?). One benchmark is to compare S_k to zero. If S_k is negative, increases in the inequality of income source k will actually reduce inequality, reflecting that y_k is an income source earned primarily by the poor. Alternatively, S_k can be compared to W_k, where W_k is the share of income derived from source k. Because the rich tend to earn more income from all sources, increases in inequality of any type of income will increase overall income inequality. However, some sources will be relatively less disequalizing, and W_k is a useful benchmark. If S_k is greater than W_k, increases in the inequality of the distribution of y_k can be viewed as disproportionately increasing income inequality, whereas if S_k is less than Wk, the income source is relatively less disequalizing.

Two statistical issues may affect the interpretation of the decomposition. First, it may be desired to net out the spatial contributions to inequality. For example, it may be that nonfarm income generates most inequality. However, this may simply reflect the possibility that areas with greater nonfarm incomes are richer. The decomposition would correctly attribute total inequality to nonfarm incomes, but the results would not imply that increases in nonfarm income in poorer areas would increase inequality. The sensitivity of the conclusions to spatial variation in the composition of income can be evaluated by allowing for cluster FEs and identifying β_k from the within-cluster variation in incomes. A second issue in the decomposition is measurement error. Any mismeasurement of an income source will lead to a spurious positive relationship between y_k and y. Again, the OLS decomposition is mechanically correct, but interpretation is difficult. Essentially, the aim of this exercise is to estimate the correlation between a given income source and a household's position in the income distribution. The measurement error in this case could lead to either an overstatement of this relationship or an understatement (through conventional attenuation bias). A standard fix for this type of measurement error would be to use an alternative estimate of the household's position in the income distribution as an instrument. In this case, household per capita consumption is used as an instrument for per capita income.

Table 5.11 reports the results of the decompositions separately for 1993 and 1998. The sample here, as before, is the panel of households for which data for both 1993 and 1998 are available. Three alternative estimates are reported here: OLS, OLS with cluster FEs, and two-stage least square (2SLS) with cluster FEs, where total income is instrumented by consumption to adjust for possible measurement error in living standards.

The focus here is on the changing role of agriculture in inequality, beginning with rural Vietnam (north and south combined). As seen before,

Table 5.11. Decompositions of Rural Income Inequality, by Source of Income

	1993				*1998*			
		Coefficient on per capita income				*Coefficient on per capita income*		
			Cluster effects				*Cluster effects*	
Source of income	*Share*	*OLS*	*OLS*	*2SLS*	*Share*	*OLS*	*OLS*	*2SLS*
Rural Vietnam								
Wages	0.110	0.041	0.022	0.002	0.120	0.048	0.023	0.024
Family business	0.152	0.534	0.552	0.252	0.177	0.404	0.429	0.307
Farming	0.423	0.141	0.138	0.290	0.347	0.268	0.262	0.229
Animal husbandry	0.069	0.034	0.040	0.048	0.087	0.029	0.041	0.045
Services, durables	0.109	0.061	0.054	0.165	0.131	0.104	0.089	0.155
Other	0.137	0.187	0.194	0.243	0.137	0.147	0.157	0.240
Rural north								
Wages	0.062	0.027	0.013	0.046	0.087	0.062	0.044	−0.072
Family business	0.133	0.519	0.530	0.125	0.165	0.397	0.409	0.308
Farming	0.466	0.075	0.071	0.219	0.316	0.141	0.167	0.089
Animal husbandry	0.105	0.042	0.046	0.131	0.116	0.058	0.041	0.065
Services, durables	0.097	0.054	0.045	0.120	0.146	0.127	0.094	0.146
Other	0.167	0.282	0.295	0.358	0.170	0.215	0.218	0.320
Rural south								
Wages	0.162	0.044	0.027	- 0.013	0.153	0.028	0.011	−0.007
Family business	0.174	0.545	0.563	0.296	0.189	0.414	0.440	0.307
Farming	0.411	0.176	0.174	0.314	0.379	0.332	0.315	0.319
Animal husbandry	0.029	0.034	0.037	0.020	0.058	0.017	0.041	0.031
Services, durables	0.121	0.064	0.058	0.180	0.117	0.092	0.085	0.161
Other	0.104	0.137	0.140	0.203	0.105	0.116	0.123	0.190

Note: 2SLS = two-stage least squares. OLS = ordinary least squares. Value of the services obtained from household durables, including housing. FEs specification includes controls for cluster FEs. The 2SLS specification instruments total income by household total consumption.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

farming represents a significant portion of rural household income. In 1993, its share was 42.3 percent, and in 1998, it was only slightly lower, at 34.7 percent. All but a small percentage of this is income from crop production. (The rest is the value of crop by-products.) The OLS estimate for 1993 for S_k is 0.141, which is considerably less than that of farming's share. Adding cluster effects has no impact on this estimate, and the 2SLS estimate is 0.290, which is larger than the OLS. This arises largely because of the spillovers from correcting the measurement error in income from family-run businesses. Family business income is notoriously difficult to measure, and this almost certainly contaminates the OLS estimates of the decomposition. Even after instrumenting, the contribution of family-run business income to total inequality significantly exceeds its income share. However, the OLS estimates are even higher, which (because of adding up) leads to an underestimate of the impact of agricultural income on overall inequality. Throughout the remaining discussion, the focus will be on the 2SLS estimates.

Turning to the 1998 figures, the contribution of agriculture to inequality has risen to 0.229, but it is still lower than agriculture's share of income (0.347). The next two panels of table 5.11 provide the breakdowns by north and south. One finding worth noting is the strongly equalizing impact of wage income: Clearly, it appears that the development of off-farm labor markets will improve income inequality. Another finding common to both regions is that inequality of income from family-run businesses is the largest contributor to overall income inequality. In the north, the impact of farming on income inequality fell from 1993 to 1998 (as did the share of income from farming) while it rose slightly in the south (with only a slight decline in its importance). Given the results from the previous section, it appears that inequality of nonrice farm income may be generating some income inequality. However, the overall conclusion that can be drawn from this exercise is that inequality of farm income is *not* the primary source of inequality in rural areas. Concern that agricultural reforms may have adverse distributional consequences, because of increasing inequality in farm incomes, seems unwarranted.

Conclusions

While there have undoubtedly been continuous changes—both subtle and not so subtle—in the institutional environment in which farmers make decisions, the most dramatic and observable changes over the 1993–98 period involved liberalization of the rice market. The panel dimension of the rich VLSSs has been exploited in this chapter to document changes in prices and explore the possible impact of these changes on efficiency and equity in rural Vietnam. Using these data, the following conclusions can be drawn:

Prices in the VLSS data reflect the main policy changes: (a) rice producer prices rose in all regions, but especially in the south, where the implicit tax of the export quota had most depressed prices; (b) fertilizer prices declined dramatically in all regions. It also appears that the rice market became more integrated as the variation in rice producer prices fell between 1993 and 1998 and the correlation of price with region also declined.

Rural households experienced rapidly rising incomes over this period, and some of this increase can be directly—and indirectly—linked to rice market liberalization. First, even if there had been no behavioral response by farmers, the higher rice prices that arose from the reforms significantly increased the value of rice output while the sharp drop in fertilizer prices cut farm costs. Second, the increased incentives in rice farming line up with the anticipated behavioral response: Rice output increased—especially in the south, where prices rose the most—and farmers made considerable increases in their use of fertilizer, further improving yields.

Despite the direct linkages between rice market liberalization and income, however, the greatest increases in agricultural output occurred in nonrice crops. Cheaper fertilizer may have facilitated this expansion, but the primary driving forces appear to have been changes in local food demand patterns, combined with broadening export opportunities, that provided incentives for farmers to expand their nonrice production, especially production of perennials.

The changing patterns of returns to various agricultural activities also appear to have shifted geographic patterns of production and marketing, with rice production shifting to the south and the north moving toward nonrice crops. At the same time, there were significant increases in the amount of domestic trade in rice at both the national and household levels: Vietnamese households are increasingly reliant on markets for obtaining rice.

Not surprisingly, given that the burden of the export quota fell most heavily on the south, and especially on farmers in the Mekong Delta, a relaxation of the quota yielded disproportionate benefits for southern farmers. This served to widen regional income differences as relative rice production and incomes returned to historical patterns of specialization.

However, total rural income inequality did not increase, despite the increased regional inequality. This occurred because of significant reductions of inequality among southern households. This chapter has shown that in both the north and south, increased producer prices for rice primarily benefit poorer and middle-income farmers. The increases in incomes from rice thus tended to equalize household incomes. To some extent, the corresponding increases in consumer prices undid these benefits, especially for the urban poor. However, taking into account the increases in rice consumer prices, this chapter did not find that the overall (net) impact of the increase in rice prices had an adverse impact on inequality among rural households.

Evidence of increasing income inequality within regions was not found by this study. Moreover, compared with other sources of income (such as family-run businesses), inequality of agricultural incomes was found to contribute less than its share to total inequality. This suggests that policymakers need not be concerned about adverse linkages between further agricultural liberalization and income inequality.

This chapter finds that the agricultural reforms had a largely beneficial impact on the well-being of rural households throughout Vietnam. An important follow-up question is whether these benefits can be expected to continue. There are certainly reasons to be cautious in extrapolating results from the 1993 to 1998 period to the next five years. First, to the extent that increased use of fertilizer is driving improved yields, there are technological limits as to the degree that additional fertilizer can further increase yields. Second, if the incentives to cultivate rice more intensively or more efficiently are driven by increased rice prices—or a continuation of other institutional reforms—a limit to the opportunities for this type of growth can be anticipated as prices converge to international levels. Again, technological constraints eventually dominate improvements in incentives. Finally, care must be taken in extrapolating time trends from any two years of data. As was seen from comparing the VLSS data to aggregate data, the overall trends observed from 1993 to 1998 are consistent with aggregate trends. However, the relative performance of the south and the north observed may in part reflect mean reversion in that 1993 was a relatively good year for the north, compared with 1998 for the south. There may also be lags in the realization of output of perennials, especially in the north, so that the observed divergence is transitory. That said, the broad picture provided by the VLSSs suggests that even over the brief span of five years, farmers responded to the changes in their economic environment generated by the reforms, and these responses are not likely to be reversed in the years ahead.

Notes

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1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. In the 1993 VLSS, the country was divided into seven administrative regions for the purpose of sampling. The north is defined in this chapter to include the Northern Uplands, the Red River Delta, and the North Central Coast. The south consists of the Central Coast, the Central Highlands, the Southeast, and the Mekong Delta. In the 1998 VLSS, eight administrative regions were used, with the Northern Uplands subdivided into the Northeast and Northwest.

3. See the reports completed for the Asian Development Bank (1996, 2000) and prepared by Goletti (1998); Goletti and Minot (1997); and Goletti, Minot, and Berry (1997) for a more detailed overview of changes in rice policy, as well as a comprehensive review of the performance of the agricultural sector in Vietnam. Timmer (1996) discusses some of the general issues concerning economic transition and the role of agriculture in economic development as they may pertain to Vietnam.

4. See Minot and Goletti (1998, p. 739).

5. See Bautista (1999) and Tran (1998) for preliminary discussion of the impact of Vietnamese agricultural policy changes and farmer productivity.

6. If Engel's Law holds—that is, if the income elasticity for food is less than one—the overall increase in the demand for food is expected to be less than proportional to the increase in incomes, and the food share of expenditures is expected to fall. This would correspond to a diminished share of agriculture in economic activity. Of course, the demand for individual agricultural commodities can be considerably more income elastic, and the composition of agricultural output can be expected to shift toward these "luxuries."

7. See World Bank (2000) for more details concerning the VLSS, in particular the sampling frame of 1998 compared with 1993.

8. See Wiens (1998) for additional discussion of the role of agriculture in household incomes, based on the 1993 survey.

9. The monthly price changes are from the Vietnamese consumer price index (CPI), which is constructed on the basis of a basket of food and nonfood items. The

regional price indexes were constructed by the General Statistical Office and are for 1998 (World Bank 2000). These indexes are discussed in more detail in World Bank (2000).

10. This is a useful point at which to provide a comparison of the panel households to the two cross-sections (1993 and 1998). The panel households are virtually indistinguishable from the full cross-section in 1993: The ratio of cross-section to panel household incomes is 1.02 in urban areas and 1.00 in rural areas. Some differences emerge for the urban households in 1998. The ratio of cross-section to panel household incomes is 1.11 in the south (urban) and 0.95 in the north (urban). Thus, the cross-section would yield a slightly greater widening of the north-south differential for urban areas. The rural samples are closer: The ratio of cross-section to panel household income in 1998 is 0.98 in the north and 0.94 in the south. The cross-section data thus imply slightly less widening of rural incomes between north and south (by 4 percentage points). However, these differences are very small. The overall story is not sensitive to whether the analysis is restricted to the panel households. Also note that some of the divergence may be driven by the change in the national sampling frame in 1998, as opposed to sample attrition from the 1993 survey. That this may be the case is underlined by the similarity between the panel and nonpanel households in 1993.

11. These results broadly corroborate those in Glewwe, Gragnolati, and Zaman (2002).

12. A similar possibility in data drawn from a household survey conducted in north China in 1995 has been identified. In Benjamin and others (2002), evidence is found that higher-income households save higher fractions of their incomes; thus, consumption-based measures of inequality may understate true differences in income-earning potential.

13. "Theoretical" here means that, in contrast to unit values, these prices are based on a price survey with "unconsummated" transactions, as opposed to prices based on realized transactions.

14. Of course, this ignores general equilibrium considerations, such as price changes, and other factors.

15. In rural China, increasing incomes have helped spur rapid investment in greenhouses and other more capital-intensive (and lucrative) forms of agriculture.

16. In 1993, land productivity, measured in terms of either rice yields or the gross value of agricultural output per unit of land, was significantly lower in the south than the north. As a result of the more rapid growth in the south between 1993 and 1998, the gap largely disappeared. Professor Jean-Pascal Bassimo (Paul Valery University, and Centre for International Economics and Finance, Chateau Lafarge, Aix-en Provence) has informed the authors, in personal correspondence (January 2002), that in the 1920s, rice yields in the north and south were actually similar.

17. An important avenue of future research will be to evaluate the distributional consequences of this striking increase in income from perennials and evaluate the possible role that land security played in encouraging investment in trees.

18. The national data suggest that income from animal husbandry grew at roughly the same rate as that from crop production.

19. Note that the 1986–98 period shows a marked divergence between north and south: The index of 1998 total agricultural output relative to 1986 is 1.96 for the south, compared with 1.56 for the north. For rice, the corresponding 1998 to 1986 output indexes are 1.87 for the south and 1.64 for the north.

20. Although some households that were not farming in 1993 were farming in 1998, this entry into farming is more than offset by the decision of a significant number of households to exit agriculture.

21. To get around the log of zero problem for input use, the log of input use is specified as $\ln(1 + X_{it})$. In general, this would not be the right approach, but the inclusion of the dummy variables for whether input use is or is not nonzero tidies up the impact of this otherwise arbitrary transformation.

22. This corresponds to Mundlak's original motivation for using an FEs specification for the estimation of farm production functions.

23. Although the contribution of productivity growth measured in percentage terms is the same in the north and the south, the much higher growth in the south implies a much larger role of increases in productivity.

24. Labor input is not broken down by crop in the survey.

25. In physical terms, the north goes from a slight per household deficit of 138.4 kilograms to a surplus of 116.3 kilograms; in the south, the surplus per household goes from 632.4 kilograms to 2,009.1 kilograms. Differences in producer and consumer prices explain the fact that, in value terms, the north was in surplus in 1993.

26. Specifically, the Fan nonparametric regression estimator, as described in Deaton (1997, chapter 4), has been used.

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Part II

Poverty Reduction in Vietnam in the 1990s

6

The Static and Dynamic Incidence of Vietnam's Public Safety Net

Dominique van de Walle

Vietnam has a system of centrally determined and mandated poverty and social welfare programs that are implemented by local authorities according to local norms, local poverty standards, and—in large part—local financing. Resources are scarce. Although they may be intended to cover the mandates, insufficient central and provincial allocations may never even reach the communes. These central allocations must inevitably be supplemented by means of local resource mobilization. There is evidence that the rural population, and the poor among them, are heavily taxed, including through numerous locally levied "fees, charges, and other contributions" (Government of Vietnam–Donor Working Group 2000). In addition, standards of "poverty" used by different authorities vary across locations; these various standards often simply mirror local resources. For these reasons, there is thought to be uneven coverage and leakage of poverty and social welfare programs. The poorest in Vietnam often need to rely on charity from within their communities, but the communities in which they live are often poor, so other households have little to spare. In this context, too, it has been argued that coverage among Vietnam's poor may be quite uneven spatially, with poor people who live in poor areas faring much worse than poor people who live in well-off areas (Rao, Bird, and Litvack 1999; van de Walle 1999).

The decentralized nature of Vietnam's public safety net also raises wider concerns from recent literature (Bardhan and Mookherjee 2000; Conning and Kevane 1999; Galasso and Ravallion 2004). A popular argument in recent years is that decentralized programs are better at reaching the poor. The contention is essentially that local authorities are better placed to accurately identify and target poor people and their problems. Against that, counterarguments can be made that local entities may not share the objectives of the central government and may be more liable to political capture.

In the light of these concerns—both specific to Vietnam and more general—this chapter examines the extent to which existing programs and expenditures on poverty reduction in Vietnam are well targeted to poor communes and poor people. Surprisingly little is known about this issue. Cross-province regressions of budgetary allocations for health- and education-related national programs strongly suggest that transfers from the center are progressive, in that they result in higher per capita spending in poor and middle-income provinces (Fritzen 1999). Fritzen also finds that central health transfers are well targeted based on health needs. However, little is known about the within-province allocations to districts and communes. Others have noted the lack of cross-commune redistribution of resources and the consequent disparities between communes in their abilities to provide basic services and assistance to the local poor (Litvack 1999). Moreover, nationally representative data on household-specific program incidence have not been available for more than one or two programs. Fortunately, new data from the 1997–98 Vietnam Living Standards Survey (VLSS) enable an analysis of the incidence across households and communes of some social welfare- and poverty-related initiatives and provide an opportunity to explore these concerns more rigorously. The availability of an earlier dataset for 1992–93 also allows some comparisons over time, including longitudinal comparisons for the same households. Total spending on certain transfers more than doubled between 1992–93 and 1997–98. This situation permits an interesting study in who benefited from the changes in outlays.

The main question this chapter addresses is whether current public social welfare programs are targeted to the poor.[1] In answering this question, the chapter explores sensitivity to the definition of poverty and what is assumed about household behavioral responses to the programs. The chapter examines whether programs perform a safety net function, recognizing that this involves both protection from poverty and promotion from poverty (Dreze and Sen 1989). The chapter also examines the role of nonincome factors, including whether equally poor communes in different provinces are treated equally and, if not, what accounts for any differences in treatment.

The chapter begins with a discussion of the background, setting, and overall system of poverty alleviation and safety net programs and their financing. The next two sections discuss the data and welfare measurement. Implications for the incidence of program spending are next addressed, followed by a section that looks at how much the system protects versus promotes the poor. This is followed by an examination of the importance of factors other than welfare to incidence, including where one lives, and then conclusions.

Despite experiencing a large reduction in poverty since embracing the market economy in the late 1980s, Vietnam remains a poor country, with more than one-third of its population in poverty. Vietnam's population is primarily rural; they are engaged in small-scale agricultural activities and subject to seasonality in incomes, recurring natural disasters, and other sources of vulnerability and impoverishment. Geographic differences and the existence of disadvantaged ethnic minority (non-Kinh) groups add to the complexity of the poverty picture (van de Walle and Gunewardena 2001). The country also faces severe budget constraints.

Yet on paper, Vietnam has—by the standards of low-income countries—an extensive social security and safety net system. This reflects a strong historical commitment to combating inequality and raising the living standards of all its regions and people. The surviving concern for and frequently expressed political commitment to ensuring a minimum level of welfare for all and maintaining a low variance in incomes also do much to preserve the regime's political legitimacy, but the government's aspirations in this area are often overshadowed by its lack of resources.

Doi Moi ("renovation") profoundly changed the way social services were delivered, leaving peasants more vulnerable (Glewwe and Litvack 1998; Kolko 1997). Cooperatives that had financed and supported health and education services for their members, as well as insurance against shocks, were disbanded in 1988. The social protection system that has evolved since decollectivization is composed of a number of different initiatives that are centrally mandated but locally implemented and often rely heavily on local resources.[2]

- The Social Security System provides pensions and other employment-related social insurance payments to formal sector workers. Public servants and armed forces personnel have been covered since 1947. In 1995, the scheme was expanded to private sector employees working in firms with 10 or more employees (Ministry of Labor, Invalids and Social Affairs [MOLISA] 1999). Although these social insurance payments are employment related and eventually meant to be fully funded from payroll taxes and employee contributions, they continue to be heavily subsidized by the central budget.
- The Social Guarantee Fund for Veterans and War Invalids extends compensation and assistance in the form of social subsidy transfers to those who contributed and suffered from the war efforts—such as disabled veterans, relatives of deceased soldiers, and others who contributed to the revolution.
- The Social Guarantee Fund for Regular Relief targets assistance to those unable to support themselves, including the disabled, orphans, and the elderly. Here especially, however, scarce public resources imply that implementation and coverage ultimately depend in large part on local-level governments and resources.
- The central government also runs a Contingency Fund for Preharvest Starvation and Natural Disasters, whose role is to minimize the consequences of natural calamities and other emergencies by dispensing disaster relief to regions and households.

- Finally, the government has devised a number of National Development Programs that aim to reduce poverty and are often targeted to "poor and remote" communes. These include interventions such as employment generation, reforestation, school and health fee exemptions, microcredit schemes, and physical infrastructure investments. Their focus is generally more on promoting growth than on providing protection.

In 1996, the government also proposed a national Hunger Eradication and Poverty Reduction (HEPR) program to coordinate existing and new efforts, as well as the resources for combating poverty. Since then, many public programs have been consolidated under the HEPR national program to better mobilize and coordinate antipoverty resources. Under the HEPR umbrella, the government implemented the National Target Program on Poverty Alleviation between 1998 and 2000 and has recently prepared a Poverty Alleviation Strategy for 2001–10 (MOLISA 2001). The HEPR and these other efforts do not appear, however, to have entailed much change in policy focus. The policy areas have all been emphasized in the past and have been addressed by past programs and a variety of ad hoc schemes. In addition, there is little new funding for HEPR from the center. New poverty mandates and targets are imposed on ministries by HEPR without the benefit of additional funding or reductions in other mandated responsibilities (Nguyen 1999; van de Walle 1999).

Throughout these programs, eligibility criteria, guidelines, and norms are largely dictated by the center, and implementation is chiefly the responsibility of the communes. Poverty and needs are locally determined following national norms, but heavily influenced by available local means and resources. Clearly, there are incentives for the local-level agencies to overstate their needs and understate their resources. Communes initially draw up lists of eligible candidates (people or households, depending on the program) for the different social protection programs to reflect their needs. These are gathered, altered, and eventually approved and passed on to the center by the districts and the provinces. After a process of review and negotiation among Vietnam's Ministry of Finance, Ministry of Planning and Investment, and MOLISA in Hanoi, transfers are made to the provinces.

Although transfers from the central budget appear to be insufficient to cover local needs or even centrally mandated spending, there is evidence that they are quite redistributive, aiming to equalize resources across provinces (Rao, Bird, and Litvack 1999). However, use of the funds and intraprovincial distribution are largely at the discretion of the provincial authorities. The evidence suggests that the redistributive process often breaks down at this level (Litvack 1999). Provinces distribute resources to districts based on criteria that vary widely from one province to another. Similarly, districts distribute to communes in disparate ways, and there is great disparity in the resources available to communes. Expenditure mandates are sometimes ignored and sometimes funded from other recurrent transfers or locally mobilized resources ("contributions"). There is often pressure on the communes to raise the resources to implement central programs through charging various fees and levying "voluntary contributions" from their populations. Communes are likely to contribute their own additional resources depending on several factors, including the economic status of households in the commune and local leadership. It is nevertheless likely that the neediest communes are often the ones that are least able to mobilize local funds. Existing fiscal arrangements that ensure progressive redistribution to poor provinces, at least for some programs, are nevertheless likely to lead to low and uneven coverage and horizontal inequity as a result of the lack of central incentives or mandates for targeting the poor within provinces. Statistics published by MOLISA (1999) show the large gap between the numbers of people who are eligible for each of the social welfare programs and the actual numbers of beneficiaries. The probability of participation is likely to depend on local budgets and leadership—hence on where the potential beneficiaries live.

In exploring the implications for the poor of the existing safety net in Vietnam, this chapter emphasizes a number of concerns. One issue relates to defining "the poor." This chapter uses per capita consumption expenditures as its general welfare measure but recognizes that some components of the observed household consumption data reflect public transfers. This has implications for drawing conclusions about the counterfactual situation—what welfare would have been without transfers—and hence about the incidence of transfers. The chapter describes a method for dealing with this concern.

A second issue addressed by this chapter concerns how the safety net performed over time. In principle, a safety net can reduce poverty either by protecting nonpoor people from becoming poor or by promoting poor people out of poverty. How does Vietnam's existing safety net perform in both functions? With panel data, methods exist to address this question (Ravallion, van de Walle, and Gautam 1995). These methods are applied to Vietnam's safety net.

A final issue addressed by this chapter concerns possible determinants of program incidence other than consumption expenditures. One possibility is that interventions are aimed at nonincome dimensions of welfare, so that the incidence picture based on consumption gives a skewed view of targeting. Another possibility is that, given public institutional arrangements for delivering social welfare programs, nonwelfare factors—in particular, political and geographic factors—may be found to matter a great deal in determining whether transfers reach the poor. In this respect, it may not be poverty that attracts benefits but rather the characteristics of the commune where the potential beneficiary lives. Communes in better-off provinces will generally have more resources for helping the poor. To what degree is the interaction of geography and low living standards the determining factor in whether the poor are assisted nationally?

Data

The analysis is based on the nationally representative 1993 and 1998 VLSSs.[3] These are multitopic household consumption expenditure surveys with modules covering numerous aspects of living standards.[4] The surveys covered 4,800 households spread across 150 communes in 1993 and 6,000 households living in 194 communes in 1998. In both years, a community questionnaire was administered in rural and small-town communes—120 communes in 1993 and 156 communes in 1998. A panel of 4,308 households was also contained in the surveys.

The welfare indicator is annual per capita consumption. This includes the value of consumption from own production and the use value of consumer durables, including imputed housing expenditures (World Bank 1995, 2000). Consumption expenditures and other monetary amounts are expressed in real January 1998 national prices and therefore take into account both inflation through the survey year and spatial price differences. The 1998 survey sought to improve the measurement of consumption in certain ways. For example, it records the consumption of own-produced nonfood items such as coal, wood, and flowers and strives for a better accounting of tobacco consumption. Although some questionnaire changes were introduced in the 1998 VLSS, care was taken to ensure comparability across the two surveys. Two total consumption expenditure measures—one that is the best possible measure for 1998 and another made comparable to the 1993 expenditure totals—are therefore available. For all comparisons over time, this chapter uses the temporally comparable measures of consumption but sticks with the best 1998 measure otherwise.

The questionnaires changed between the two surveys in certain other respects as well. In particular, the 1998 VLSS contains considerably more information on government programs and policies than the 1993 survey. This puts certain limitations on the types of issues that can be examined with respect to public interventions. The only transfer receipts recorded in 1993 for which a comparison can be made over time are education scholarships, social insurance, and social subsidy funds. Details are also available for 1998 on whether the household received transfers from the poverty alleviation fund or nongovernmental organizations (NGOs). In addition, there is information on the existence of programs and numbers of beneficiaries of various interventions at the commune level for 1998. It should be noted that there are a number of other ways in which the government intervenes to increase social welfare—for example, through subsidizing microcredit and various goods, and disaster relief (MOLISA 1999). Although information at the commune level for some such schemes (for example, disaster relief) permits analysis of geographic reach, an analysis of household-level benefits is not feasible.

Behavioral Responses to Transfers

In assessing whether programs reach the poor, a first step involves accurately identifying them. To accurately distinguish the poor, it is necessary to determine what welfare would have been without the government interventions. Program outcome assessments may depend on that choice—the appearance of weak targeting may just be due to deficient welfare measurement.

Typically, studies of the incidence of public spending subtract the entire amount of government transfer receipts from household income or consumption to approximate preintervention welfare and to rank the population into quintiles, for instance. Netting transfers out fully assumes that there is no replacement through savings, labor effort, schooling decisions, interhousehold transfers, and other potential changes in household behavior. That assumption is implausible. Yet treating posttransfer consumption as the welfare indicator instead is just as problematic. Ideally, the intervention amount would be subtracted, but the replacement income households would have had if they had not benefited from the intervention would be added. Van de Walle (2003) addresses these concerns by estimating the marginal propensity to consume out of social income (PCSI) (see also Ravallion, van de Walle, and Gautam [1995]). The estimated PCSI is then used to determine the net gain to consumption from social transfers and construct the counterfactual consumption level without intervention. This section summarizes the key results from van de Walle (2003). The estimate is then used for the chapter's incidence analysis. In the following analysis, transfers comprise social insurance, social subsidies, and education scholarship receipts—the only components of social income that can be identified in both surveys.

Consumption of household i at time t ($t = 1993, 1998$) (C_{it}) is assumed to be represented by an additive function of public transfers (T_{it}), observed household characteristics (X_{it}), and time-varying (δ_t) and time-invariant (η_i) latent factors:

$$C_{it} = \alpha + \beta T_{it} + \gamma X_{it} + \eta_i + \delta_t + \varepsilon_{it}. \tag{6.1}$$

There are a number of potential problems with estimating β directly with equation 6.1. For example, transfers are likely to be correlated with time-invariant household characteristics [$\text{cov}(T_{it}\ \eta_i) \neq 0$], such as if there is purposive targeting to the long-term poor. Another possible source of endogeneity arises if transfers are correlated with time-varying determinants of consumption [$\text{cov}(T_{it}\ \delta_t) \neq 0$ or $\text{cov}(T_{it}\ \varepsilon_{it}) \neq 0$]. This would occur if transfers target those who suffered a shock. Alternatively, transfer eligibility may have changed because of the death of an elderly household member who had received a pension. Furthermore, such changes may not all be observed in the data. Finally, the behavioral response, and hence the PCSI, may well vary across households with different household characteristics.

A number of alternative specifications are run to test for these possibilities. A double differencing model where all variables are expressed in first differences is used to purge the estimate of fixed effects and deal with the first source of endogeneity. Equation 6.1 is then:

$$\Delta C_{it} = \beta \Delta T_{it} + \gamma \Delta X_{it} + \Delta \delta_t + \Delta \varepsilon_{it}. \tag{6.2}$$

Because there are only two rounds of data, in equation 6.2 the term $\Delta\delta_t$ becomes an ordinary intercept term in a regression of the change in consumption on the change in transfers. This regression was initially run assuming that $\gamma\Delta X_{it} = 0$ (characteristics do not change or do not have any effect), giving the standard double difference estimate of the consumption impact of transfers. This gives a β estimate of 0.45 with a heteroskedasticity and clustering-corrected t statistic of 4.3 (van de Walle 2003). To deal with potential remaining contamination through dependence of the change in transfers on time-varying characteristics, a regression is run that controls for changes in observable household characteristics in the double differencing model of consumption as a function of transfers. A number of variables are found to be significant—changes in household size and in the language of interview have a negative impact, and an older head of household and a higher educational level influence consumption positively.[5] The β estimate is 0.37 ($t = 3.6$) and is not significantly different from the initial simple double difference estimate.

To deal with possible omitted variables that alter over time and affect transfers, the last ordinary least squares regression (OLS) is reestimated with the change in transfers instrumented by transfer receipts in the first period.[6] This gives an estimated β of 0.72 ($t = 3.7$). This is higher, but still not statistically significantly different from the first, naive estimate.

Van de Walle (2003) also tests for heterogeneity in impacts by adding interactions between the change in transfers and household characteristics to the OLS regression with controls for time-varying changes in characteristics. The results suggest that the impact of transfers on consumption is higher in households with more education. However, a test of the joint significance of the interaction terms shows them to be not significantly different from zero.

The analysis in van de Walle (2003) suggests a range of estimates of the PCSI, none of which are significantly different from the simple double difference estimate of 0.5.[7] So, in the following analysis, consumption expenditures are net of half of the value of transfer receipts that can be identified, unless otherwise noted.[8]

Incidence of Poverty-Related Programs

In exploring the evidence from the 1998 VLSS on the incidence of programs and policies aimed at raising living standards, the focus is squarely on the distributional impacts and who is getting how much. In reality, these programs serve other objectives—such as assisting the elderly or those who contributed to and suffered from the war effort—that one may want to take into account when assessing whether to expand or contract them. At the same time, it is often argued that there is a coincidence of objectives and that some of the larger funds—particularly social subsidies—are quite pro-poor. Substantial public resources are spent on these programs—although poverty may not be their sole objective, it is important to ask how much is reaching the poor.

In table 6.1, individuals are ranked into national population quintiles on the basis of their household per capita expenditures—net of half of current transfer receipts as discussed in "Behavioral Responses to Transfers." (These are referred to as net quintiles.) The table presents real monetary amounts per capita of various types of public transfers received by households during the 12 months before the survey. Amounts are expressed averaged over each quintile's population—recipient and nonrecipient. Percentages of the population living in households where at least one member benefited from these transfers are given in table 6.2. In general, outlays are small and there is weak coverage.[9]

The largest payments are from the Social Insurance Fund, covering pension and disability benefits for civil servants and employees of state-owned enterprises. As a result, one would expect these payments to be more widespread in urban areas and to be not particularly pro-poor. In fact, they are predominant in urban areas—where 18.3 percent of the population lives in households where someone received these payments in 1998 (table 6.2). Yet per capita amounts from this source are by far the largest for the poor in urban areas. In rural areas, by contrast, the amounts received from the Social Insurance Fund rise steadily with standards of living. The Social Insurance Fund also touches the greatest number of people of any program (11.2 percent of the population, nationally).

Social subsidies, which include payments to veterans and the families of those who died during the war, as well as to those who are unable to support themselves, are much smaller in absolute amounts. These programs are often claimed by the government to be reaching the poor in Vietnam. Per capita amounts of these social subsidies are largest for those in the poorest quintile in urban areas. In rural areas, the poorest quintile follows the top quintile with the second largest per capita amounts. In general, receipts are much more even across expenditure levels than for social insurance benefits. Interestingly, mean payments are larger in rural areas, although coverage is relatively similar across the sectors.

Actual individual social insurance and subsidy payments are found to vary widely across recipient households. For example, social insurance outlays range from D (dong) 49,252 to D 21,500,000 a year and social subsidy outlays from D 14,264 to D 8,645,464 a year. It should be noted that some of this variance is expected. For instance, the VLSS does not allow identification of recipients, and some households may have more than one beneficiary. Furthermore, social insurance payments consist of pensions, but they also consist of disability payments that are likely to be lower than pensions. Government-set minimum regular relief transfers also vary across the different types of potential beneficiaries (MOLISA 1999).

The VLSSs also asked about transfers received under policies or programs supported by the government's scholarship program, its poverty alleviation efforts, and transfers received from NGOs. Few scholarships are awarded (141 were reported in the sample). Their incidence is regressive: The top quintile has the largest share of recipients as well as the highest

Table 6.1. Incidence of Social Welfare Income

National population	*Number of households*	*Social insurance fund (dong per capita)*	*Social subsidies (dong per capita)*	*Education scholarships (dong per capita)*	*Poverty alleviation income (dong per capita)*	*NGO income (dong per capita)*	*Total social welfare income (dong per capita)*	*Percentage of household expenditures*
Net quintile								
1	937	69,506	22,785	1,158	2,652	1,030	97,130	8.3
2	1,001	67,883	17,021	772	1,600	508	87,785	5.2
3	1,165	98,543	17,556	1,856	607	338	118,901	5.4
4	1,319	109,339	17,503	2,806	829	286	130,764	4.4
5	1,576	140,439	18,337	7,912	654	443	167,785	3.1
Total	5,998	97,145	18,639	2,901	1,268	521	120,474	5.3
Rural								
Net quintile								
1	887	57,947	21,649	1,058	2,707	1,071	84,431	7.3
2	917	58,712	17,237	817	1,721	546	79,032	4.7
3	997	73,569	17,437	1,411	398	384	93,199	4.2
4	973	80,694	18,862	2,823	444	373	103,195	3.5
5	607	92,885	23,625	6,011	116	0	122,638	2.5
Total	4,381	69,697	19,340	1,944	1,249	546	92,776	4.8

Urban								
Net quintile								
1	50	357,704	51,106	3,642	1,296	0	413,747	34.6
2	84	189,868	14,148	185	0	0	204,200	12.4
3	168	281,715	18,431	5,126	2,140	0	307,411	14.1
4	346	203,987	13,015	2,752	2,104	0	221,858	7.4
5	969	174,381	14,562	9,269	1,037	760	200,010	3.4
Total	1,617	201,095	15,981	6,527	1,341	425	225,369	7.3

Note: The rural-urban breakdown follows the 1993 VLSS definition. Individuals are ranked into national population quintiles based on household per capita expenditures net of half of transfer receipts. The amounts represent household self-reported income received from the government during the 12 months before the survey expressed on a per capita basis across the population of each quintile. Social insurance refers to pensions and disability payments. Social subsidies consist of transfers to families of war dead and disabled veterans and from social organizations or production facilities. These come from the Social Guarantee Fund for Veterans and War Invalids and the Social Guarantee Fund for Regular Relief. The poverty alleviation income represents all funds received from programs associated with the government's poverty alleviation policy. NGO income is assistance received from private and international NGOs.

Source: 1998 VLSS.

Table 6.2. Population Receiving Social Welfare Income

	Percent of population living in households who received				
National population	*Social insurance*	*Social subsidies*	*Education scholarships*	*Poverty alleviation*	*NGO income*
Net quintile					
1	9.5	11.6	1.1	6.4	0.5
2	9.1	9.4	0.8	2.1	1.2
3	11.6	9.6	1.9	1.3	0.3
4	12.1	10.0	2.7	0.9	0.2
5	13.9	7.3	5.6	0.2	0.1
Total	11.2	9.6	2.4	2.2	0.5
Rural					
Net quintile					
1	8.7	11.5	0.9	6.6	0.5
2	8.5	9.4	0.7	2.3	1.3
3	9.5	9.6	1.8	1.1	0.3
4	10.1	10.8	2.3	0.8	0.3
5	11.1	9.4	5.1	0.1	0.0
Total	9.4	10.2	1.8	2.6	0.6
Urban					
Net quintile					
1	27.8	13.0	4.6	2.5	0.0
2	17.3	8.9	2.6	0.0	0.0
3	27.0	9.2	2.7	2.8	0.0
4	18.6	7.4	4.1	1.2	0.0
5	15.8	5.9	6.0	0.3	0.2
Total	18.3	7.1	4.9	0.8	0.1

Note: The rural-urban breakdown follows the 1993 VLSS definition. Individuals are ranked into national population quintiles based on household per capita expenditures net of half of transfer receipts.

Source: 1998 VLSS.

per capita amounts in both rural and urban areas. However, the urban population in the bottom quintile is also notable for having the second highest incidence of beneficiaries. In general, scholarships benefit a larger share of the urban than of the rural population. Per capita amounts are also higher in urban than in rural areas.

The amounts involved in the poverty alleviation and NGO funds are negligible and are equivalent to approximately US$0.22 per person a year (1998 official exchange rate) in the case of poverty alleviation funds and US$0.08 from NGOs for the quintile with the largest receipts. The little money there is appears to be moderately well targeted in rural areas, in that per capita amounts fall with higher quintiles. However, there is also evidence of capture by the well-off, because all quintiles receive something. This is more pronounced in urban areas for both poverty and NGO transfers.

Finally, expressing all transfers together as a share of household per capita expenditures indicates progressive overall incidence in both rural and urban areas.[10] Transfers to the urban poor in the bottom national quintile account for 35 percent of their consumption, which is quite a contrast with the poorest in rural areas, for whom transfers account for 7.3 percent. Nonetheless, it is clear that income from social welfare programs accounts for only a small percentage of consumption expenditures overall.

The low average amounts received from social welfare in table 6.1 could reflect either low coverage or low monetary amounts among those covered. Table 6.2 provides information on percentages of the population in each subgroup whose household received social welfare transfers (as discussed in table 6.1). The patterns across quintiles are what one would expect from the discussion of table 6.1. Only 2.2 percent of the population (2.6 and 0.8 percent of the rural and urban populations, respectively) belongs to households that received assistance under a poverty program. This rises to a maximum of 6.6 percent for the poorest rural quintile. These figures may well underestimate the coverage of poverty programs if households do not know the source of assistance. Nevertheless, the data suggest very limited coverage. Table 6.3 further shows the urban bias of spending on these programs. Although only 22 percent of the population and 6 percent of the poor lived in urban areas in 1998, 46 percent of total spending goes to urban areas.

One important initiative under the education-related national programs has been targeted exemptions from paying school fees and other contributions. Such exemptions appear to be received by children at all levels of education but most commonly for primary, followed by secondary, schooling. Because primary school fees were abolished in 1993 (Behrman and Knowles 1999), the exemptions picked up by the 1998 VLSS and received by primary school children must cover other school expenditures. Table 6.4 presents percentages of the population living in households with at least one child benefiting from exemptions across quintiles, as well as the reasons given for exemptions. Unfortunately, the data do not allow a calculation of the pecuniary benefit of the fee discharges.

Exemptions can be partial or total. In the 1998 VLSS sample, there were only 862 households that had at least one recipient child, though many had more than one. One thousand children benefited from partial exemptions, and 571 had total exemptions. In both urban and rural areas, more partial than total exemptions were bestowed—3.7 percent versus 2.1 percent of the rural population and 1.8 percent versus 0.7 percent of the urban. There are clear indications that total exemptions are better targeted than partial ones. This can also be seen in the reasons given for receiving the exemption. Of the reasons listed in the questionnaire, unspecified "other" is the most common for partial exemptions in both urban and rural areas (see endnote 11 for an explanation of "other"). This is followed by living in a remote or mountainous region and having a parent who is a disabled soldier or cadre in rural

Table 6.3. Total Spending on Social Welfare in 1998 as Reported in the Vietnam Living Standards Survey

Program	*Rural*	*Urban*	*Total*
Social insurance			
Total amount	1,458,655.0	1,443,274.0	2,901,929.0
Percent of total	50.3	49.7	100
Social subsidies			
Total amount	404,762.6	117,436.0	522,198.6
Percent of total	77.5	22.5	100
Education scholarships			
Total amount	40,680.61	46,779.39	87,460.0
Percent of total	46.5	53.5	100
Poverty alleviation funds			
Total amount	26,137.04	9,613.08	35,750.12
Percent of total	73.1	26.9	100
NGO funds			
Total amount	11,431.44	3,044.012	14,475.452
Percent of total	79.0	21.0	100
Total social income			
Total amount	1,941,667.0	1,620,147.0	3,561,814.0
Percent of total	54.5	45.5	100
Percent of poor	94	6	100
Percent of population	78	22	100
Sample observations	4,381	1,618	5,999

Note: Amounts are in thousands of 1998 dong and equal the weighted sums of monetary amounts received by households as reported in the 1998 VLSS.

Source: 1998 VLSS.

areas, and the latter reason and being poor in urban areas. In contrast, living in a remote or mountainous region is the most commonly given reason for receiving the total exemption in rural areas, followed by being from an ethnic minority group and poor. In urban areas, poverty is given as the main reason, and it is given as a reason across all quintiles. For example, 35 percent of exemptions received in the fourth quintile give poverty as the reason. Targeting exemptions to the children of disabled soldiers or cadres primarily benefits the most well-off groups in both sectors. However, 33 percent of all reasons in rural areas and 43 percent in urban areas were given as "other" (which is omitted from the table).[11]

Table 6.4 shows the incidence of school fee exemptions to be mildly pro-poor. Similar conclusions are reached when the incidence is instead expressed across the percentage of children ages 6 to 14 across consumption quintiles (Government of Vietnam–Donor Working Group 2000). However, as noted by Behrman and Knowles (1999), school fees account for only a

Table 6.4. Incidence of School Fee Exemptions

				Reason for fee exemption (percent)									
	Percentage of population with fee exemption			*Disabled or orphan*		*Ethnic minority*		*Poverty*		*Remote or mountainous area*		*Parent is disabled soldier or cadre*	
National population	*Partial*	*Total*	*Either*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*
Net quintile													
1	3.2	3.8	7.0	0.6	1.6	8.6	37.9	12.7	17.4	24.8	31.3	8.8	3.6
2	3.7	2.2	5.9	2.1	2.3	10.7	15.9	11.0	27.9	22.5	36.1	11.9	4.0
3	4.3	1.4	5.7	0.4	0	5.2	14.8	12.6	34.6	24.3	27.2	19.5	12.6
4	3.1	1.1	4.2	0.9	6.4	4.4	26.8	6.0	11.2	16.2	37.7	28.2	6.0
5	2.4	0.6	3.0	4.4	3.9	2.3	0	6.9	10.7	6.0	15.1	26.4	15.8
Total	3.3	1.8	5.1	1.5	2.1	6.6	24.7	10.3	21.8	20.0	31.3	18.1	6.3
Rural													
Net quintile													
1	3.2	3.8	7.1	0	1.6	8.9	38.7	11.2	15.9	25.6	31.9	9.1	3.4
2	3.8	2.3	6.1	2.2	2.4	11.3	17.1	10.1	22.5	23.7	38.8	12.6	4.3
3	4.4	1.4	5.8	0.4	0	6.1	15.0	9.8	27.7	28.1	32.2	20.5	14.9
4	3.5	1.2	4.7	1.1	3.6	4.0	28.5	3.4	6.6	19.2	45.0	28.6	7.2
5	3.8	0.6	4.4	0.5	0	2.9	0	4.8	16.3	6.7	36.4	19.1	0
Total	3.7	2.1	5.8	0.9	1.7	7.3	27.1	8.6	18.6	22.8	35.2	17.1	5.7

(table continues on following page)

Table 6.4. (*continued*)

National population	*Percentage of population with fee exemption*			*Reason for fee exemption (percent)*									
				Disabled or orphan		*Ethnic minority*		*Poverty*		*Remote or mountainous area*		*Parent is disabled soldier or cadre*	
	Partial	*Total*	*Either*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*	*Partial*	*Total*
Urban													
Net quintile													
1	2.1	2.2	4.2	17.5	0	0	0	52.4	89.3	0	0	0	10.7
2	1.6	1.0	2.6	0	0	0	0	27.2	100	0	0	0	0
3	3.8	1.1	4.9	0	0	0	13.3	30.0	72.5	0	0	13.6	0
4	1.9	0.6	2.4	0	20.9	6.5	18.3	20.2	34.9	0	0	26.0	0
5	1.5	0.6	2.1	11.0	6.7	1.3	0	10.6	6.7	4.9	0	38.9	26.9
Total	1.8	0.7	2.6	5.3	5.7	1.8	5.8	21.4	47.1	1.9	0	24.2	11.2

Note: The rural-urban breakdown follows the 1993 VLSS definition. Individuals are ranked into national population quintiles based on household per capita expenditures net of half of transfer receipts. Some aggregation has been made across reasons given for receiving a fee exemption: disabled and orphan; ethnic minority and boarding student in minority area; parent is deceased soldier, seriously wounded soldier, or disabled government cadre; the remainder (not shown) includes "parent is farmer" and "other."

Source: 1998 VLSS.

small share of total school-related expenditures and have a negligible impact on poverty outcomes.

Households in Vietnam are expected to make cash or in-kind contributions to a myriad of funds, associations, and national causes. Table 6.5 provides some information about average household per capita annual contributions to their commune's labor and local security and police funds, as well as to mass associations. These are the funds for which the household survey collected information, but they represent just a few among the many payments made by households. Such funds collect fees that are earmarked for particular services. For example, contributions to the labor fund can be made in labor time, cash, or in-kind contributions and are intended to finance road maintenance and small construction works in the commune. With the exception of the labor fund in rural areas, absolute amounts generally rise with standards of living for all categories. As a share of household expenditures, they are still moderately regressive for the rural population, but they are income neutral for the urban population at a consistent 0.4 percent of expenditures across quintiles. Strikingly, more is paid per capita by all but the top quintile in rural areas. This is driven by much higher contributions to the labor fund by the rural population.

A much larger percentage of the population contributes to one of the three funds (for which there is self-reported information) than benefits from social welfare income. In rural areas, this varies from 70 percent of the population to 54 and 49 percent for the labor fund, security fund, and associations, respectively. A compulsory contribution of 10 labor days a year for able-bodied adults within a certain age range is an established tradition in Vietnam. With the introduction of the market economy, the labor contribution has been partly or fully replaced by a cash or in-kind contribution in some regions. A national ordinance specifies the money amounts to be paid for each workday and details a number of characteristics that exempt individuals either temporarily or permanently. The 1998 VLSS asked the household about both the amount of time given in labor and the cash and in-kind payments made by family members during the past year. The data, as well as other sources, suggest that there is liberal interpretation of the national ordinance at the local level. For example, a study of six communes in three provinces found the time obligation to vary between 10 and 15 days and the cash alternative to be between D 3,400 and D 10,000 per day (Government of Vietnam–Donor Working Group 2000). The evidence thus suggests that the cash amounts paid in lieu of labor are considerably lower on average than daily wage rates. Imputing a cash value for labor time by using mean, commune-specific, level agricultural and nonagricultural unskilled wages will tend to overestimate the labor contributions.[12] Short of going to every commune, it is impossible to know how the policy is enforced for each household. The discussion below uses what appears to be reasonable, if upper-bound, estimates of D 10,000 and D 15,000 per day for rural and urban areas, respectively.

Imputed labor time is added to the cash and in-kind contributions to give the total payments to the labor fund presented in table 6.5. Participation in

Table 6.5. Incidence of Household Contributions

	Labor fund		*Local security fund*		*Associations*		*Total payments*	
National population	*Dong per capita*	*Population with payments (percent)*	*Dong per capita*	*Population with payments (percent)*	*Dong per capita*	*Population with payments (percent)*	*Dong per capita*	*As percentage of household expenditures*
Net quintile								
1	13,251	72.3	852	53.6	902	38.9	15,005	1.3
2	16,134	70.1	1,156	52.8	1,206	44.3	18,496	1.1
3	15,355	65.3	1,450	56.7	2,030	49.3	18,835	0.8
4	14,726	61.4	1,999	57.6	2,538	56.9	19,263	0.6
5	9,546	49.8	5,239	73.1	7,987	66.5	22,773	0.4
Total	13,803	63.8	2,140	58.8	2,933	51.2	18,875	0.9
Rural								
Net quintile								
1	13,699	74.2	827	53.4	870	38.8	15,396	1.3
2	16,960	72.9	1,130	52.2	1,222	44.9	19,312	1.1
3	16,691	69.3	1,321	54.5	1,979	49.3	19,991	0.9
4	16,776	65.9	1,576	52.5	2,551	57.0	20,903	0.7
5	13,892	61.6	2,437	59.0	5,737	65.9	22,066	0.4
Total	15,750	69.9	1,323	53.8	2,038	49.0	29,111	1.0

Urban								
Net quintile								
1	2,120	24.6	1,480	59.6	1,694	40.3	5,294	0.3
2	5,155	33.2	1,508	61.0	985	36.9	7,648	0.4
3	5,553	35.8	2,396	73.1	2,407	49.7	10,357	0.4
4	7,952	46.5	3,396	74.5	2,494	56.5	13,842	0.4
5	6,444	41.4	7,240	83.1	9,593	67.0	23,277	0.3
Total	6,431	40.7	5,231	77.7	6,320	59.7	17,981	0.4

Note: The rural-urban breakdown follows the 1993 VLSS definition. Individuals are ranked into national population quintiles based on household per capita expenditures net of half of transfer receipts. Dong amounts are self-reported household payments to local government or any of the numerous associations (mass organizations) during the 12 months before the survey expressed on a per capita basis across the entire quintile population. The value of contributions in labor time has been imputed using values of D 10,000 and D 15,000 per day worked in rural and urban areas, respectively, and added to cash contributions to the labor fund.

Source: 1998 VLSS.

the labor fund decreases with increasing living standards in rural areas. The picture is quite different in urban areas: In all quintiles, a smaller percentage contributes to the labor fund than in rural areas, and participation rises with expenditures—from 25 percent of the poorest to 42 percent of the top quintile. A large percentage contributes to local security (59 percent overall), and the more so the higher the quintile. Close to 60 percent of the urban population also contributed to associations over the last year. For these contributory "funds," coverage appears reasonably wide, though average amounts paid among those contributing are clearly low. As noted, however, the reviewed charges account for just part of the amounts levied from households. A recent study suggests that in aggregate they can be quite burdensome as a share of household expenditures. Conversely, they clearly play a crucial role in commune-level budgets (Government of Vietnam–Donor Working Group 2000).

Tables 6.6 and 6.7 combine data from the household and commune surveys to present percentages of the rural and small-town populations classified into poor and nonpoor groups, by whether (a) they live in communes where any of seven public programs are currently active (poverty

Table 6.6. Rural Population Living in a Commune with Poverty Programs and Other Programs
(percent)

Program	*Total*	*Poor*	*Nonpoor*
Poverty alleviation	79.1	83.6	76.2
Employment generation	21.1	19.1	22.5
Environmental or clean water	15.3	13.7	16.4
Public health	25.0	28.7	22.5
Infrastructure development	49.5	52.7	47.3
Education and culture	18.9	18.7	19.1
Other project	7.6	7.8	7.5
Disaster relief	66.1	71.5	62.5
Recent infrastructure investments	92.4	93.4	91.9
Roads	50.5	45.8	53.6
Electricity	28.1	26.9	28.8
Irrigation	36.7	40.6	34.1
Schools	58.9	52.8	63.0
Health center	36.2	33.3	38.1
Water sources	18.1	18.9	17.5
Other	0.9	0.5	1.1
Observations	4,269	1,439	2,830

Note: The table combines information from the household and commune datasets. "Rural" is defined according to the 1998 VLSS definition. The questionnaire asked for the first, second, and third kinds of government or other projects or programs currently existing in the commune. The table reports the percentage of population living in communes where a kind of project was listed either first, second, or third.

Source: 1998 VLSS.

Table 6.7. Small-Town Population Living in a Commune with Poverty Programs and Other Programs
(percent)

Program	*Total*	*Poor*	*Nonpoor*
Poverty alleviation	83.1	86.2	82.7
Employment generation	38.4	45.0	37.4
Environmental and clean water	20.5	23.3	20.1
Public health	6.6	14.1	5.5
Infrastructure development	22.5	24.2	22.3
Education and culture	26.5	20.0	27.5
Disaster relief	50.7	61.4	49.1
Recent infrastructure investments	78.0	83.3	77.2
Roads	67.6	78.5	65.9
Electricity	21.3	17.2	21.9
Irrigation	12.7	18.2	11.8
Schools	57.7	62.8	57.0
Health center	23.3	20.6	23.7
Water sources	27.2	26.9	27.2
Observations	581	59	522

Note: The table combines information from the household and commune datasets. The questionnaire asked for the first, second, and third kinds of government or other projects or programs currently existing in the commune. The table reports the percentage of population living in communes where a kind of project was listed either first, second, or third.

Source: 1998 VLSS.

alleviation, employment generation, environmental or clean water, public health, infrastructure development, education or culture, or other); (b) whether the commune received disaster relief in the last year; and (c) whether any physical infrastructure was built or improved during the past three years, and if so what type it was.[13]

Poverty programs are the most common of all among these public programs. These were active at the time of the 1998 survey in communes covering 80 percent of the rural population and 84 percent of the rural poor. However, they were slightly more common in small towns, where 83 percent of the entire population and 86 percent of the poor were covered. Employment generation, sanitation and clean water, and education and culture projects also reached a larger proportion of small-town residents than rural residents. By contrast, public health and infrastructure development programs covered more of the rural population. Disaster relief was also received in communes covering 65 percent of the nonurban population (rural and small-town). Finally, infrastructure investments are extremely widespread, covering communes containing 92 percent of the rural and 78 percent of the small-town populations. In both sectors, roads and schools are the most common investments. In rural communes, both roads and schools tend to benefit larger percentages of the better-off than of the poor.

In the programs reviewed in tables 6.6 and 6.7, there is some evidence of targeting of the poorer population groups. Disaster relief, for example, is received by the communes with a greater percentage of poor than nonpoor households. However, based on these data, it is not possible to judge whether, relative to needs, disaster relief would still appear well targeted. Many of the other programs are thought to be geographically targeted to government-identified "poor and remote" communes. Yet on the whole, the impression is one of programs being spread widely across expenditure groups and the rural population generally. This may reflect problems in identifying the poor through the current "poor and remote" commune classification, corroborating the results of Minot and Baulch (2004). It could also indicate that communes are heterogeneous in terms of standards of living, and geographic targeting may be an inefficient way to help the poor. Of course, these tabulations tell nothing about the magnitude or impact of the programs.

Careful evaluation of Vietnam's various poverty program disbursements must be made to better understand what does and does not work. However, the data reviewed at both household and commune levels suggest a government preference for programs that are community based rather than targeted to households. Transfers to households are negligible, and coverage is weak. By contrast, the data indicate substantial community-based programs and investments. Again, how much is being spent is unclear, as is the impact of the latter programs. However, as assessed by incidence across per capita expenditure quintiles, such interventions appear to be only weakly targeted to Vietnam's poor. The data suggest that transfers are redistributive, but not particularly well targeted, in that the poor receive less in absolute amounts than the nonpoor, in general.

Protection versus Promotion

As can be seen in table 6.8, there was a clear expansion in the total outlays going to social welfare programs between 1993 and 1998.[14] As reported in the survey, mean overall real per capita amounts rose from D 51,443 to D 116,641 in 1998 prices, a 127 percent proportionate increase.

Was this expansion pro-poor? A comparison of panel households over time can help answer this and other pertinent questions concerning the performance of the safety net. An important role for the public sector in a poor rural economy such as Vietnam is to provide protection for those who are vulnerable to poverty as a result of uninsured shocks. The preceding incidence picture is uninformative about whether transfers perform such a safety net function. The static incidence may not seem particularly well targeted, but it may be deceptive about the degree to which outlays, coverage, and changes over time were perhaps correlated to poverty-related shocks and changes in exogenous variables. The considerable variability in payment amounts across recipients has already been seen. There is also much instability over time in who gets transfers. For example, out of a total of 744 and 769 panel households who respectively received social insurance or social subsidy outlays in one of

Table 6.8. Changes in Incidence of Social Transfers over Time

	1993 Social transfers			*1998 Social transfers*			
National population	*Dong per capita*	*Household expenditures (percent)*	*Population (percent)*	*Dong per capita*	*Household expenditures (percent)*	*Population (percent)*	*Percent increase in social transfers*
1993 Net quintile							
1	34,330	4.8	22.1 (775)	76,197	5.8	16.3 (775)	122.0
2	39,166	3.4	19.7 (830)	90,452	5.0	17.0 (829)	131.0
3	43,492	2.9	21.7 (850)	101,858	5.5	21.2 (850)	134.2
4	54,532	2.8	23.4 (895)	130,822	5.4	21.6 (891)	139.9
5	85,654	2.5	24.2 (958)	184,128	0.6	23.2 (958)	115.0
Total	51,443	3.3	22.2 (4,305)	116,641	4.5	19.8 (4,303)	126.7
Mean net quintile							
1	35,041	4.6	24.2 (740)	80,468	7.1	16.5 (740)	129.6
2	32,952	2.8	19.4 (809)	78,878	5.1	17.9 (809)	139.4
3	50,290	3.6	21.3 (872)	117,442	6.0	22.2 (872)	133.5
4	58,657	3.0	23.8 (924)	139,395	5.5	20.5 (924)	137.6
5	77,257	2.5	22.5 (960)	166,996	1.5	22.0 (958)	116.2
Total	51,443	3.3	22.2 (4,308)	116,641	4.5	19.8 (4,303)	126.7

(table continues on following page)

Table 6.8. (*continued*)

	1993 Social transfers			*1998 Social transfers*			
National population	*Dong per capita*	*Household expenditures (percent)*	*Population (percent)*	*Dong per capita*	*Household expenditures (percent)*	*Population (percent)*	*Percent increase in social transfers*
1998 Net quintile							
1	38,652	4.1	23.0 (735)	91,545	3.2	17.6 (735)	136.8
2	35,299	3.1	21.8 (797)	89,965	5.8	18.1 (797)	154.9
3	51,934	3.5	22.7 (879)	114,218	5.6	22.3 (879)	119.9
4	50,131	3.0	21.0 (929)	116,325	4.3	19.3 (929)	132.0
5	76,857	2.9	22.6 (965)	171,121	3.4	21.8 (963)	122.7
Total	51,443	3.3	22.2 (4,305)	116,641	4.5	19.8 (4,303)	126.7

Note: Quintiles are national population quintiles constructed based on per capita expenditures net of half of social transfers. The number of sample households in each quintile is given in parentheses. Dong amounts are expressed on a per capita basis across the quintile populations.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

the two years, only 402 and 111 received them in both years. Does this reflect a response to changing household circumstances on the part of the system? This section examines social welfare incomes from this perspective.

When using the panel to study the incidence of the *changes* in social income, there is a question of how households should be ranked in deciding who is "poor." Table 6.8 ranks households by three different definitions of welfare, which can be loosely referred to as denoting the initial, new, and long-term poor—namely, per capita expenditures (net of half of transfers) in the initial period, the same in the later period, and by the mean over both years—and presents a comparison of mean per capita social income receipts in both survey years. The proportional gains from expansion were fairly uniform across groups. However, among the "poor" in each of the three senses, the "initial poor" clearly had the lowest gains, with a 122 percent proportionate increase in benefits for the bottom quintile and a 131 percent increase for the second lowest. The "new poor" had the highest proportionate gains (137 percent and 155 percent increase, respectively), and the "long-term poor" fell somewhere in between (130 percent and 139 percent). Per capita amounts increased for all groups, but the share of the population receiving transfers declined slightly overall (22 to 20 percent), as did the proportion of the poor receiving them by all three definitions. The evidence does not suggest that the poor were targeted by the program expansion.

Were changes in transfers responsive to poverty-related shocks? Table 6.9 presents information on mean changes in transfers received by panel

Table 6.9. Incidence of Changes in Transfers by Initial Consumption and Changes in Consumption over Time

Indicator	*Fall in consumption*	*Consumption stayed the same*	*Large rise in consumption*
Low initial consumption	34%	27%	27%
	111,901	246,476	241,658
	80	506	848
Middle initial consumption	32%	30%	30%
	408,469	251,619	296,513
	240	422	772
High initial consumption	33%	36%	32%
	481,618	343,329	367,991
	496	221	720

Note: The population is ranked into three equal groups based on 1993 per capita expenditures net of half of transfers and cross-tabbed against the level of their change in consumption over time net of half the change in transfers. The first number gives the percentage of households in the cell that received transfers in 1998. The second number gives the per capita amount (in dong) of the change in transfers received by those with positive receipts only. The final number gives the number of households in the cell. Changes in transfers refer to changes in amounts received from social insurance, social subsidies, and school scholarships.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

households classified into a three-by-three matrix. Households ranked into terciles of their initial 1993 level of per capita consumption (low, middle, or high) are cross-tabbed against the change in their consumption between the two dates categorized into whether it underwent a fall, stayed more or less the same, or rose significantly.[15] So, for example, 34 percent of those who were in the bottom third of the distribution in 1993 and experienced a fall in consumption over time received transfers equal to about D 111,901 per person in recipient households.

There is little sign that the system responded to consumption shocks. Indeed, the percentage of households who benefited from social incomes is relatively uniform across cells. Neither starting out poor, nor experiencing negative consumption shocks, appears to have elicited a response from social welfare programs. Thirty-two percent of those who enjoyed the highest initial consumption and the highest gains to consumption were beneficiaries, compared with 34 percent of the worst-off in both respects. Furthermore, if anything, the per capita transfers to participants increase with initial and rising welfare. The smallest amount went to the neediest. These specific programs appear unresponsive to shocks.[16]

As discussed in the beginning of this chapter, and to be further discussed in the section on geographic targeting, location may be an important factor in the determination of program participation. Possibly the absence of a pattern in table 6.9 arises from variation across geographic areas that is obscuring patterns within them. To test this, a dummy variable indicating whether transfers were received in 1998 was regressed against initial (1993) per capita consumption and the change in per capita consumption (1993 to 1998). A linear probability model was used, and it was run with and without commune effects. With commune effects, there is no sign of transfers responding to either initial consumption or changes in consumption. Without commune effects, the results suggest that transfers respond perversely to initial consumption ($\beta = 1.12e{-}8$, $t = 2.52$) and not to shocks (similar to table 6.9). This suggests that it is households in better-off communes that primarily benefit from these transfers.

It is of further interest to examine what role transfers played in the impressive reduction in poverty that occurred over this period. The panel structure is now exploited to evaluate how well the safety net performed dynamically, including how well it protected against poverty distinguished from how well it promoted out of poverty, following the approach proposed in Ravallion, van de Walle, and Gautam (1995). In comparing joint distributions of consumption expenditures, such as with and without policy changes, the approach tests a policy's ability to protect the poor (PROT) and its ability to promote the poor (PROM).[17] It indicates which distribution offered more protection and which offered more promotion and allows a calculation of the statistical significance of the difference.

Table 6.10 presents the baseline joint distribution of consumption in the two survey years. Households are classified into four groups according to whether they were poor or nonpoor in both years, as well as whether they escaped or fell into poverty over the five-year period between the surveys.

There is evidence of a large fall in poverty: 27 percent of the population escaped poverty, 5 percent fell into poverty, 34 percent were persistently poor, and 35 percent were never poor. There is considerable persistent poverty.

What is the effect of transfers on poverty? To answer this question, it is necessary to simulate the counterfactual joint distribution without transfers. As in the static incidence calculations, this is done by subtracting half the transfers received in each respective year from consumption in that year. The simulated joint distribution is given in table 6.11. Transfers are found to

Table 6.10. Baseline Discrete Joint Distribution

	1998		
1993	*Poor*	*Nonpoor*	*Total*
Poor	33.54%	26.58%	60.12
	(55.78)	(44.22)	100
Nonpoor	4.84%	35.04%	39.88
	(12.14)	(87.86)	100
Total	38.38	61.62	100

Note: The population is ranked into poor and nonpoor groups based on actual per capita expenditures at each date and cross-tabbed. The first number in each cell gives the percentage of total population that was in that row's poverty group in 1993 and that column's group in 1998. The numbers in parentheses give the proportion of each row's population that is in each column's group in 1998 or the transition probability.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

Table 6.11. Joint Distribution without Transfers

	1998		
1993	*Poor*	*Nonpoor*	*Total*
Poor	35.21%	25.88%	61.09
	(57.63)	(42.37)	100
Nonpoor	5.15%	33.76%	38.91
	(13.24)	(86.76)	100
Total	40.36	59.64	100

[PROT = 0.31(0.66); PROM = 0.70(0.74)]

Note: PROT = Test of policy's protection of the poor. PROM = Test of policy's promotion of the poor. The population is ranked into poor and nonpoor groups based on their simulated "without transfer" per capita expenditures (net of half of the transfers) at each date and cross-tabbed. The first number in each cell gives the percentage of total population that was in that row's poverty group in 1993 and that column's group in 1998. The numbers in parentheses give the proportion of each row's population that was in each column's group in 1998. z scores for the PROM and PROT tests are given below the table. Critical values: 1.96 (2.58) at the 5 percent (1 percent) level.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

Table 6.12. No Change in Transfers between 1993 and 1998

	1998		
1993	*Poor*	*Nonpoor*	*Total*
Poor	34.23%	25.89%	60.12
	(56.94)	(43.06)	100
Nonpoor	5.19%	34.69%	39.88
	(13.02)	(86.98)	100
Total	39.43	60.57	100

[PROT = 0.36(0.76); PROM = 0.69(0.73)]

Note: PROT = Test of policy's protection of the poor. PROM = Test of policy's promotion of the poor. The population is ranked into poor and nonpoor groups based on actual per capita expenditures for 1993 and the simulated 1998 distribution had there been no change in transfers (per capita expenditures in 1998 net of half of the change in transfers) and cross-tabbed. The first number in each cell gives the percentage of total population that was in that row's poverty group in 1993 and that column's group in 1998. The numbers in parentheses give the proportion of each row's population that was in each column's group in 1998. *z* scores for the PROM and PROT tests are given below the table. Critical values: 1.96 (2.58) at the 5 percent (1 percent) level.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

have a negligible impact on poverty. Without them, 1 and 2 additional percent of the population would have been poor in 1993 and 1998, respectively. The measures of promotion and protection are not statistically significantly different from zero. Table 6.12 simulates the joint distribution had there been no changes in transfers between the two years. The change in the proportion who fell into poverty identifies the degree of protection offered, and the change in the proportion who escaped poverty indicates promotion. Changes enabled just over 1 percent of the population to escape poverty, and they protected about 1 percent from falling into poverty. Again, these are not statistically different from zero effect. Low spending, low coverage, and poor targeting together explain the negligible impact of transfers and changes in transfers on poverty.

How much could better targeting improve impacts on poverty incidence? Table 6.13 compares the current distribution relative to a simulated uniform allocation of actual 1998 social income across the entire population. This would have a small, but statistically significant, further impact on poverty: An additional 3 percent of the population (7 percent of the poor) under the actual allocation would escape poverty (standard error of 0.4 percent). Just over 2 percent of the nonpoor would have fallen into poverty (standard error of 0.3 percent). What if 1998 transfers were instead targeted based on an equal allocation to those below the poverty line only? The results in table 6.14 show that outlays would be sufficient to bring 17 percent of the poor (7 percent of the population, with a standard error of estimate of 0.4 percent) out of poverty. Only 3 percent of the nonpoor would have fallen into poverty (2 percent of the population, standard error of 0.2 percent).

Table 6.13. Actual 1998 Distribution versus Uniform Allocation of 1998 Transfers

	1998 Simulated		
1998 Actual	*Poor*	*Nonpoor*	*Total actual*
Poor	35.54%	2.83%	38.38
	(92.61)	(7.39)	100
Nonpoor	1.54%	60.09%	61.62
	(2.49)	(97.51)	100
Total simulated	37.08	62.92	100

Note: The population is ranked into poor and nonpoor groups based on actual per capita expenditures for 1998 and the simulated 1998 distribution, if the five transfers identifiable in 1998 had been distributed uniformly across individuals and cross-tabbed. The first number in each cell gives the percentage of total population that was in that row's poverty group in 1993 and that column's group in 1998. The numbers in parentheses give the proportion of each row's population that was in each column's group in 1998.

Source: van de Walle (2003), using the 1998 VLSS.

Table 6.14. Actual 1998 Distribution versus 1998 Transfers Targeted on Equal Per Capita Basis to the Poor

	1998 Simulated		
1998 Actual	*Poor*	*Nonpoor*	*Total actual*
Poor	31.72%	6.66%	38.38
	(82.66)	(17.34)	100
Nonpoor	1.98%	59.64%	61.62
	(3.21)	(96.79)	100
Total simulated	33.70	66.30	100

Note: The population is ranked into poor and nonpoor groups based on actual per capita expenditures for 1998 and the simulated 1998 distribution, if the five transfers identifiable in 1998 had been distributed on a per capita basis only to the poor and cross-tabbed. The first number in each cell gives the percentage of total population that was in that row's poverty group in 1993 and that column's group in 1998. The numbers in parentheses give the proportion of each row's population that was in each column's group in 1998.

Source: van de Walle (2003), using the 1998 VLSS.

Finally, going back to the concerns of table 6.8, table 6.15 presents the joint distribution of the incidence of proportionate gains in social incomes. When ranked by their 1998 welfare, large gains are again apparent for the nonpoor. The new information here is that within the nonpoor population, the largest gains went to the "initial poor." Once again, the evidence suggests very poor performance on protection.

Poverty fell quite dramatically in Vietnam between 1993 and 1998, but social insurance, social subsidy, and scholarship income transfers appear to

Table 6.15. Incidence of Proportionate Changes in Social Incomes
(percent)

	1998	
1993	*Poor*	*Nonpoor*
Poor	102	189
Nonpoor	54	125

Note: The population is ranked into poor and nonpoor groups based on their actual per capita expenditures at each date and cross-tabbed. The numbers give the percentage change in the three transfers between the dates.

Source: van de Walle (2003), using the 1993 and 1998 VLSSs.

have had negligible bearing on that outcome. They did not fulfill a safety net role, either, in protecting those who faced falling living standards during this period. Part of the reason for this failure of promotion and protection is low overall spending on these programs. However, the simulations above suggest that poor targeting is a fundamental problem, as are low total outlays.

Geographic Targeting

One possible explanation for the picture that has emerged so far may be the narrowness of the welfare indicator that has been used. Consumption expenditures per capita may simply be too narrow a welfare metric to reveal the underlying pro-poor targeting. Programs may well respond to in-the-field definitions of welfare that are considerably more complex than per capita consumption.

Another possible explanation is that, given Vietnam's institutional arrangements for delivering social welfare programs, nonwelfare dimensions, such as politico-geographic dimensions, may largely determine whether transfers reach the disadvantaged. This section explores these possibilities.

Poor communes have greater needs, but better-off communes can better afford poverty-related programs. Better-off communes may also be better at implementing programs and reaching their poor residents. One means of equalizing resources is through the central government's national programs. Two obvious questions to ask at this point are: To what degree does redistribution occur through these programs? Are the limited resources that are transferred from the national programs to the local level targeted to poorer communes? It is not possible to answer these directly, because there is no way to use the VLSSs to determine whether a sampled household benefits from a national program (with the exception of school fee exemptions, for which a benefit amount is not identifiable). However, incidence at the commune level is observed in the commune-level data for employment generation, poverty alleviation, education and culture, infrastructure development, public health, environment, and other programs. Similarly, household participation at the commune level is observed for microcredit, school and health fee exemptions, tax exemptions, and training and disaster relief programs. Most of these programs are probably centrally mandated "national programs," although they cannot be identified specifically. Table 6.16 links the household- and commune-level data to show the incidence of programs and of beneficiary households across communes classified into three equal groups—poor, middle, and rich—by the mean per capita consumption expenditures of their population as sampled in the household survey. A comparison of commune mean per capita expenditures gives an indication of the income disparities across communes. The mean for the poorest 10 percent of communes is 70.3 percent lower than that for the 10 percent richest communes.

Are poor communes more likely to have poverty programs? Table 6.16 suggests that the answer is yes. In general, poorer communes appear to have both more poverty-related programs and a greater share of their populations participating—but the exceptions to this generality are interesting. The percentage of households benefiting from occupational training is highest in better-off communes. Education, employment generation, and environmental programs are all most common in the most well-off communes. There appears to be capture of skills and employment-related schemes in better-off communes, perhaps because they are already well endowed with the benefits offered by the other programs. Overall, the incidence across communes is redistributive in that there is a greater concentration of programs in the poorest communes. However, it is also true that programs are geographically spread around quite widely.[18]

The above results tell nothing about the benefits to households from living in a commune with a program or from being among the beneficiaries of a program. To obtain this information, it is necessary to turn to household-level data. Linking up household and commune information further allows an exploration of the importance of location to participation in programs. For example, how do the poor in poorer communes fare compared with the poor in better-off communes? To what degree does a poor household's location determine whether and how much it benefits from assistance programs? Do poor households in the most well-off communes do better than those in poor communes? Are there signs of better targeting when more is spent overall in a location? (See Ravallion [1999].) Tables 6.17 and 6.18 examine these issues by looking at the distribution of beneficiaries and of social income payments (as reported at the household level) across the populations of poor, middle, and rich communes ranked into national terciles of per capita consumption net of transfers.

Table 6.18 clearly shows that, not only is more being spent per capita overall in better-off communes, but much more is also going to the poor. Total mean per capita payments in the richest communes are more than

Table 6.16. Incidence of Poverty-Related Programs and Beneficiaries by Rural Poor, Middle, and Rich Communes

	Percentage of commune households who received					
Communes	*Subsidized credit*	*School fee exemptions*	*Hospital fee exemptions*	*Tax exemptions*[a]	*Training*[b]	*Disaster relief*
Poor	19.4	13.1	13.6	13.4	1.1	8.2
Middle	12.6	6.8	2.1	5.4	0.9	4.0
Rich	11.4	4.8	4.0	7.0	4.0	1.8
Total	14.6	8.3	6.7	8.8	1.9	4.7

	Percentage of communes with programs						
Communes	*Poverty alleviation*	*Development investments*[c]	*Education and culture*	*Health and public health*	*Employment generation*	*Environment and clean water*	*Other*
Poor	88.5	53.9	25.0	30.8	19.2	9.6	7.7
Middle	76.9	42.3	15.4	23.1	19.2	19.2	3.9
Rich	71.2	36.5	26.9	9.6	32.7	21.2	7.7
Total	78.8	44.2	22.4	21.2	23.7	16.7	6.4

Note: Communes are ranked into three equal groups based on the mean per capita expenditures net of half of social incomes of their population. All the other information is based on the commune-level data.

a. Exemption or reduction of production or business taxes.
b. Occupational and agricultural technology training.
c. Economic and infrastructure development investments.

Source: 1998 VLSS.

Table 6.17. Incidence of Social Transfers across the Rural Population by Terciles and Poor, Middle, or Rich Communes

	Percentage of population benefiting from the following household level funds					
Population tercile	*Social insurance*	*Social subsidies*	*Poverty alleviation*	*NGO*	*Education scholarships*	*Total*
Poorest communes						
1 (968)	7.6	10.2	6.7	0.7	0.9	23.4
2 (542)	10.7	8.5	2.4	0.7	2.3	21.6
3 (150)	12.2	4.3	3.0	0	3.4	22.3
Total (1,660)	8.8	9.5	5.1	0.7	1.5	22.8
Middle communes						
1 (405)	11.9	12.3	1.3	1.5	0.7	25.3
2 (741)	9.0	12.3	0.5	0.5	1.5	21.8
3 (489)	7.8	13.4	0	0	2.6	21.6
Total (1,635)	9.5	12.6	0.6	0.7	1.5	22.8
Richest communes						
1 (149)	8.7	6.9	3.1	0	2.7	18.4
2 (479)	14.9	7.4	0.7	0.2	1.7	21.2
3 (927)	12.3	6.5	0.2	0	4.2	19.2
Total (1,555)	12.8	6.8	0.7	0.1	3.2	19.8

Note: Communes are ranked into three equal groups based on the mean per capita expenditures net of half of social incomes of their population. The rural population is ranked into population terciles. The number of sample households in each tercile is given in parentheses.

Source: 1998 VLSS.

double that in the poorer communes. Mean per capita amounts going to the poor are 136 percent higher. There are signs of better targeting in better-off communes. Social insurance and social subsidies largely drive these results. Although table 6.17 indicates that more of the poor live in households that participate in programs in poor communes than in rich communes, the per capita amounts received by the poor in the latter dwarf the former. They account for 7.1 percent of household expenditures compared with 4.3 percent for the bottom tercile in the poorest communes. Although small, outlays from the poverty alleviation fund tend to be concentrated in poor communes and on the poorest. The targeting differentials, given by the difference between the mean expenditures going to the poorest 50 percent of the population to that going to the top 50 percent, are 1,202, 1,210, and 161 for poor, middle, and rich communes, respectively.

Conclusions and Policy Implications

This chapter's results reveal little overall sign of targeting to poor people or poorer communes in terms of their standards of living measured by

Table 6.18. Incidence of Social Transfer Amounts across the Rural Population by Terciles and Poor, Middle, or Rich Communes

	Per capita dong received by rural population from funds						
Population tercile	*Social insurance*	*Social subsidies*	*Poverty alleviation*	*NGO*	*Education scholarships*	*Total*	*Percent of household expenditures*
Poorest communes							
1 (968)	45,122	18,461	2,132	1,204	1,339	68,257	4.3
2 (542)	65,356	21,537	1,009	366	1,646	89,915	3.5
3 (150)	94,177	8,802	210	0	4,735	107,924	2.7
Total (1,660)	54,310	18,797	1,672	874	1,643	77,296	3.9
Middle communes							
1 (405)	88,919	22,820	2,979	384	447	115,548	6.2
2 (741)	73,515	17,495	746	447	1,369	93,572	3.5
3 (489)	75,394	27,084	0	0	2,859	105,337	2.5
Total (1,635)	78,485	21,462	1,210	316	1,475	102,948	4.0
Richest communes							
1 (149)	141,927	17,322	890	0	788	160,927	7.1
2 (479)	146,022	17,052	491	634	1,839	166,038	5.6
3 (927)	126,358	15,486	83	0	6,745	148,672	3.1
Total (1,555)	134,507	16,202	306	207	4,480	155,701	4.4

Note: Communes are ranked into three equal groups based on the mean per capita expenditures net of half of social incomes of their population. The rural population is ranked into population terciles. The number of sample households in each tercile is given in parentheses.

Source: 1998 VLSS.

consumption. If anything, transfer receipts rise with consumption per person, though there are signs that the share of social incomes in consumption falls with consumption, implying that transfers reduce inequality. At the same time, the existing system is ineffective in protecting households that are vulnerable to falling living standards. Differences are apparent when specific programs are compared, though these are not marked. Social insurance payments are clearly urban biased where they are also quite pro-poor. In rural areas, they accrue primarily to better-off households. Though they benefit the urban poor less, education scholarships show a similar pattern. Social subsidy benefits are distributed more evenly across deciles and are larger in rural Vietnam. Finally, poverty alleviation and NGO transfers, though negligible in size, tend to be well targeted to the poor and to favor rural areas. Household payments and contributions also appear to be regressive.

The current system suffers from the lack of national norms for identifying the poor consistently across regions; the lack of survey and other instruments with which to consistently measure and monitor local needs and program performance; a lack of integration and coordination among sub-programs with well-defined and universal rules for implementation at the local level; insufficient welfare-maximizing redistribution of resources across space so that everyone is treated equally regardless of where they reside; and a lack of resources and attention to helping households and communities deal with covariate risk. Progress in these areas could lead to significant improvement in social protection for Vietnam's poor and vulnerable households.

In terms of funding and priorities, it is clear that the primary focus of HEPR continues to be microfinance and infrastructure development. The potential immediate importance of HEPR lies in the possibility of greater consistency in priorities and norms, better monitoring of outcomes, much needed integration and coordination between programs, better coverage of the poor, and redistribution toward poorer and less administratively capable provinces. Here too, though, there has been little discernible progress since HEPR's inception.

While the HEPR concept offers the potential for considerable improvements in the safety net, the government of Vietnam faces a number of difficult challenges. The very principles on which the current highly decentralized, community-based assistance and safety net system is built are threatened by the emerging market economy. In particular, increasing mobility—important to a well-functioning market system—dictates a thorough rethinking of the safety net's foundations. Household mobility renders community-level identification and targeting of the poor less effective and is likely to make the mobilization of community resources for helping the poor more difficult. The high level of decentralization inhibits the country's ability to provide adequate protection from covariate risks, which, in turn, appear to be on the rise because of environmental destruction. Adequately addressing this challenge, and the consequent widening urban-rural and regional inequalities, will require a greater level of risk pooling nationally through greater reliance on state-contingent redistribution mediated through the center. Important political hurdles can also be expected in efforts aimed at reallocating resources to better protect Vietnam's poor and vulnerable.

Geographic targeting is a widespread practice and is generally assumed to work well when there are geographic concentrations of poverty and identification of the poor is possible at a sufficiently disaggregated level. However, it may well be that poorer areas are less capable of reaching their poor well or implementing poverty programs, or both, than are their better-off counterparts. This chapter finds that across Vietnam's communes, more is spent relatively and absolutely on the poor in better-off communes. This is likely to reflect the large differences in resources across regions. More research is needed to understand whether it also reflects a weaker capacity for reaching the poor. However, in the absence of a reform of the fiscal redistributive system—whereby the center's redistributive process promotes an equalization of resources all the way to the commune level—if the question is where resources will have the greatest impact, perhaps better-off communes rather than poorer ones should be targeted.

The data do not allow identification of whether funding comes from the national or local level. Past evidence seems to indicate that existing national resources are relatively well targeted spatially at the provincial level, but the redistributive effect is mitigated by the distribution that then occurs within provinces. Although this chapter cannot answer this question, it does show that the combination of funding and implementation mechanisms results in poor areas and people getting less than better-off areas and people. This suggests the need for more compensatory mechanisms from the center, which could take the form of more money, better incentives for fiscal redistribution at the local level, more monitoring of central norms, or administrative constraints on local discretion in the implementation of centrally mandated social welfare programs.

Notes

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1. This chapter's focus is on public transfers only. For a discussion of private interhousehold transfers, see Cox (2004).

2. For more details, see van de Walle (1999).

3. The 1992–93 survey spanned a full year starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

4. The World Bank (1995, 2000) provides detailed information on the surveys, accessible at www.worldbank.org/lsms/.

5. The regression controls for changes in household size and composition—in particular, the number of members in the birth to 6 and 7 to 16 age groups, the number of women and men older than 55 and 60, respectively (the formal sector legal retirement age)—and for a change in the highest grade completed by the most educated member of the household, the change in the age and gender of the household head, and finally a change in the language of interview. (Households had the option of being interviewed in a language other than the Kinh language in both survey years.) See van de Walle (2003) for full regression results and explanation.

6. A high correlation is found between these variables (0.50). The key untestable exclusion restriction is that transfers in 1993 do not appear on the right-hand side of the equation [such as $\text{cov}(\varepsilon_{it}, T_{it\text{-}1}) = 0$]. This appears plausible but would not hold if, say, the initial level of transfers helps prevent households from falling into destitution or succeeds in putting them on a different growth path. There is no other obvious instrument with which to do an overidentification test.

7. The lower the PCSI, the more targeted transfers appear to be to the poor. See van de Walle (2003) for a discussion.

8. Note that this means half of the total of scholarships, social insurance, and subsidy funds for 1993 and half that same total plus poverty alleviation and NGO funds for 1998.

9. The official January 1998 exchange rate was about D 12,290 to the U.S. dollar.

10. Note that throughout this chapter, "progressive" is defined as meaning that, as a proportion of expenditures, transfers decline as expenditures increase.

11. Other (not individually recorded) reasons for receiving exemptions included being a student at a pedagogic college; being an excellent student, a class monitor, the children of teachers, and/or the children of officers and workers for whom tuition is paid by the parent's work; and households with two or more children attending school (General Statistical Office communication of May 2001).

12. For example, commune mean daily unskilled agricultural wages in real 1998 prices are D 19,421 and D 16,609 for men and women, respectively.

13. Here and elsewhere, this chapter uses the national poverty lines described in Glewwe, Gragnolati, and Zaman (2002).

14. Note that this refers only to programs—scholarships, social insurance, and social subsidies—covered in both VLSSs. Although these do not account for all programs, they cover the bulk of social income receipts.

15. Consumption in 1993 is net of half of transfers, and changes in consumption are net of half the change in transfers.

16. One may not expect a pension scheme to respond to changing household circumstances. However, as noted, there is huge instability in who gets social insurance transfers over time. These consist of disability, maternity, and death as well as pension payments and could thus respond to consumption shocks.

17. Details on the tests are given in Ravallion, van de Walle, and Gautam (1995) and van de Walle (2003).

18. Again, the empirical evidence does not support the claim that truly poor communes are being targeted much more than others. This could reflect deficiencies in the government's identification of poor communes (see Minot and Baulch [2004]) or point to the inefficiency of geographic targeting due either to fundamental heterogeneity among communes or, alternatively, to targeting not actually being implemented.

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7

The Spatial Distribution of Poverty in Vietnam and the Potential for Targeting

Nicholas Minot and Bob Baulch

This chapter combines household survey and census data to construct a provincial poverty map of Vietnam and evaluate the accuracy of geographically targeted antipoverty programs. Per capita expenditure is estimated as a function of selected household and geographic characteristics using the 1998 Vietnam Living Standards Survey (VLSS).[1] Next, these results are combined with data on the same household characteristics from the 1999 census to estimate the incidence of poverty in each province. The results indicate that rural poverty is concentrated in 10 provinces in the Northern Uplands, two provinces in the Central Highlands, and two provinces in the Central Coast. Finally, receiver operating characteristics (ROC) curves are used to evaluate the effectiveness of geographic targeting. The results show that the existing poor communes system excludes large numbers of poor people, but there is the potential to sharpen poverty targeting by using a small number of easy-to-measure household characteristics.

In most countries, poverty is spatially concentrated. Extreme poverty in inaccessible areas with unfavorable terrain often coexists with relative affluence in more favorable locations close to major cities and markets. Information on the spatial distribution of poverty is of interest to policymakers and researchers for a number of reasons. First, it can be used to quantify suspected regional disparities in living standards and identify which areas are falling behind in the process of economic development. Second, it facilitates the targeting of programs—such as education, health, credit, and food aid—whose purpose is, at least in part, to alleviate poverty. Third, it may shed light on the geographic factors associated with poverty, such as mountainous terrain or distance from major cities.

Traditionally, information on poverty has come from household income and expenditure surveys. These surveys generally have sample sizes of 2,000 to 8,000 households, which allow estimates of poverty for only 3 to 12 regions within a country. Previous research has shown, however, that geographic targeting is most effective when the geographic units are quite small, such as a village or district (Baker and Grosh 1994; Bigman and Fofack 2000). The only household information usually available at this level of disaggregation is census data, but census questionnaires are generally limited to household characteristics and rarely include questions on income or expenditure.

In recent years, new techniques have been developed that combine household and census data to estimate poverty for more disaggregated geographic units. Although various approaches have been used, they all involve two steps. First, household survey data are used to estimate poverty or expenditure as a function of such household characteristics as household composition, education, occupation, housing characteristics, and asset ownership. Second, census data on those same household characteristics are inserted into the equation to generate estimates of poverty for small geographic areas.

For example, Minot (1998, 2000) used the 1993 VLSS and a probit model to estimate the likelihood of poverty for rural households as a function of a series of household and farm characteristics. District-level means of these same characteristics were then obtained from the 1994 Agricultural Census and inserted into this equation, generating estimates of rural poverty for each of the 543 districts in Vietnam.

Hentschel and others (2000) developed a similar method using survey and census data from Ecuador. Using log-linear regression models and household-level data from a census, they demonstrate that their estimator generates unbiased estimates of the poverty headcount, and they show how to calculate the standard error of the poverty headcount.[2] This approach has been applied in a number of other countries, including Panama and South Africa (see Statistics South Africa and the World Bank [2000]; World Bank [2000]).

The earlier Vietnam study (Minot 1998, 2000) has several limitations. First, because it relied on an agricultural census, it generated poverty estimates only for the rural areas. Second, the use of a probit regression and district-level means, although intuitively plausible, does not necessarily generate consistent estimates of district-level poverty.[3] Third, in the absence of household-level census data, it was not possible to estimate the standard errors of the estimates to evaluate their accuracy.

Accordingly, this chapter has three objectives. First, it explores the household factors associated with poverty in Vietnam, using the 1998 VLSS. In this task, it builds on an earlier report describing the characteristics of poor households and individuals in Vietnam (Poverty Working Group 1999).

Second, it examines the spatial distribution of poverty in Vietnam. It is well known in Vietnam that "poverty has marked regional characteristics" with the Northern Uplands, Central Highlands, and North Central Coast regions being the poorest (Socialist Republic of Vietnam 2001). However, because of sampling considerations, the VLSS can be disaggregated only down to the regional level. Our analysis uses the 1998 VLSS and a 3 percent sample of the 1999 Population and Housing Census. It therefore represents an improvement on the earlier Vietnam studies: (a) the data are more recent, an important consideration in a rapidly growing country such as Vietnam;

(b) the analysis covers the spatial distribution of poverty at the provincial level, providing a more disaggregated view of poverty than is normal in Vietnam; and (c) the standard error of the poverty headcount is calculated. The standard errors are based on the methods suggested by Hentschel and others (2000), with extensions to incorporate the sampling error associated with using a 3 percent sample of the census, rather than the full census.

Third, this study examines the efficacy of Vietnam's existing geographically targeted antipoverty programs and investigates the potential for improving the targeting of the poor by using the type of additional household-level variables that could be collected in a "quick and dirty" enumeration of households.

The section that follows this brief introduction describes the data and methods used to generate poverty maps for Vietnam from household survey data and census data. The next section, "Factors Associated with Poverty in Vietnam," describes the results of the regression analysis. Although these are an input in the poverty mapping procedure, they also yield insights on the factors associated with poverty and how they vary between urban and rural areas. "Poverty Maps of Vietnam" presents the provincial estimates of urban and rural poverty in Vietnam, along with the standard errors of these estimates. The next section examines the efficacy of Vietnam's poor and disadvantaged communes program and investigates whether use of additional household variables might improve poverty targeting. Finally, the last section summarizes the results, discusses some of their policy implications, and suggests areas for future research.

Data and Methods

This study makes use of two datasets: the 1998 VLSS and the 1999 Population and Housing Census. The VLSS was implemented by the General Statistical Office (GSO) of Vietnam with funding from the Swedish International Development Agency and the United Nations Development Programme (UNDP) and technical assistance from the World Bank. The sample included 6,000 households (4,270 in rural areas and 1,730 in urban areas) in Vietnam, selected using a stratified random sample.

Data

The 1999 census was carried out by the GSO and refers to the situation as of April 1, 1999. It was conducted with the financial and technical support of the United Nations Family Planning Association and UNDP. The full results of the census have not yet been released; thus, this analysis is based on a 3 percent sample of the census. The 3 percent sample was selected by the GSO using a stratified random sample of 5,287 enumeration units and 534,139 households. It was designed to be representative at the provincial level.

A number of variables are common to both the VLSS and the census, which allows household-level expenditures to be predicted and disaggregated poverty estimates produced. Table 7.1 summarizes the 17 variables that were selected for inclusion in this poverty-mapping exercise.

Table 7.1. Household Characteristics Common to the Census and the Vietnam Living Standards Survey

		Question number	
Variable name(s)	*Description of variable*	*1999 Census*	*1998 VLSS*
hhsize	Household size (number of people)	Pt I,Q4	S1A
pelderly	Proportion of elderly people (age over 60) in household	Pt I, Q4	S1A,Q2
pchild	Proportion of children (aged under 15) in household	Pt I, Q4	S1A,Q6
pfemale	Proportion of females in household	Pt I, Q3	S1A,Q6
Iedchd_1 to 6	Highest level of education completed by head (less than primary school, primary school, lower secondary school, upper secondary school technical or vocation training, college diploma or university degree)	Pt I,Q11-13	S2A
Iedcsp_0	Dummy for no spouse	Pt I, Q2	S1B,Q3
Iedcsp1 to 6	Highest level of education completed by spouse (less than primary, primary school, lower secondary school, upper secondary school technical or vocation training, college diploma or university degree)	Pt I,Q11-13	S2A
ethnic	Dummy for ethnic minority head (not Kinh or Chinese)	Pt I, Q4	S0A
Ioccup_1 to 7	Occupation of head over last 12 months (political leader or manager, professional or technical worker, clerk or service worker, agriculture nonfarm enterprises, unskilled worker, not-working)	Pt I, Q16	S4D
Ihouse_1 to 3	Type of house (permanent; semipermanent or wooden frame, "simple")	Pt III, Q3	S6A,Q1
htypla1 to 2	House type interacted with living area (m^2)	Pt III, 4	S6C,Q1a
electric	Household with electricity	Pt III, Q7	S6B,Q33
Iwater_1 to 3	Main source of drinking water (private or public tap, rainwater and wells, rivers and lakes)	Pt III, 8	S6B,Q25
Itoilet_1 to 3	Type of toilet (flush, latrine/other, none)	Pt III, Q9	S6B,Q31
tv	Dummy for TV ownership	Pt III, Q10	S12C
radio	Dummy for radio ownership	Pt III, Q11	S12C
reg7_1 to 7	Regional dummies (7 regions)	page 1	S0A

Source: Questionnaires for 1998 VLSS and 1999 Population and Housing Census.

To estimate the poverty headcount, expenditures were predicted using these common variables and then the food and overall poverty lines developed by the GSO and the World Bank for use with the VLSSs (Poverty Working Group 1999) were applied. The lower of these two lines, the food poverty line, corresponds to the expenditure (including the value of home production and adjusted regional and seasonal price differences) required to purchase 2,100 kilocalories per person a day. The upper overall poverty line also incorporates a modest allowance for nonfood expenditures.[4]

Vietnam's Ministry of Labor, Invalids and Social Affairs (MOLISA) estimates provincial poverty rates based on a system of administrative reporting that uses different welfare indicators (rice equivalent income), different poverty lines, and a different unit of analysis (households).[5] Nonetheless, the results are fairly similar to those obtained in this study.

Estimating Poverty with a Household Survey

As mentioned above, the first step in implementing this approach is to estimate poverty or household welfare as a function of household characteristics. In this study, per capita consumption expenditure is used as the measure of household welfare. The explanatory variables must be useful in "predicting" household welfare, and they must exist in both the household survey and the census. Economic theory provides no guidance on the functional form, but often a log-linear function is used:

$$\ln(y_i) = X_i\beta + \varepsilon_i \tag{7.1}$$

where y_i is the per capita consumption expenditure of household i, X_i is a $1 \times k$ vector of household characteristics of household i, β is a $k \times 1$ vector of coefficients, and ε_i is a random disturbance term distributed as $N(0, \sigma)$. Because the main interest here is predicting the value of $\ln(y)$ rather than assessing the impact of each explanatory variable, the possible endogeneity of some of the explanatory variables is not a concern.

Hentschel and others (2000) show that the probability that household i with characteristics X_i is poor can be estimated as:

$$E[P_i \mid X_i, \hat{\beta}, \hat{\sigma}] = \Phi\left[\frac{\ln z - X_i\hat{\beta}}{\hat{\sigma}}\right] \tag{7.2}$$

where P_i is a variable taking a value of one if the household is poor and zero otherwise, z is the poverty line expressed in terms of consumption expenditure per capita, $\hat{\beta}$ and $\hat{\sigma}$ are the estimated coefficients from the regression in equation 7.1, and Φ is the cumulative standard normal function.

Applying Regression Results to the Census Data

In the second step, the estimated regression coefficients from equation 7.1 are combined with census data on the same household characteristics to predict the probability that each household in the census is poor. This is accomplished by inserting the household characteristics for household i from the census, X_i^C, into equation 7.2, as shown in equation 7.3.

$$E\left[P_i \mid X_i^C, \hat{\beta}, \hat{\sigma}\right] = \Phi\left[\frac{\ln z - X_i^C \hat{\beta}}{\hat{\sigma}}\right] \tag{7.3}$$

For a given area (such as a district or province), Hentschel and others (2000) show that the proportion of the population living in households that are below the poverty line is estimated as the mean of the probabilities that individual households are poor, as shown in equation 7.4.

$$E\left[P \mid X^C, \beta, \sigma^2\right] = \sum_{i=1}^{N} \frac{m_i}{M} \Phi\left[\frac{\ln z - X_i^C \beta}{\sigma}\right] \tag{7.4}$$

where m_i is the size of household i, M is the total population of the area in question, N is the number of households, and X^C is an $N \times k$ matrix of household characteristics. The advantage of using the census data, of course, is that the large number of households allows estimation of poverty headcounts for geographic units much smaller than would be possible with the VLSS data.

Provided that (a) the error term is homoskedastic, (b) there is no spatial autocorrelation, and (c) the full census data are used, the variance of the estimated poverty headcount can be calculated as shown in equation 7.5.

(7.5)

$$\mathrm{var}(P^*) = \left(\frac{\partial P^*}{\partial \hat{\beta}}\right)' \mathrm{var}(\hat{\beta}) \frac{\partial P^*}{\partial \hat{\beta}} + \left(\frac{\partial P^*}{\partial \hat{\sigma}^2}\right)^2 \frac{2\hat{\sigma}^4}{n-k-1} + \sum_{i=1}^{N} \frac{m_i^2 P_i^*(1-P_i^*)}{M^2}$$

where P^* is the estimated poverty headcount and n is the sample size in the regression model. Thus, n, k, and σ^2 are from the regression analysis, and m_i, M, and N are obtained from the census data. The partial derivatives of P^* with respect to the estimated parameters can be calculated as shown in equations 7.6 and 7.7.

$$\frac{\partial P^*}{\partial \hat{\beta}_j} = \sum_{i=1}^{N} \frac{m_i}{M} \left(\frac{-x_{ij}}{\hat{\sigma}}\right) \varphi\left(\frac{\ln z - X_i' \hat{\beta}}{\hat{\sigma}}\right) \tag{7.6}$$

$$\frac{\partial P^*}{\partial \hat{\sigma}^2} = -\frac{1}{2} \sum_{i=1}^{N} \frac{m_i}{M} \left(\frac{\ln z - X_i'^C \hat{\beta}}{\hat{\sigma}^3}\right) \varphi\left(\frac{\ln z - X_i'^C \hat{\beta}}{\hat{\sigma}}\right) \tag{7.7}$$

The first two terms in equation 7.5 represent the "model error," which comes from the fact that there is some uncertainty regarding the true value of β and σ in the regression analysis. This uncertainty is measured by the estimated covariance matrix of β and the estimated variance of σ^2, as well as the effect of this variation on P^*. The third term in equation 7.5 measures the "idiosyncratic error," which is related to the fact that, even if β and σ are measured exactly, household-specific factors will cause the actual expenditure to differ from predicted expenditure. These equations are described in more detail in Elbers, Lanjouw, and Lanjouw (2003) and Hentschel and others (2000).

As noted, equation 7.5 is valid only if the full census data are available for the second stage of the mapping procedure. When using a sample survey or a sample of the census data in the second stage, this expression must be modified as shown in equation 7.8.

$$\text{(7.8)} \qquad \operatorname{var}(P^*) = \left(\frac{\partial P^*}{\partial \hat{\beta}}\right)' \operatorname{var}(\hat{\beta}) \frac{\partial P^*}{\partial \hat{\beta}} + \left(\frac{\partial P^*}{\partial \hat{\sigma}^2}\right)^2 \frac{2\hat{\sigma}^4}{n-k-1} + \sum_{i=1}^{N} \frac{m_i^2 P_i^*(1-P_i^*)}{M^2} + V_s$$

where V_s represents the variance associated with the sampling error in the census, taking into account the design of the sample. In this study, the software package Stata is used to calculate the variance associated with the sampling error, taking into account the design of the survey.[6]

To compare poverty headcounts in different regions or provinces, it is convenient to calculate the variance of the difference between two estimates of poverty. Hentschel and others (2000, footnote 17) provide an expression for the case when full census data are used. The expression is extended to include the variance associated with sampling error, as shown in equation 7.9.

(7.9)

$$\operatorname{var}(P_1 - P_2) = \left(\frac{\partial P_1 - P_2}{\partial \hat{\beta}}\right)' \operatorname{var}(\hat{\beta}) \left(\frac{\partial P_1 - P_2}{\partial \hat{\beta}}\right) + \left(\frac{\partial P_1 - P_2}{\partial \hat{\sigma}^2}\right)^2 \frac{2\hat{\sigma}^4}{n-k-1} + V_i(P_1) + V_i(P_2) + V_s(P_1) + V_s(P_2) - 2\operatorname{cov}_s(P_1, P_2)$$

where $V_i(P_r)$ is the idiosyncratic variance of the poverty estimate for region r (the third term in equation 7.5), $V_s(P_r)$ is the sampling variance of the poverty estimate for region r, and $\operatorname{cov}_s(P_1, P_2)$ is the covariance in the poverty estimates for regions 1 and 2 associated with sampling error.

Two qualifications need to be made regarding the implementation of this method in the case of Vietnam. Researchers at the World Bank have recently been addressing the issue of spatial autocorrelation in the first-stage regressions (equation 7.1). Analytical solutions for the variance of the headcount are not possible in this case, and it becomes necessary to use complex simulation methods to calculate the estimators and their standard errors (Elbers, Lanjouw, and Lanjouw 2003). Although preliminary analysis indicates the presence of some spatial autocorrelation, in this case it could not be eliminated by including community-level variables in the regression analysis. This suggests that there may be some inefficiency in the results of the first-stage regression analysis, though the magnitude of these effects is difficult to assess.

In addition, the estimate of the variance associated with sampling error produced by Stata is only an approximation. Exploratory analysis reveals that the sampling error is relatively small compared with the model error, suggesting that this approximation does not substantively influence the results.

Factors Associated with Poverty in Vietnam

The first step in constructing a poverty map is to estimate econometrically per capita consumption expenditure as a function of variables that are common to the census and the VLSS. These household characteristics include household size and composition, ethnicity, education of the head of household and his or her spouse, occupation of the head of household, housing size and type, access to basic services, and ownership of selected consumer durables. Table 7.1 lists the variables, and appendix 7A provides descriptive statistics for each of them.

It is reasonable to expect that the factors that "predict" expenditure in rural areas may be different from those predicting expenditure in urban areas. Indeed, a Chow test strongly rejects the hypothesis that the coefficients for the urban subsample are the same as those for the rural subsample ($F = 6.16$, $p < .001$). This implies that separate analyses should be carried out on rural and urban samples.

The next level of disaggregation is the stratum used in the VLSS sample. The VLSS was designed to be representative for each of 10 strata, comprising 3 urban strata and 7 rural strata. For this analysis, it was necessary to collapse the three urban strata (Hanoi and Ho Chi Minh City, other cities, and towns) into two (Hanoi and Ho Chi Minh City, other urban areas) because the census data do not allow distinction between "other cities" and "towns." Within urban areas, a Chow test suggests that Hanoi and Ho Chi Minh City differ significantly from other urban areas ($F = 2.20$, $p < .001$). In addition, the seven rural regions differ significantly from each other ($F = 12.61$, $p < .001$). In other ways, however, the stratum-level regressions are not very satisfactory. Because of the small sample size in each stratum (ranging from 368 to 1,111 households), many of the coefficients are not statistically significant at conventional levels or have counterintuitive signs. Furthermore, the goodness-of-fit of most of the stratum regressions is below 0.5, compared with 0.54 and 0.55 for the rural and urban regressions. One result of this is that the standard errors of the poverty estimates from the stratum-level regressions are higher than those obtained from the urban-rural regressions (see "Regional Poverty Estimates" below).

This chapter presents the results of both the urban-rural regressions (see tables 7.2 and 7.3) and the stratum-level regressions (see appendixes 7B and 7C), as well as the poverty estimates derived from each (tables 7.4–7.6 and appendix 7D). However, greater prominence is given to the results from the urban-rural regression analysis. As will be shown in another section, the two methods yield similar poverty headcounts and rankings, particularly for the poorest provinces. The results of the regression analysis are summarized to "predict" per capita expenditures in the next sections.

Household Size and Composition

Large households are strongly associated with lower per capita expenditure in both urban and rural areas, as shown in table 7.2. The negative sign of the

Table 7.2. Determinants of Per Capita Expenditure for Rural and Urban Areas

Rural model			*Urban model*		
N	*4269*			*1730*	
R-squared	*0.536*			*0.550*	
Variable	*Coefficient*	*t*	*Variable*	*Coefficient*	*t*
hhsize	−0.0772	−19.5***	hhsize	−0.0785	−8.1***
pelderly	−0.0831	−2.4**	pelderly	−0.1026	−1.6
pchild	−0.3353	−9.4***	pchild	−0.2368	−3.6***
pfemale	−0.1177	−3.5***	pfemale	0.0386	0.5
ethnic	−0.0765	−1.9*	ethnic	0.0142	0.2
Iedchd_2	0.0585	3.4***	Iedchd_2	0.0616	1.7
Iedchd_3	0.0883	4.5***	Iedchd_3	0.0338	1.3
Iedchd_4	0.0884	3.3***	Iedchd_4	0.1368	3.2***
Iedchd_5	0.1355	4.2***	Iedchd_5	0.1603	3.5***
Iedchd_6	0.2552	4.9***	Iedchd_6	0.1843	3.7***
Iedcsp_0	0.0173	1.0	Iedcsp_0	0.0344	0.8
Iedcsp_2	0.0049	0.3	Iedcsp_2	0.0642	1.9*
Iedcsp_3	0.0132	0.6	Iedcsp_3	0.0987	2.6**
Iedcsp_4	0.0107	0.3	Iedcsp_4	0.1912	2.7**
Iedcsp_5	0.0921	2.3**	Iedcsp_5	0.1285	3.2***
Iedcsp_6	0.1571	2.7***	Iedcsp_6	0.1752	3.1***
Ioccup_1	0.1414	3.5***	Ioccup_1	0.2312	3.0***
Ioccup_2	0.1350	3.3***	Ioccup_2	0.0576	1.2
Ioccup_3	0.1362	3.4***	Ioccup_3	0.0357	0.9
Ioccup_4	−0.0163	−0.6	Ioccup_4	−0.0093	−0.2
Ioccup_5	0.0701	1.9*	Ioccup_5	0.0071	0.2
Ioccup_6	−0.0586	−1.7*	Ioccup_6	−0.1599	−2.9***
Ihouse_1	−0.9228	−4.3***	Ihouse_1	−0.5194	−3.4***
Ihouse_2	−0.3120	−3.6***	Ihouse_2	−0.4001	−3.8***
htypla1	0.2958	5.7***	htypla1	0.2001	5.4***
htypla2	0.1180	5.2***	htypla2	0.1403	4.6***
electric	0.0765	2.7***	electric	−0.0026	0.0
Inwate_1	0.0828	1.4	Inwate_1	0.2289	5.3***
Inwate_2	0.1157	4.4***	Inwate_2	0.0340	0.6
Itoile_1	0.2700	5.5***	Itoile_1	0.1311	2.2**
Itoile_2	0.0556	2.6**	Itoile_2	0.0049	0.1
tv	0.2124	15.1***	tv	0.2167	5.5***
radio	0.1009	7.0***	radio	0.1599	6.2***
Ireg7_2	0.0314	0.6	Ireg7_2	0.0693	0.7
Ireg7_3	0.0485	0.8	Ireg7_3	0.0445	0.6
Ireg7_4	0.1373	2.2**	Ireg7_4	0.1460	1.9*
Ireg7_5	0.1708	2.1**	lreg7_5	omitted	
Ireg7_6	0.5424	9.4***	Ireg7_6	0.4151	5.5***
Ireg7_7	0.3011	5.1***	Ireg7_7	0.1895	2.1**
_cons	7.5327	108.7***	_cons	7.7538	64.7***

Note: The dependent variable is log of per capita expenditure.

*Coefficient is significant at the 10 percent level, **at the 5 percent level, and ***at the 1 percent level.

Source: Regression analysis of 1998 VLSS.

coefficient on household size implies that, other factors being equal, each additional household member is associated with a 7–8 percent reduction in per capita expenditure.[7] The stratum-level regressions show similar results (see appendix 7B).

In rural areas, a household with a large number of elderly members, children, and females is likely to have low per capita expenditure. In urban areas, however, only the number of children is statistically significant (see table 7.2). Household composition appears to matter less in urban areas than rural ones. It may be that the number of children, women, and elderly people has less effect on household welfare in urban areas because income-earning capacity in the cities and towns is less dependent on physical strength.

Ethnicity[8] is a predictor of per capita expenditure, but a surprisingly weak one, after controlling for other household characteristics (education, occupation, ownership of consumer durables, and so on). In rural areas, the coefficient on ethnicity was significant only at the 10 percent level, and in urban areas, it was not statistically significant (see table 7.2). The urban coefficient is not surprising, given the very small sample of ethnic minority households in urban areas (just 19 households). The weakly significant, although appropriately signed, coefficient for rural areas is more surprising, given the strong correlation between poverty and ethnicity in Vietnam. Other research (Baulch and others 2004; van de Walle and Gunewardana 2001) suggests that ethnic minorities have both lower levels of endowments and lower returns to those endowments. The results in this chapter are consistent with these findings, showing that after controlling for differences in endowments (education, housing characteristics, and ownership of consumer durables), differences in per capita expenditure between ethnic minority households and others remain, but are much smaller.

Education

In both urban and rural areas, the level of schooling of the head of household is a good predictor of a household's per capita expenditure.[9] The five dummy variables that represent the education of the head of household are jointly significant at the 1 percent level in both rural and urban areas (see table 7.3). In rural areas, heads of household who completed primary school earn 6 percent more than those who did not complete primary school. In urban areas, households whose head has completed primary or lower secondary school do not seem to be better off than those whose head has not completed primary school, but higher levels of education are associated with significantly higher earnings (see table 7.2).

In general, the educational level of the spouse is less significant than that of the household head as a predictor of per capita expenditure.[10] In the rural areas, only the highest two levels of education of the spouse (advanced technical training and postsecondary education) show any significant effect relative to the base level (not completing primary school). The education of the spouse is a better predictor in urban areas than in rural areas (see table 7.2).

Table 7.3. Tests of Significance of Groups of Explanatory Variables in Urban-Rural Regressions

Sector	*Variables*	*df1*	*df2*	*F statistic*	*Probability*
Rural	Education of head of household	5	129	7.80	0.0000***
	Education of spouse	6	129	1.97	0.0738*
	Occupation of head	6	129	12.65	0.0000***
	Type of housing	2	129	14.00	0.0000***
	Main source of water	2	129	9.69	0.0001***
	Type of sanitary facility	2	129	15.64	0.0000***
	Region	6	129	26.20	0.0000***
Urban	Education of head of household	5	55	4.01	0.0036***
	Education of spouse	6	55	3.10	0.0110**
	Occupation of head	6	55	2.90	0.0157**
	Type of housing	2	55	10.76	0.0001***
	Main source of water	2	55	17.17	0.0000***
	Type of sanitary facility	2	55	4.12	0.0216**
	Region	5	55	10.29	0.0000***

Note: The dependent variable is log of per capita expenditure.

*Coefficient is significant at the 10 percent level, **at the 5 percent level, and ***at the 1 percent level.

Source: Regression analysis of per capita expenditure using 1998 VLSS.

Occupation

The occupation of the head of household is a statistically significant predictor of per capita expenditure in rural and urban areas.[11] In rural areas, the first three occupational categories (political leaders or managers, professionals or technicians, and clerks or service workers) are significantly better off than households in which the head of household is not working. There is no statistically significant difference between the expenditure of farm households and households with nonworking heads, however (see table 7.2). This somewhat counterintuitive finding reflects the fact that nonworking heads include retirees as well as a disproportionate number of skilled workers who can "afford" to look for better-paid work.

In urban areas, households whose head is a leader or manager are significantly better off than those with nonworking heads, and those whose head is an unskilled worker are significantly worse off (see table 7.2). This suggests that in urban areas, a nonworking head of household is not a reliable indicator that the household is poor.

Housing and Basic Services

Various housing characteristics are good predictors of expenditures. Living in a house or other dwelling made of permanent rather than temporary materials is associated with 19 percent (24 percent) higher per capita expenditure in rural (urban) areas.[12] Similarly, having a house of semipermanent rather than temporary materials implies a significantly higher level of per capita expenditure. The living area of houses is also a useful predictor of household well-being. Houses in Vietnam have an average living area of about 45 square meters, and each 10 percent increase in area is associated with a 12–30 percent increase in per capita expenditure, depending on the place of residence (urban or rural) and the type of house (permanent or semipermanent).[13]

Electrification[14] is a statistically significant predictor of household welfare in rural areas, where 71 percent of the households have access to electricity. By contrast, in urban areas, where 98 percent of the households are already electrified, electricity is not a significant predictor of expenditures (see table 7.2).

The main source of water is also useful in distinguishing poor households. In rural areas, households with access to well water have a higher level of per capita expenditures than households using river or lake water (the omitted category). Access to tap water is not a statistically significant predictor of expenditures in rural areas, presumably because just 2 percent of the rural households fall into this category. By contrast, in urban areas, more than half the sample households (58 percent) have access to tap water, and this variable is a good predictor of urban per capita expenditures.

Finally, sanitation facilities can be used to separate poor from nonpoor households. In rural areas, flush toilets and latrines are statistically significant indicators of higher per capita expenditure at the 5 percent level. In urban areas, having a flush toilet is a significant predictor of expenditures at the 5 percent level but having a latrine is not (see table 7.2).

Consumer Durables

Television ownership is one of the strongest predictors of per capita expenditures—a statistically significant predictor in both urban and rural areas. Radio ownership is almost as good a predictor: statistically significant at the 1 percent level in both urban and rural areas. As expected, the coefficient for radio ownership is smaller than that of television ownership (see table 7.2). Later in this chapter, the extent to which the addition of variables reflecting ownership of consumer durables or housing characteristics can improve the geographic targeting of the poor is examined.

Region

Regional dummy variables were included in the urban and rural regression models, with the Northern Uplands as the base region. Even after controlling for other household characteristics, rural households in the four southern regions are shown to be better off than those in the Northern Uplands. The coefficient in the Southeast is the largest, implying that households in this region have expenditure levels 72 percent higher than similar households in the Northern Uplands. A similar pattern holds for urban households (see table 7.2). The regional dummy variables are jointly significant at the 1 percent level in both urban and rural areas (see table 7.3).

Poverty Maps of Vietnam

The second stage in constructing a poverty map is to combine the regression coefficients estimated from the VLSS in the first stage and the census data on the same household characteristics. This gives predicted expenditures for each household in the census, which are then used to estimate the incidence of poverty (the poverty headcount) for individual regions and provinces, as well as the standard errors associated with these estimates. The estimates of the incidence of poverty are presented first at the regional level and then at the provincial level.

Regional Poverty Estimates

Regional poverty headcounts and their standard errors, as estimated directly from the 1998 VLSS, are shown in the first two columns of table 7.4. For the country as a whole, the incidence of poverty is 37.4 percent, with a 95 percent confidence interval of ±3.2 percentage points. The regional poverty headcounts range from 0.9 percent in urban Hanoi and Ho Chi Minh City to 65.2 percent in the rural Northern Uplands. The standard errors suggest that the degree of precision in the estimates of regional poverty using the VLSS is relatively low: Four of the nine regions have confidence limits of ±10 percentage points or more.

By combining the urban-rural regression models and the census data (as described above), an alternative set of estimates of regional headcount poverty rates and standard errors, shown in the second pair of columns in table 7.4, can be seen. Seven of the nine regional estimates are within 3 percentage points of the corresponding estimate from the VLSS. However, the census-based poverty estimates tend to be less extreme: They are higher than the VLSS estimates where the incidence of poverty is low (such as in the rural Southeast and urban areas) and lower where the incidence is high (such as in the rural Northern Uplands). In every region except one (Hanoi and Ho Chi Minh City), the standard errors of the census-based estimates are substantially smaller than those of the VLSS estimates. Apparently, the gains in accuracy from using a larger sample exceed the losses due to estimating expenditure based on household characteristics.

According to the urban-rural regression results in table 7.4, the rural Northern Uplands is the poorest region. In fact, it is significantly poorer than the other eight regions at the 1 percent confidence level (see table 7.5). The rural Central Highlands and the rural North Central Coast are the next poorest regions, although there is no statistically significant difference between the two. The rural South Central Coast, the rural Mekong Delta, and the rural Red River Delta follow, with the differences being statistically significant in each case. The rural Southeast and "other urban" areas are significantly less poor than the rural Red River Delta, but the difference between the former two areas (that is, rural Southeast and "other urban") is not statistically significant. The ninth region, Hanoi and Ho Chi Minh City, is significantly less poor than any of the other eight regions (see tables 7.4 and 7.5).

Table 7.4. Comparison of Original and Census-Based Poverty Headcounts

	VLSS 1998		*Urban-rural regressions with Census data*		*Stratum regression with Census data*	
Region	*Poverty*	*Standard error*	*Poverty*	*Standard error*	*Poverty*	*Standard error*
Hanoi and Ho Chi Minh City	0.009	0.004	0.037	0.007	0.031	0.009
Other urban	0.138	0.021	0.145	0.012	0.146	0.014
Rural Northern Uplands	0.652	0.057	0.598	0.011	0.626	0.037
Rural Red River Delta	0.361	0.038	0.379	0.006	0.407	0.031
Rural North Central Coast	0.488	0.058	0.513	0.011	0.490	0.036
Rural South Central Coast	0.436	0.075	0.460	0.010	0.400	0.028
Rural Central Highlands	0.524	0.097	0.533	0.016	0.525	0.046
Rural Southeast	0.130	0.022	0.234	0.004	0.173	0.018
Rural Mekong Delta	0.412	0.033	0.397	0.007	0.386	0.031
Total	0.374	0.016	0.365	0.012	0.365	0.011

Note: Poverty headcounts are expressed as fractions rather than percentages.

Source: Data from 1998 VLSS and 3 percent sample of 1999 Population and Housing Census.

Table 7.5. Differences in Regional Poverty Headcounts and Their Statistical Significance

Region	*Hanoi & Ho Chi Minh City*	*Other urban*	*Rural N Uplands*	*Rural Red R Delta*	*Rural N C Coast*	*Rural S C Coast*	*Rural C Highlands*	*Rural Southeast*
Other urban	−0.109***	—						
	(0.012)	—						
Rural Northern Uplands	−0.561***	−0.452***	—					
	(0.013)	(0.016)	—					
Rural Red River Delta	−0.343***	−0.234***	0.218***	—				
	(0.009)	(0.013)	(0.012)	—				
Rural North Central Coast	−0.477***	−0.368***	0.084***	−0.134***	—			
	(0.013)	(0.016)	(0.016)	(0.013)	—			
Rural South Central Coast	−0.438***	−0.330***	0.123***	−0.096***	0.038***	—		
	(0.012)	(0.015)	(0.016)	(0.012)	(0.014)	—		
Rural Central Highlands	−0.481***	−0.372***	0.081***	−0.138***	−0.004 n.s.	−0.042**	—	
	(0.017)	(0.020)	(0.021)	(0.018)	(0.020)	(0.019)	—	
Rural Southeast	−0.089***	0.020 n.s.	0.472***	0.254***	0.388***	0.349***	0.392***	—
	(0.008)	(0.012)	(0.012)	(0.007)	(0.012)	(0.011)	(0.017)	—
Rural Mekong Delta	−0.360***	−0.252***	0.201***	−0.017**	0.117***	0.078***	0.120***	−0.271***
	(0.009)	(0.013)	(0.013)	(0.008)	(0.013)	(0.012)	(0.017)	(0.008)

Note: Differences expressed as poverty headcount of column region minus poverty headcount of row region. Standard errors in parentheses.
*Statistically significant at the 10 percent level, **at the 5 percent level, and ***at the 1 percent level.
n.s. Not statistically significant at the 10 percent level.
Source: Data from 1998 VLSS and 3 percent sample of 1999 Population and Housing Census.

Combining the stratum-level regression models with the census data yields results similar to those based on the urban-rural regression models, as shown in the last two columns of table 7.4. Again, the poverty estimates are less extreme than the VLSS estimates and the standard errors are somewhat lower. One notable difference is that the standard errors of the poverty estimates based on the stratum-level regression models are higher, often two to three times higher, than those based on the urban-rural regression models.

Provincial Poverty Estimates

One of the main advantages of using census data is that they allow the generation of reliable estimates of poverty for smaller geographic units, such as provinces or districts, which would be difficult or impossible to estimate with a household sample survey such as the VLSS.[15] Table 7.6 shows the estimated provincial poverty rates, along with the standard errors of the estimates, based on the urban-rural regression models (the corresponding results from the stratum-level regressions are given in appendix 7B). Map 7.1 shows the geographic distribution of poverty at the provincial level, also based on the urban-rural regression models.

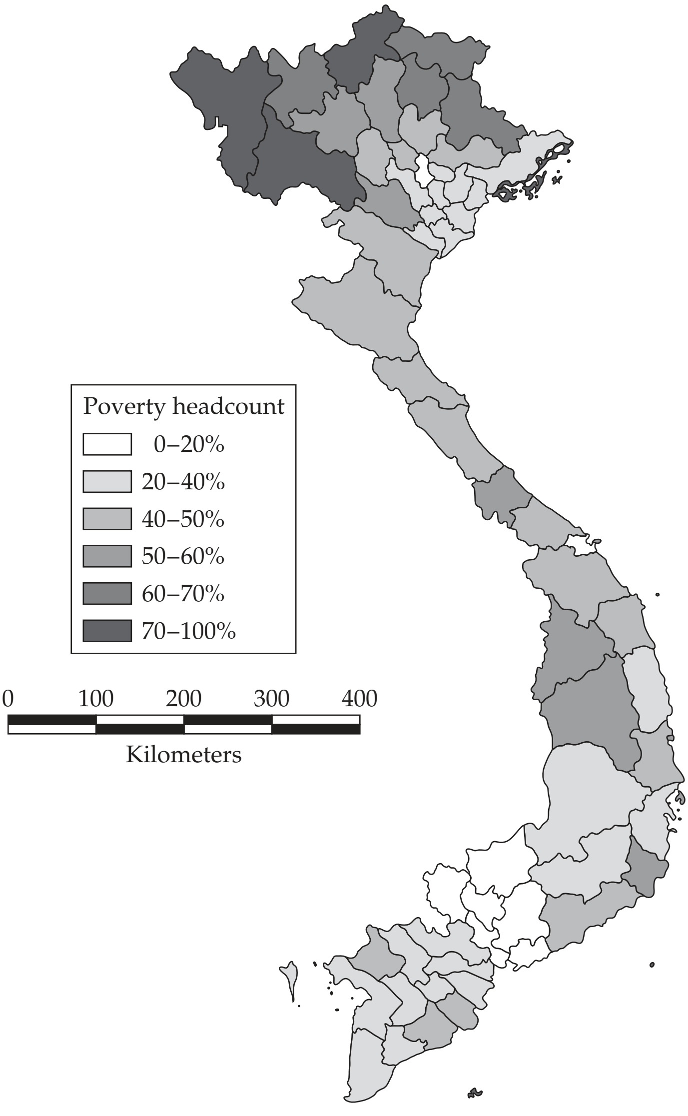
The results indicate that Lai Chau, located at the extreme northwest corner of Vietnam, is the poorest province, with more than three-quarters of its population living below the poverty line. The next five poorest provinces (Ha Giang, Son La, Cao Bang, Lao Cai, and Lang Son) are all provinces in the Northern Uplands on the northern border with China or the western border with the Lao People's Democratic Republic. In fact, the 10 poorest provinces are all in the Northern Uplands. This is probably a reflection of their mountainous topography, distance from major markets, and limited infrastructure, all of which reduce the returns to agriculture in this region. Ethnic minorities also make up more than half of the population of these provinces.

Poverty is not limited to the Northern Uplands, however. The North Central Coast composes six provinces, all of which are among the poorest 21 provinces in the country. The incidence of poverty in these provinces ranges from 44 percent to 52 percent.

The Central Highlands region includes three provinces. Two of the three, Kon Tum and Gia Lai, are among the 15 poorest provinces in Vietnam, with poverty headcounts of more than 50 percent. The third province, Dak Lak, is more prosperous, with a poverty headcount similar to the national average. This is probably due to the importance of coffee production. Vietnam now exports US$500 million worth of coffee per year, most of which is grown in Dak Lak province.

Poverty is less severe in the southern regions, although each region has at least one province with a poverty headcount over 40 percent. The Southeast region is the least poor region, but it has two provinces, Ninh Thuan and Binh Thuan, with poverty headcounts of more than 40 percent. These provinces are farther from Ho Chi Minh City than the other provinces in the Southeast. In the South Central Coast, Quang Ngai has a poverty headcount

Map 7.1. Incidence of Poverty by Province



Source: Estimated from urban-rural regression models of the 1998 VLSS and household characteristics in the 1999 Population and Housing Census.

of 47 percent. In the Mekong Delta region, Soc Trang, Tra Vinh, and An Giang have rates of more than 40 percent.

The lowest incidence of poverty is found in Ho Chi Minh City (less than 5 percent), followed by four provinces in the Southeast (Binh Duong, Ba Ria-Vung Tau, Dong Nai, and Tay Ninh), all of which have poverty headcounts under 15 percent. The headcounts for Hanoi and Da Nang are both close to 15 percent.

Table 7.6. Provincial Poverty Headcounts Estimated with Urban-Rural Regression Model

			Poverty headcount			*Standard errors*		
Rank	*Province*	*Region*	*Rural*	*Urban*	*Total*	*Rural*	*Urban*	*Total*
1	Lai Chau	NU	0.857	0.221	0.777	0.038	0.036	0.034
2	Ha Giang	NU	0.770	0.195	0.722	0.039	0.032	0.036
3	Son La	NU	0.795	0.153	0.714	0.039	0.029	0.034
4	Cao Bang	NU	0.739	0.142	0.675	0.037	0.034	0.033
5	Lao Cai	NU	0.747	0.197	0.652	0.043	0.031	0.036
6	Lang Son	NU	0.724	0.141	0.617	0.038	0.033	0.032
7	Bac Kan	NU	0.676	0.189	0.609	0.039	0.037	0.034
8	Hoa Binh	NU	0.655	0.155	0.586	0.041	0.028	0.036
9	Tuyen Quang	NU	0.635	0.161	0.583	0.043	0.026	0.038
10	Yen Bai	NU	0.644	0.165	0.550	0.044	0.027	0.036
11	Gia Lai	CH	0.650	0.194	0.538	0.062	0.032	0.047
12	Ninh Thuan	SE	0.618	0.214	0.525	0.041	0.038	0.033
13	Kon Tum	CH	0.670	0.221	0.522	0.061	0.035	0.043
14	Quang Tri	NCC	0.618	0.192	0.520	0.043	0.034	0.034
15	Quang Binh	NCC	0.532	0.132	0.491	0.044	0.028	0.040
16	Nghe An	NCC	0.515	0.140	0.477	0.046	0.029	0.041
17	Quang Ngai	SCC	0.513	0.153	0.474	0.043	0.030	0.038
18	Thua Thien - Hue	NCC	0.579	0.185	0.472	0.043	0.033	0.033
19	Bac Giang	NU	0.494	0.164	0.470	0.050	0.028	0.047
20	Thanh Hoa	NCC	0.492	0.135	0.460	0.045	0.027	0.041
21	Ha Tinh	NCC	0.474	0.151	0.445	0.044	0.030	0.040
22	Vinh Phuc	NU	0.470	0.199	0.442	0.052	0.032	0.047
23	Binh Thuan	SE	0.498	0.235	0.435	0.041	0.040	0.033
24	Phu Tho	NU	0.482	0.132	0.431	0.049	0.024	0.042
25	Soc Trang	MRD	0.463	0.244	0.424	0.034	0.040	0.029

26	Thai Nguyen	NU	0.495	0.126	0.419	0.047	0.023	0.038
27	Tra Vinh	MRD	0.452	0.191	0.418	0.034	0.032	0.030
28	Phu Yen	SCC	0.469	0.188	0.416	0.042	0.036	0.035
29	Quang Nam	SCC	0.443	0.191	0.408	0.041	0.035	0.036
30	An Giang	MRD	0.454	0.196	0.406	0.033	0.036	0.027
31	Dac Lac	CH	0.451	0.176	0.395	0.063	0.029	0.050
32	Ha Tay	RRD	0.417	0.125	0.395	0.033	0.028	0.031
33	Dong Thap	MRD	0.424	0.195	0.391	0.032	0.036	0.028
34	Binh Dinh	SCC	0.460	0.179	0.391	0.041	0.033	0.032
35	Ninh Binh	RRD	0.424	0.109	0.385	0.033	0.026	0.029
36	Bac Ninh	NU	0.405	0.166	0.383	0.050	0.028	0.046
37	Hung Yen	RRD	0.403	0.163	0.383	0.032	0.037	0.030
38	Kien Giang	MRD	0.428	0.210	0.380	0.034	0.036	0.028
39	Bac Lieu	MRD	0.430	0.207	0.377	0.033	0.037	0.027
40	Ha Nam	RRD	0.391	0.143	0.376	0.033	0.031	0.031
41	Quang Ninh	NU	0.519	0.155	0.357	0.048	0.026	0.029
42	Nam Dinh	RRD	0.385	0.110	0.351	0.032	0.026	0.028
43	Can Tho	MRD	0.402	0.156	0.349	0.031	0.031	0.025
44	Ca Mau	MRD	0.388	0.152	0.345	0.032	0.030	0.027
45	Lam Dong	SE	0.458	0.144	0.337	0.061	0.024	0.039
46	Vinh Long	MRD	0.360	0.148	0.330	0.031	0.030	0.027
47	Thai Binh	RRD	0.345	0.075	0.330	0.033	0.021	0.032
48	Ben Tre	MRD	0.342	0.137	0.325	0.031	0.029	0.028
49	Hai Duong	RRD	0.353	0.106	0.319	0.032	0.027	0.028
50	Khanh Hoa	SCC	0.416	0.126	0.311	0.040	0.024	0.027
51	Long An	MRD	0.335	0.151	0.305	0.031	0.031	0.027
52	Hai Phong	RRD	0.395	0.074	0.286	0.032	0.019	0.022
53	Tien Giang	MRD	0.301	0.105	0.276	0.030	0.025	0.026
54	Binh Phuoc	SE	0.197	0.076	0.179	0.028	0.017	0.024

(table continues on following page)

Table 7.6. (*continued*)

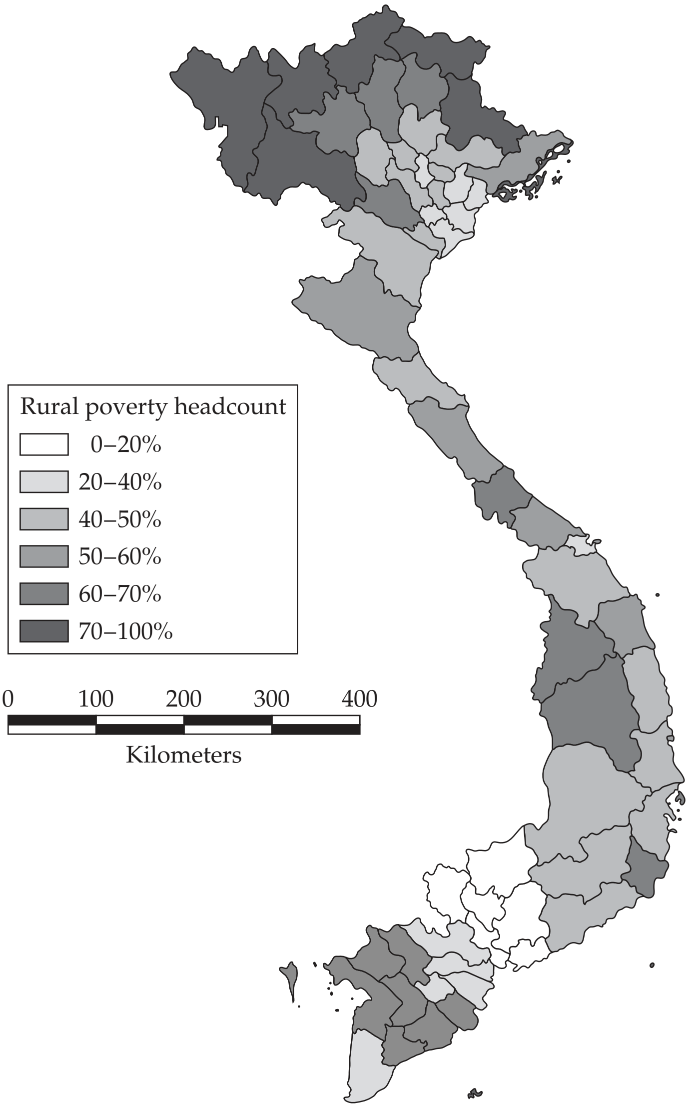
			Poverty headcount			*Standard errors*		
Rank	*Province*	*Region*	*Rural*	*Urban*	*Total*	*Rural*	*Urban*	*Total*
55	Da Nang	SCC	0.346	0.106	0.156	0.038	0.022	0.019
56	Ha Noi	RRD	0.306	0.037	0.152	0.031	0.010	0.015
57	Tay Ninh	SE	0.130	0.081	0.124	0.019	0.017	0.016
58	Dong Nai	SE	0.137	0.048	0.111	0.020	0.011	0.014
59	Ba Ria-Vung Tau	SE	0.109	0.062	0.090	0.016	0.013	0.011
60	Binh Duong	SE	0.092	0.051	0.079	0.014	0.012	0.010
61	TP Ho Chi Minh	SE	0.082	0.036	0.044	0.014	0.008	0.007
	Total		0.441	0.111	0.365	0.015	0.011	0.012

Note: A poverty headcount of 0.406 for An Giang implies that 40.6 percent of the population in An Giang live in households with per capita expenditures below the 1998 GSO/WB poverty line.

The region codes are NU = Northern Uplands, RRD = Red River Delta, NCC = North Central Coast, SCC = South Central Coast, CH = Central Highlands, SE = Southeast, and MRD = Mekong River Delta.

Source: Estimated from 1998 VLSS and 3 percent sample of 1999 Population and Housing Census.

Map 7.2. Incidence of Rural Poverty by Province



Source: Estimated from urban-rural regression models of the 1998 VLSS and household characteristics in the 1999 Population and Housing Census.

Poverty headcounts in rural areas are similar to the overall provincial poverty levels, which is not surprising, given the large proportion of the population living in rural areas in most provinces (see table 7.6 and map 7.2). Rural poverty is greatest in the border provinces of the Northern Uplands. The Central Highlands provinces of Gia Lai and Kon Tum are among the 10 poorest provinces in terms of rural poverty.

As expected, the incidence of poverty in urban areas is consistently lower than that in rural areas. Even in the poorest provinces, where more than 70 percent of the rural population is poor, urban poverty is below 25 percent. In contrast, the difference between rural and urban poverty headcounts is relatively small in the more prosperous provinces in the Southeast (see table 7.6).

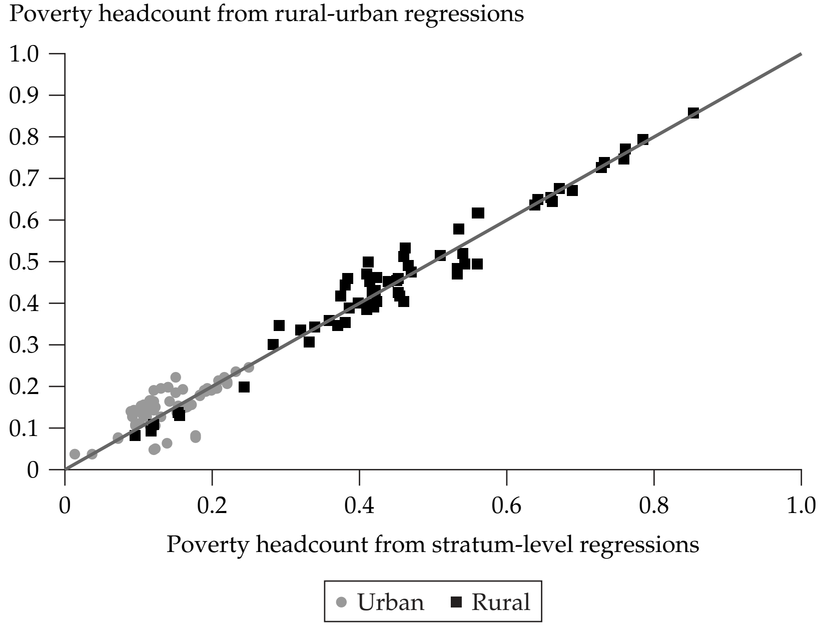
To determine whether the poverty estimates for any two provinces are statistically different from one another, the standard error of the difference between their poverty headcounts must be calculated. This statistic can be computed using equation 7.9, which takes into account the modeling error, the idiosyncratic error, and the sampling error associated with the 3 percent sample census. The standard errors of these differences (based on the urban-rural regressions) have been calculated for the 1,830 possible pairs of provinces, and their rural and urban subsamples, with the 61 urban-rural pairs in the same province. The results can be summarized as follows:

- About one-quarter (23 percent) of the provincial pairs with a 6 percentage point gap[16] in their poverty incidence are significantly different from each other at the 5 percent level of statistical significance. Forty-three percent of the provincial pairs with an 8 percentage point gap and 70 percent of those with a 10 percentage point gap have statistically different poverty levels. This implies that poverty headcounts are generally not statistically different from one another in provinces that are adjacent to each other in poverty rankings. Provinces that are four to five provinces away from each other in the ranking, however, will usually have statistically significant differences in their poverty headcounts.
- Poverty headcounts in 65 percent of the rural provincial pairs, but just 33 percent of the urban pairs, are significantly different from one another (at the 5 percent level). This is largely due to the fact that rural areas have higher and more diverse poverty headcounts, so the (absolute) differences are larger.
- In every province except one, Tay Ninh, the incidence of rural poverty is significantly higher than that of urban poverty.

Finally, the sensitivity of these results to the type of regression models estimated in the first step of the analysis was examined. In particular, how different are the results when stratum-level regressions were used instead of urban-rural regressions? The average (absolute value) gap between provincial poverty headcounts obtained from these two regression models is 2.2 percentage points. Just eight provinces have differences of more than 5 percentage points, and none have differences of more than 10 percentage points. Furthermore, the ranking of the 10 poorest provinces is the same according to the two approaches.

Figure 7.1 shows the similarity of the rural and urban poverty headcounts for each province (identical headcounts would be represented by points along the diagonal line). The two methods are most similar for the

Figure 7.1. Provincial Poverty Headcounts Estimated Using Urban-Rural and Stratum-Level Regression Models



Source: Estimated from rural-urban regression models of 1998 VLSS and household characteristics in the 1999 Population and Housing Census.

poorest rural regions, where the difference in estimates is typically just 1 percentage point. They are less similar for more prosperous rural areas and for urban areas. The urban poverty headcounts often differ by 4 to 8 percentage points.

The standard errors of the provincial poverty headcounts were also compared. Those based on the urban-rural regression models were often (72 percent of the time) lower than the corresponding standard errors based on the stratum-level regressions. For the poorest provinces, the standard errors of the headcount based on the stratum-level regressions are roughly twice as large as those based on the urban-rural regressions.

The Potential of Geographic and Additional Targeting Variables

Given knowledge about where the poor live, a natural question to ask is, "How effective are geographic variables in identifying the poor?" Experience in other countries indicates that the ability to target poor households typically improves with greater geographic disaggregation (Baker and Grosh 1994; Bigman and Fofack 2000). Many of Vietnam's antipoverty programs use highly disaggregated listings of "poor and remote communes";

thus, one would expect the efficiency of its geographic targeting programs to be quite high.[17] In addition, the institutional impediments to internal migration imposed by the *ho khau* (registration permits) system mean that the spatial distribution of poverty is likely to be more persistent than in countries with free mobility of labor. Furthermore, spatial dependence means that sizable differences in living standards can persist even after one controls for observable household and individual characteristics (Ravallion and Wodon 1997). The ability to target poor households and individuals is therefore an integral part of the government of Vietnam's desire to limit urban-rural disparities and inequality (Socialist Republic of Vietnam 2001).

The government of Vietnam is strongly committed to poverty reduction and over the 1990s has developed a complex array of geographically targeted antipoverty programs and policies (Conway 2001). The most important of these are the Hunger Eradication and Poverty Reduction (HEPR) program, also known as Program 133, and Program 135, which assists communes in the most mountainous and remote areas. The HEPR program was established in 1996 with the objective of fighting poverty through the coordination and improvement of existing targeted poverty alleviation programs in education, health, agricultural extension, irrigation, job creation, training, microfinance, and basic infrastructure. It is implemented in a number of poor communes (1,715 communes in 1998) identified by MOLISA, although program funding and implementation remain under the line ministries responsible for specific sectors. A commune is eligible to benefit from Program 133 grants if its poverty rate is above 40 percent, and poor households within these communes are eligible for targeted assistance (such as free or subsidized schooling, health insurance cards, and sometimes exemption from local taxes).[18] MOLISA conducts an annual exercise in which its district and commune representatives, along with party cadres, make lists of the poor households in each of the more than 10,000 communes in the country. In 1998, Program 135 was introduced to assist in the building of basic infrastructure in 1,000 communes in "especially difficult circumstances in mountainous and remote areas." This program is implemented by the Committee for Ethnic Minorities in Mountainous Areas in association with sector ministries. The mechanism used to target communes under Program 135 uses five criteria, which include the altitude of the commune, distance to the nearest town, adult illiteracy rate, and productive structure, in addition to the poverty rate. In addition to Programs 133 and 135 there are a number of antipoverty interventions, such as paying transportation subsidies and higher salaries to teachers working in remote areas, that are implemented at the local level.

It is therefore important to know whether the poor can be identified more accurately if additional information other than place of residence is available. Implicitly, this is what the commune and district level staff of MOLISA do in their annual exercise to determine whether a household is classified as poor.[19] Put differently, can the geographic targeting of the poor be improved by the use of the type of additional socioeconomic variables that can be collected easily in a "quick and dirty" enumeration of households?

The efficacy of different targeting variables was assessed using a relatively novel technique: Receiver Operating Characteristic (ROC) curves, a graphic and nonparametric way of portraying the accuracy of a diagnostics test originally developed for use in electrical engineering and signal processing (Stata Corporation 2001a). An ROC curve shows the ability of a diagnostic test to correctly distinguish between two states or conditions. In the context of poverty targeting, an ROC curve plots the probability of a test correctly classifying a poor person as poor (the test's sensitivity) on the vertical axis against one minus the probability of the same test correctly classifying a nonpoor person as nonpoor on the horizontal access (the test's specificity).[20] When the diagnostic test (here, the values of a targeting variable) takes several discrete values, the ROC curves will consist of a series of linear segments corresponding to these discrete values. The greater the area under an ROC curve and the closer it is to the left and top axes, the greater the efficacy of a diagnostic test. The closer an ROC curve is to the 45-degree line, the weaker its efficacy.

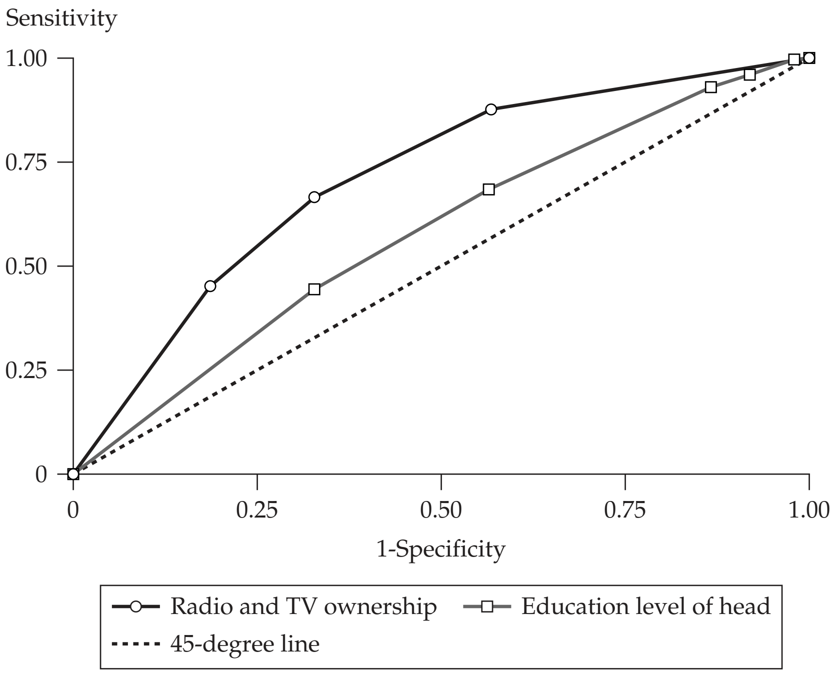
To the best of the authors' knowledge, the only previous use of ROC analysis for analyzing the impact of poverty targeting is by Wodon (1997), who used household survey data from Bangladesh. As Wodon points out, unlike conventional statistical hypothesis tests, ROC analysis can take account of continuous as well as categorical targeting variables. However, like conventional hypothesis tests, ROC analysis can be employed only for dichotomous outcome variables, so it cannot be used to examine the depth or severity of poverty.

Figure 7.2 shows an example of two pairs of ROC curves drawn using data from the 1998 VLSS. Because the curve for the index of radio and television ownership in rural areas lies everywhere above and to the left of the curve for the education level completed by the household head, panel A shows that use of the television and radio ownership variables unambiguously dominates that for education of the household head as a poverty targeting variable. Note that the ROC for the index of radio and television ownership has four linear segments corresponding to the four values of the index, and the ROC curve for the head of household's education has six segments corresponding to the six educational levels a household head may complete. Panel B shows the contrasting situation in which the ROC for quintiles of land area and the number of children per household cross, in which case neither variable unambiguously dominates the other from a targeting perspective.[21]

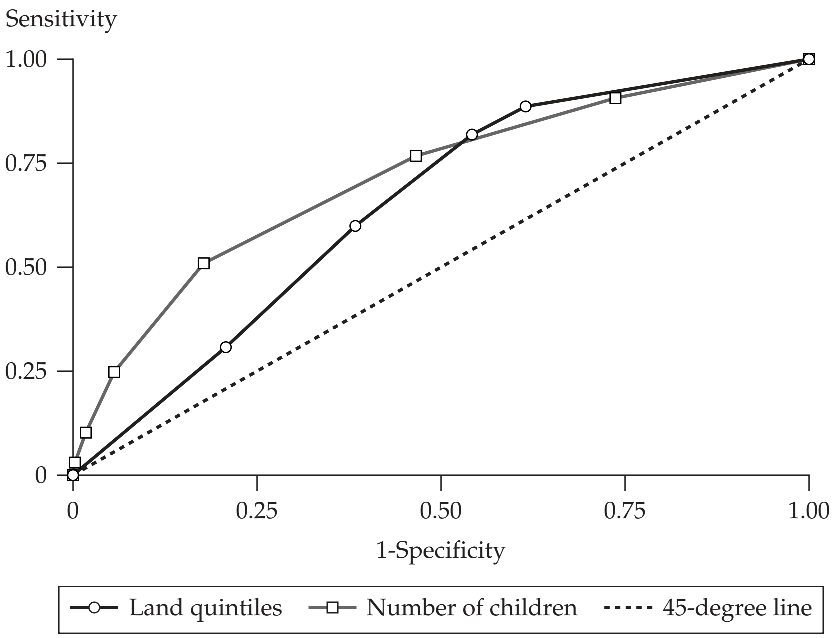
As long as a potential targeting variable increases in value as the likelihood of poverty increases (that is, it is "monotonically increasing with the risk of failure") (Stata Corporation 2001a), the area under an ROC curve can be used for ranking the accuracy of different targeting variables. The more a test's ROC curve is bowed toward the upper left-hand corner of the graph, the greater the accuracy of the test. Because ROC curves are bounded by the interval [0, 1], the maximum value for the area under an ROC curve is one (in which case, the test would predict poverty perfectly and the ROC curve

Figure 7.2. Receiver Operating Characteristic Curves for Selected Targeting Variables

a. Radio/TV ownership and education



b. Land ownership and children



would coincide with the left-hand vertical and top horizontal axes). In contrast, a test with no predictive power would correspond to an area of 0.5 under the ROC curve (which would itself coincide with the 45-degree line in the ROC diagram). Table 7.7 shows the area under the ROC curves for a number of possible poverty targeting variables for which information could be obtained relatively easily in a "quick and dirty" survey.

It can be seen that the current system for classifying poor and remote communes does not perform particularly well in identifying poor people, especially for the overall poverty line. The simple reason for this is that the vast majority of poor people in Vietnam do not live in an officially designated poor or remote commune. With the exception of educational level of the spouse, land allocated, and livestock owned in rural areas, table 7.7 shows that household-level targeting variables are generally much better at identifying poor individuals than whether they live in a poor or remote commune. The four categories of provincial poverty headcounts identified in the national poverty maps (map 7.1) also do quite well according to this criterion. Nonetheless, as shown by this and the ranking of poor communes according to their mean expenditures, there is considerable potential for improving the targeting of Vietnam's poor and remote communes programs.

Table 7.7 also shows that the most effective poverty targeting variables are those related to housing quality and ownership of durable assets. Floor type is generally a better predictor of both food poverty and overall poverty than roof or toilet type.[22] The level of education completed by household heads and their spouses performs considerably better as a targeting indicator in urban than in rural areas. Demographics, as proxied by the number of children younger than 15 years of age (the age by which Vietnamese children should have completed lower secondary school), are a better indicator of food poverty than overall poverty in both rural and urban areas. Ethnicity of the household head is a reasonable predictor of both food and overall poverty in rural areas, but it performs poorly in urban areas with few ethnic minority households.

An unexpected finding is that a simple index of radio and television ownership is a better targeting indicator than all other asset, demographic, or educational variables. Indeed, table 7.7 confirms that the radio and television ownership index dominates all other targeting variables, with the exception of communes ranked by the level of their median per capita expenditures. Using a cutoff point corresponding to ownership of neither a radio nor a television, the index is able to correctly classify some 76 percent of poor people in the VLSS sample.[23]

It would be possible to further increase the accuracy of targeting by combining a few of the above variables into a composite targeting indicator. Initial work on developing such an indicator using stepwise regressions shows that sex variables (the number of children younger than 15 and number of females in the household, fuel type, and the ownership of a television and motorcycles), with the choice of an appropriate poverty cutoff point, allow up to 94 percent of poor and nonpoor households to be correctly identified

Table 7.7. Accuracy of Different Variables in Targeting Poor Households

	Area under ROC curve					
	Rural		*Urban*		*All Vietnam*	
Targeting variable	*Food poverty*	*Overall poverty*	*Food poverty*	*Overall poverty*	*Food poverty*	*Overall poverty*
Poor or remote commune	0.586	0.589	0.557	0.503	0.591	0.560
Categories in national poverty map	0.641	0.622	0.620	0.645	0.663	0.650
Communes ranked by median expenditure	0.829	0.790	0.726	0.808	0.849	0.827
Land allocated (quintiles)	0.529	0.542	n/a	n/a	0.619	0.646
Livestock owned (animal eq. units)	0.474	0.448	0.591	0.541	0.467	0.441
Educational level of household head	0.601	0.579	0.715	0.685	0.625	0.609
Educational level of spouse*	0.570	0.554	0.739	0.727	0.602	0.597
Number of children under 15	0.733	0.690	0.753	0.789	0.742	0.714
Number of females	0.636	0.618	*0.578*	0.671	0.632	0.616
Ethnicity	0.650	0.615	0.515	0.533	0.660	0.625
Floor type	0.696	0.665	0.694	0.773	0.734	0.720
Roof type	0.630	0.585	0.687	0.658	0.637	0.594
Toilet type	0.597	0.577	0.773	0.730	0.650	0.648
Radio and TV ownership	0.736	0.711	0.876	0.792	0.771	0.751

Notes on targeting variables:

Poor commune: 0 = commune not included in CEMMA's list of remote communes or the MOLISA list of poor communes; 1 = commune included in either CEMMA's list of remote communes or the MOLISA list of poor communes; 2 = commune included in MOLISA's list of poor communes; 3 = both a remote and a poor commune.

Categories in national poverty map: 0 = provincial poverty headcount <25 percent; 1 = headcount 25–45 percent; 3 = headcount 45–60 percent; 4 = headcount >60 percent.

Livestock owned: number of livestock multiplied by their livestock equivalents units: 0.7 = cow, horses, and water buffalo; 0.1 = goats, pig, and deer; 0.01 = ducks and chickens.

Educational level completed (both heads and spouses): 0 = postsecondary; 1 = advanced technical; 2 = upper secondary; 3 = lower secondary; 4 = lower secondary; 5 = primary; 6 = less than primary (* Note: 1,284 households do not include a spouse).

Ethnicity: 0 = Chinese; 1 = Kinh; 2 = Khmer; 3 = Northern Uplands minorities; 4 = Central Highlands minorities.

Floor type: 0 = earth; 1 = other; 2 = bamboo/wood; 3 = lime and ash; 4 = cement; 5 = brick; 6 = marble or tile.

Roof type: 0 = other; 1 = leaves/straw; 2 = bamboo/wood; 3 = canvas/tar paper; 4 = panels; 5 = galvanized iron; 6 = tile; 7 = cement or concrete.

Toilet type: 0 = flush; 1 = other; 2 = none.

Radio and TV ownership: 0 = color TV; 1 = black and white TV; 2 = radio; 3 = none.

in urban areas. Developing a composite targeting indicator is more difficult in rural areas, although the addition of three more variables (ethnicity, floor type, and ownership of radios) allows up to 75 percent of households to be correctly classified as poor or nonpoor. A further advantage of this method is that it allows the tradeoff between coverage of the poor and exclusion of the nonpoor to be quantified in terms that are readily understandable by policymakers.[24]

Summary and Conclusions

Vietnam's current antipoverty programs rely heavily on the geographic targeting of poor households. Yet, as in many developing countries, the relatively small numbers of households that are sampled in its national household surveys do not allow poverty statistics below the regional level to be estimated accurately. Meanwhile, questions have been raised about the comparability and reliability of the more disaggregated province, district, and commune poverty statistics that are collected through Vietnam's administrative reporting system. This chapter has shown how the data collected by the 1998 VLSS may be combined with that of the 1999 Population and Housing Census to bridge this gap and allow disaggregated maps of poverty to be constructed. The procedure to construct these maps involves two steps. First, the VLSS is used to explore the factors associated with poverty at the household level and develop linear regression models for predicting per capita expenditures at the rural or urban and strata levels. Second, these regression models are applied to household data from the 3 percent enumeration sample of the census to derive and map provincial-level estimates of the percentage of people living in households whose per capita expenditures fall below the GSO–World Bank poverty line (the poverty headcount).

The national poverty map resulting from this two-step procedure shows that poverty is concentrated in Vietnam's Northern Uplands, in particular in the six provinces that border China and the Lao People's Democratic Republic. Fourteen other provinces, most of which are located in the Northern Uplands, Central Highlands, and North Central Coast, have poverty headcounts above 45 percent. When rural areas are considered separately from urban areas, rural poverty is also found to be high in most of the remaining provinces of the Northern Uplands, together with Gia Lai and Kon Tum and the Central Highlands. A group of moderately poor rural provinces (with rural headcounts between 45 and 50 percent) can also be seen clustered in the North Central Coast and Red River Delta. However, even relatively prosperous regions have their own pockets of poverty, such as Ha Tay in the Red River Delta and Ninh Thuan in the Southeast.

To consider the effectiveness of Vietnam's existing geographically targeted antipoverty programs, we applied the relatively novel technique of ROC curves to the VLSS data. The results confirm that a consistent ranking of communes has high potential to identify Vietnam's poor population. However, the existing, officially designated list of poor and remote communes is less effective in targeting the poor, because it excludes a large number of poor people living in other areas. Among the additional household-level variables that might be used to help sharpen the focus of targeting, demographics (in particular, the number of children younger than 15 in a household), housing characteristics (especially floor type), and ownership of durable assets perform well. A simple index of radio and television ownership dominates all other individual targeting variables, with the exception of communes ranked by their median per capita expenditures. Combining several household-level variables into a composite targeting indicator offers the potential to further improve the targeting of the poor, especially in urban areas.

When household-level data from the full sample of the 1999 census become available, it should be possible to extend this poverty mapping to the district level. Because the determinants of expenditures and poverty are likely to remain relatively stable over time, the authors believe that this will be a useful exercise, even though the 1999 census and VLSS are now three to four years old. In addition, although censuses are conducted only every 10 years, the first step of the poverty mapping calculations (the expenditure regressions) can be reestimated and new poverty maps derived each time a nationally representative household sample survey is conducted. The complete provincial poverty map could also be redone every five years with information from the interdecadal censuses.[25] Furthermore, international experience (Baker and Grosh 1994; Bigman and Fofack 2000) indicates that greater geographic disaggregation is likely to improve the targeting of Vietnam's antipoverty programs. With more computational effort, it is also feasible to estimate poverty headcounts (and other poverty and inequality measures) at the commune and ward levels, although the confidence intervals around some of these estimates will be large. More regionally specific analysis of the use and combination of additional household-level targeting variables, such as housing characteristics and asset ownership, would also be useful at this time. Nonetheless, it is hoped that this chapter has demonstrated the feasibility and policy relevance of these tools to targeting antipoverty interventions in Vietnam.

Appendix 7A Descriptive Statistics for Variables Used in Regression Analysis

		Rural areas				Urban areas			
Variable	*Description*	*Mean*	*Std dev*	*Minimum*	*Maximum*	*Mean*	*Std dev*	*Minimum*	*Maximum*
lnrpce	Log of per capita expenditure	7.56	0.478	5.879	10.148	8.293	0.602	6.526	10.732
hhsize	Size of household (members)	5.55	1.904	1.000	16.000	5.221	2.196	1.000	19.000
pelderly	Proportion over 60 years (fraction)	0.10	0.187	0.000	1.000	0.117	0.191	0.000	1.000
pchild	Proportion under 15 years (fraction)	0.35	0.214	0.000	0.833	0.244	0.201	0.000	0.750
pfemale	Proportion female (fraction)	0.51	0.173	0.000	1.000	0.526	0.177	0.000	1.000
ethnic	Household head is ethnic minority	0.18	0.384	0.000	1.000	0.010	0.099	0.000	1.000
Iedchd_1	Head has not completed primary school (omitted)	0.39	0.487	0.000	1.000	0.249	0.433	0.000	1.000
Iedchd_2	Head has completed primary school	0.24	0.425	0.000	1.000	0.208	0.406	0.000	1.000
Iedchd_3	Head has completed lower secondary school	0.28	0.448	0.000	1.000	0.256	0.437	0.000	1.000
Iedchd_4	Head has completed upper secondary school	0.04	0.198	0.000	1.000	0.086	0.280	0.000	1.000
Iedchd_5	Head has completed advanced technical degree	0.05	0.214	0.000	1.000	0.114	0.318	0.000	1.000
Iedchd_6	Head has postsecondary education	0.01	0.102	0.000	1.000	0.086	0.281	0.000	1.000
Iedcsp_0	Head does not have a spouse	0.14	0.344	0.000	1.000	0.207	0.405	0.000	1.000
Iedcsp_1	Spouse has not completed primary school (omitted)	0.42	0.493	0.000	1.000	0.218	0.413	0.000	1.000
Iedcsp_2	Spouse has completed primary school	0.18	0.384	0.000	1.000	0.163	0.369	0.000	1.000
Iedcsp_3	Spouse has completed lower secondary school	0.20	0.403	0.000	1.000	0.211	0.408	0.000	1.000
Iedcsp_4	Spouse has completed upper secondary school	0.03	0.173	0.000	1.000	0.056	0.229	0.000	1.000

(table continues on following page)

Appendix 7A (*continued*)

		Rural areas				Urban areas			
Variable	*Description*	*Mean*	*Std dev*	*Minimum*	*Maximum*	*Mean*	*Std dev*	*Minimum*	*Maximum*
Iedcsp_5	Spouse has completed advanced technical degree	0.03	0.163	0.000	1.000	0.090	0.287	0.000	1.000
Iedcsp_6	Spouse has postsecondary education	0.01	0.073	0.000	1.000	0.056	0.230	0.000	1.000
Ioccup_1	Head is a political leader or manager	0.02	0.126	0.000	1.000	0.032	0.176	0.000	1.000
Ioccup_2	Head is a professional or technical worker	0.03	0.163	0.000	1.000	0.100	0.300	0.000	1.000
Ioccup_3	Head is a clerk or service worker	0.05	0.212	0.000	1.000	0.264	0.441	0.000	1.000
Ioccup_4	Head is in agriculture, forestry, or fishing	0.70	0.458	0.000	1.000	0.149	0.356	0.000	1.000
Ioccup_5	Head is a skilled worker	0.07	0.259	0.000	1.000	0.190	0.392	0.000	1.000
Ioccup_6	Head is an unskilled worker	0.06	0.241	0.000	1.000	0.064	0.245	0.000	1.000
Ioccup_7	Head is not working (omitted)	0.07	0.261	0.000	1.000	0.201	0.401	0.000	1.000
Ihouse_1	House made of permanent materials	0.09	0.283	0.000	1.000	0.361	0.480	0.000	1.000
Ihouse_2	House made of semipermanent materials	0.62	0.486	0.000	1.000	0.500	0.500	0.000	1.000
Ihouse_3	House made of temporary materials (omitted)	0.29	0.456	0.000	1.000	0.139	0.346	0.000	1.000
htypla1	Interaction of log(house area) and Ihouse_1	0.34	1.108	0.000	5.537	1.417	1.914	0.000	5.835
htypla2	Interaction of log(house area) and Ihouse_2	2.35	1.876	0.000	5.293	1.832	1.865	0.000	4.973
electric	House has electricity	0.71	0.456	0.000	1.000	0.982	0.133	0.000	1.000

Inwate_1	House uses water from a public or private tap	0.02	0.136	0.000	1.000	0.578	0.494	0.000	1.000
Inwate_2	House uses well water	0.68	0.467	0.000	1.000	0.316	0.465	0.000	1.000
Inwate_3	House uses river or lake water (omitted)	0.30	0.459	0.000	1.000	0.106	0.307	0.000	1.000
Itoile_1	House has flush toilet	0.04	0.188	0.000	1.000	0.615	0.487	0.000	1.000
Itoile_2	House has latrine	0.74	0.439	0.000	1.000	0.257	0.437	0.000	1.000
Itoile_3	House has neither flush toilet nor latrine (omitted)	0.22	0.416	0.000	1.000	0.127	0.333	0.000	1.000
tv	Household has television	0.51	0.500	0.000	1.000	0.822	0.382	0.000	1.000
radio	Household has radio	0.47	0.499	0.000	1.000	0.599	0.490	0.000	1.000
reg7_1	Household in Northern Uplands (omitted)	0.20	0.403	0.000	1.000	0.092	0.290	0.000	1.000
reg7_2	Household in the Red River Delta	0.19	0.391	0.000	1.000	0.224	0.417	0.000	1.000
reg7_3	Household in the North Central Coast	0.16	0.369	0.000	1.000	0.053	0.225	0.000	1.000
reg7_4	Household in the South Central Coast	0.10	0.294	0.000	1.000	0.148	0.355	0.000	1.000
reg7_5	Household in the Central Highlands	0.05	0.212	0.000	1.000	0.000	0.000	0.000	0.000
reg7_6	Household in the Southeast	0.08	0.267	0.000	1.000	0.301	0.459	0.000	1.000
reg7_7	Household in the Mekong River Delta	0.22	0.418	0.000	1.000	0.181	0.385	0.000	1.000

Note: Means and standard deviations are calculated using sampling weights.

Source: 1998 VLSS.

Appendix 7B Determinants of Per Capita Expenditure of Each Stratum

	Hanoi & Ho Chi Minh City		*Other urban areas*		*Northern Uplands*		*Red River Delta*		*North Central Coast*		*South Central Coast*		*Central Highlands*		*Southeast*		*Mekong River Delta*	
N	*619*		*1,111*		*672*		*783*		*600*		*502*		*368*		*514*		*830*	
R-squared	*0.4330*		*0.486*		*0.539*		*0.414*		*0.451*		*0.712*		*0.671*		*0.482*		*0.508*	
Variable	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*	*Coefficient*	*t*
hhsize	−0.0688	−4.4***	−0.0806	−6.7***	−0.0835	−7.9***	−0.0996	−9.7***	−0.0758	−12.2***	−0.0697	−5.4***	−0.0587	−4.9***	−0.0530	−4.0***	−0.0876	−12.8***
pelderly	−0.0408	−0.4	−0.1849	−2.4**	−0.1178	−1.3	−0.1435	−2.0*	−0.1491	−2.4**	−0.0006	0.0	0.0414	0.2	−0.1000	−0.5	0.0208	0.3
pchild	−0.0119	−0.1	−0.2641	−2.9***	−0.3242	−3.7***	−0.4184	−6.6***	−0.3163	−3.3***	−0.2247	−2.7**	−0.2424	−2.2**	−0.1399	−1.3	−0.3240	−5.3***
pfemale	0.0877	0.6	0.0387	0.4	−0.1101	−1.4	−0.0559	−0.7	−0.1993	−2.1*	−0.1449	−1.4	−0.1041	−1.4	0.0521	0.6	−0.2205	−3.3***
ethnic	−0.2614	−1.5	0.0629	0.7	0.0220	0.4	−0.0471	−1.0	−0.0940	−1.5	−0.4229	−5.7***	−0.2360	−2.3**	−0.1268	−1.0	−0.0192	−0.3
Iedchd_2	0.1198	2.1*	0.0454	1.1	0.0394	0.8	0.0972	2.0*	0.0152	0.4	0.0925	2.0*	0.0092	0.2	0.0801	1.8*	−0.0072	−0.3
Iedchd_3	0.1504	2.7**	−0.0265	−0.8	0.0495	1.2	0.1619	3.3***	0.0206	0.5	0.1045	1.7	0.1235	1.7	0.0769	1.0	0.0512	1.4
Iedchd_4	0.0864	0.9	0.1437	2.7**	0.1299	2.3**	0.1628	3.0***	−0.0173	−0.3	0.0397	0.4	0.0989	0.7	0.2199	2.6**	0.1093	1.8*
Iedchd_5	0.1358	2.0*	0.0725	1.2	0.0837	1.6	0.1898	3.6***	0.0932	1.6	0.1071	0.9	0.1929	1.0	0.2753	3.2***	0.1614	1.0
Iedchd_6	0.2101	2.5**	0.1766	3.1***	0.1313	0.9	0.4954	4.2***	0.1436	2.1*	0.4427	1.7	−0.0982	−0.3	0.0057	0.1	0.3651	2.2**
Iedcsp_0	0.0876	1.2	−0.0087	−0.2	0.0232	0.5	0.0083	0.2	−0.0123	−0.2	−0.0034	−0.1	0.0177	0.3	0.0154	0.4	−0.0046	−0.2
Iedcsp_2	0.0996	1.3	0.0764	2.0*	−0.0397	−1.1	−0.0149	−0.4	−0.0170	−0.4	0.0310	0.7	−0.0782	−1.1	0.0839	1.2	0.0299	0.8
Iedcsp_3	0.1423	2.0*	0.0508	1.1	0.0219	0.6	0.0090	0.3	−0.0508	−0.9	0.1720	1.8*	0.0401	0.5	0.1084	1.5	−0.0432	−0.7
Iedcsp_4	0.4751	3.2***	0.0838	1.0	0.0029	0.0	0.0203	0.4	−0.0648	−0.7	0.3033	2.3**	−0.0851	−1.3	0.3571	2.8**	−0.0921	−1.6
Iedcsp_5	0.1802	2.1*	0.0091	0.2	0.1641	3.1***	0.0948	1.3	0.0116	0.1	−0.0565	−0.3	0.1595	1.3	−0.0083	−0.1	−0.0366	−0.1

Iedcsp_6	0.2505	3.0***	0.0353	0.5	0.1188	1.6	0.1520	2.8**	0.3326	1.8*	−0.0609	−0.3			−0.1791	−1.2	−0.1293	−0.6
Ioccup_1	0.1849	1.5	0.2371	2.7**	0.1595	1.2	0.1464	1.7	0.0952	0.7	0.2959	5.1***	0.0083	0.1	0.3054	1.9*	0.0727	0.9
Ioccup_2	−0.0377	−0.5	0.1284	1.9*	0.1408	1.5	0.1393	1.9*	0.0502	0.5	0.1778	1.9*	−0.0281	−0.2	0.0619	0.5	0.2130	2.4**
Ioccup_3	0.0192	0.3	0.0466	1.1	0.0498	0.4	0.2760	3.5***	0.0559	0.5	0.1103	1.1	−0.0879	−0.7	0.1426	1.3	0.0917	1.5
Ioccup_4	−0.1906	−2.8**	0.0012	0.0	−0.0591	−0.8	0.0436	0.8	−0.0687	−1.2	0.0289	0.5	−0.0588	−0.7	−0.0829	−0.8	0.0197	0.5
Ioccup_5	−0.0614	−0.9	0.0736	1.5	0.1772	2.4**	0.0892	1.2	0.1033	0.9	0.0028	0.0	−0.1286	−1.2	−0.0818	−0.7	0.0579	0.7
Ioccup_6	−0.1697	−1.6	−0.1292	−2.3**	0.3607	4.7***	0.0204	0.2	−0.0448	−0.7	0.1239	0.6	−0.2498	−1.7	−0.2348	−2.6**	−0.0832	−1.5
Ihouse_1	−0.8704	−4.3***	−0.9722	−3.5***	−0.0977	−0.2	−1.1440	−7.1***	−1.4392	−1.4	−0.4968	−0.6	0.4357	0.7	−2.7300	−2.3**	−1.6038	−2.2**
Ihouse_2	−0.7219	−3.6***	−0.5709	−3.7***	−0.3355	−1.6	−0.0902	−0.6	−0.2913	−1.3	−0.5064	−2.4**	−0.1755	−0.8	−0.7977	−3.5***	−0.1717	−1.1
htypla1	0.2274	4.7***	0.3095	4.6***	0.0918	0.9	0.3552	8.1***	0.4639	1.6	0.2399	1.1	0.0545	0.4	0.6983	2.4**	0.4052	2.6**
htypla2	0.1850	3.6***	0.1826	4.6***	0.1233	2.2**	0.0669	1.6	0.1126	1.7*	0.1687	2.8**	0.1604	3.2***	0.2531	4.0***	0.0628	1.7
electric	0.6201	3.6***	−0.0019	0.0	0.0217	0.3	0.1918	3.3***	0.0015	0.0	0.0899	1.5	0.1557	1.4	0.1725	4.4***	0.0903	2.4**
Inwate_1	0.1200	1.5	0.1782	3.5***			0.0200	0.2	−0.4072	−5.3***	0.2541	2.9**	−0.1713	−1.0	0.0189	0.1	0.1542	3.2***
Inwate_2	0.0073	0.1	0.0030	0.1	0.0959	1.9*	0.1741	2.3**	−0.1565	−2.8**	0.0254	0.6	0.1120	4.4***	0.0649	2.5**	0.1117	2.8**
Itoile_1	0.2932	3.3***	0.1138	1.7*	0.4844	6.5***	0.3322	3.4***	0.2321	1.3	0.0556	0.8	0.4115	4.1***	0.1856	2.7**	0.3758	4.9***
Itoile_2	0.1079	0.8	−0.0152	−0.3	0.0681	1.7	0.0699	1.0	0.0444	1.3	0.0741	1.9*	−0.0057	−0.1	0.0824	1.3	0.0567	2.0*
tv	0.2363	3.6***	0.2056	4.0***	0.2624	10.4***	0.1907	8.1***	0.2439	5.9***	0.1917	4.3***	0.1115	2.6**	0.2094	4.5***	0.1512	6.8***
radio	0.2558	5.5***	0.1573	4.6***	0.0313	0.9	0.0913	3.5***	0.1533	3.9***	0.0809	2.2**	0.1415	3.1**	0.0537	1.3	0.1492	5.2***
_cons	7.3886	29.8***	8.0018	82.1***	7.6097	75.2***	7.3747	45.1***	8.0240	44.2***	7.6878	69.5***	7.4845	31.5***	7.7554	45.2***	7.9655	105.8***

Note: The dependent variable is log of per capita expenditure.

*Indicates that the coefficient is significant at the 10 percent level, **at the 5 percent level, and ***at the 1 percent level.

Source: Regression analysis of 1998 VLSS.

Appendix 7C Tests of Significance of Groups of Explanatory Variables in Stratum-Level Regression Model

Stratum	*Variables*	*df1*	*df2*	*F statistic*	*Probability*
Hanoi	Education of head of household	5	19	2.65	0.0557*
and	Education of spouse	6	19	3.84	0.0112**
Ho Chi Minh City	Occupation of head	6	19	6.45	0.0008***
	Type of housing	2	19	12.29	0.0004***
	Main source of water	2	19	2.24	0.1340
	Type of sanitary facility	2	19	6.09	0.0090***
Other urban areas	Education of head of household	5	36	3.52	0.0108**
	Education of spouse	6	36	1.41	0.2364
	Occupation of head	6	36	3.74	0.0054***
	Type of housing	2	36	8.88	0.0007***
	Main source of water	2	36	9.24	0.0006***
	Type of sanitary facility	2	36	4.08	0.0252**
Rural Northern	Education of head of household	5	20	1.19	0.3501
Uplands	Education of spouse	6	20	3.05	0.0275**
	Occupation of head	6	20	6.13	0.0009***
	Type of housing	2	20	1.28	0.2986
	Main source of water	2	20	3.55	0.0743*
	Type of sanitary facility	2	20	21.33	0.0000***
Rural Red River	Education of head of household	5	24	5.99	0.0010***
Delta	Education of spouse	6	24	1.85	0.1306
	Occupation of head	6	24	4.54	0.0033***
	Type of housing	2	24	25.39	0.0000***
	Main source of water	2	24	7.78	0.0025***
	Type of sanitary facility	2	24	6.06	0.0074***

Rural Northern Central	Education of head of household	5	18	2.14	0.1071
Coast	Education of spouse	6	18	0.91	0.5103
	Occupation of head	6	18	3.33	0.0219**
	Type of housing	2	18	1.88	0.1811
	Main source of water	2	18	15.26	0.0001***
	Type of sanitary facility	2	18	1.46	0.2577
Rural South Central	Education of head of household	5	15	1.73	0.1882
Coast	Education of spouse	6	15	1.69	0.1909
	Occupation of head	6	15	6.66	0.0014***
	Type of housing	2	15	3.48	0.0572*
	Main source of water	2	15	4.59	0.0278**
	Type of sanitary facility	2	15	1.89	0.1855
Rural Central	Education of head of household	5	11	2.42	0.1031
Highlands	Education of spouse	6	11	6.79	0.0040***
	Occupation of head	6	11	1.23	0.3623
	Type of housing	2	11	0.67	0.5310
	Main source of water	2	11	10.68	0.0026***
	Type of sanitary facility	2	11	21.98	0.0001***
Rural	Education of head of household	5	16	3.32	0.0302**
Southeast	Education of spouse	6	16	1.7	0.1848
	Occupation of head	6	16	5.35	0.0034***
	Type of housing	2	16	11.81	0.0007***
	Main source of water	2	16	3.07	0.0746*
	Type of sanitary facility	2	16	3.59	0.0514*
Rural	Education of head of household	5	25	1.95	0.1208
Mekong	Education of spouse	6	25	1.20	0.3374
River	Occupation of head	6	25	7.59	0.0001***
Delta	Type of housing	2	25	2.85	0.0767*
	Main source of water	2	25	6.37	0.0058***
	Type of sanitary facility	2	25	12.80	0.0001***

Note: The dependent variable is log of per capita expenditure.

*Coefficient is significant at the 10 percent level, **at the 5 percent level, and ***at the 1 percent level.

Source: Regression analysis of per capita expenditure using 1998 VLSS.

Appendix 7D Poverty Headcounts Estimated with Stratum-Level Regression

			Poverty headcount			*Standard errors*		
	Province code	*Region*	*Rural*	*Urban*	*Total*	*Rural*	*Urban*	*Total*
1	Lai Chau	NU	0.853	0.150	0.765	0.037	0.022	0.033
2	Ha Giang	NU	0.763	0.130	0.709	0.042	0.020	0.039
3	Son La	NU	0.785	0.103	0.699	0.042	0.016	0.037
4	Cao Bang	NU	0.732	0.094	0.664	0.040	0.020	0.036
5	Lao Cai	NU	0.760	0.140	0.653	0.042	0.018	0.035
6	Lang Son	NU	0.728	0.090	0.611	0.041	0.020	0.034
7	Bac Kan	NU	0.673	0.121	0.597	0.045	0.022	0.039
8	Hoa Binh	NU	0.659	0.120	0.585	0.049	0.019	0.042
9	Tuyen Quang	NU	0.638	0.115	0.581	0.051	0.016	0.045
10	Yen Bai	NU	0.661	0.114	0.554	0.047	0.017	0.038
11	Kon Tum	CH	0.689	0.217	0.533	0.062	0.029	0.043
12	Gia Lai	CH	0.642	0.193	0.532	0.060	0.025	0.046
13	Bac Giang	NU	0.561	0.121	0.530	0.060	0.018	0.055
14	Vinh Phuc	NU	0.533	0.140	0.493	0.062	0.021	0.055
15	Ninh Thuan	SE	0.561	0.208	0.480	0.045	0.028	0.035
16	Quang Tri	NCC	0.562	0.160	0.470	0.034	0.021	0.027
17	Nghe An	NCC	0.509	0.112	0.469	0.048	0.017	0.043
18	Phu Tho	NU	0.532	0.092	0.469	0.059	0.015	0.050
19	Thai Nguyen	NU	0.542	0.092	0.450	0.058	0.014	0.046
20	Ha Tinh	NCC	0.471	0.122	0.440	0.047	0.018	0.043
21	Thanh Hoa	NCC	0.467	0.112	0.435	0.043	0.017	0.039
22	Thua Thien-Hue	NCC	0.536	0.150	0.431	0.038	0.021	0.028
23	Ha Tay	RRD	0.456	0.111	0.430	0.036	0.017	0.033
24	Bac Ninh	NU	0.460	0.117	0.429	0.061	0.018	0.055
25	Quang Ngai	SCC	0.460	0.155	0.427	0.041	0.023	0.036

26	Quang Binh	NCC	0.462	0.105	0.425	0.049	0.017	0.044
27	Ninh Binh	RRD	0.453	0.095	0.408	0.036	0.015	0.031
28	An Giang	MRD	0.452	0.208	0.406	0.038	0.025	0.031
29	Ha Nam	RRD	0.421	0.120	0.403	0.035	0.018	0.033
30	Hung Yen	RRD	0.424	0.142	0.401	0.033	0.022	0.031
31	Soc Trang	MRD	0.423	0.250	0.392	0.041	0.030	0.034
32	Dong Thap	MRD	0.419	0.205	0.389	0.038	0.026	0.033
33	Dac Lac	CH	0.439	0.184	0.387	0.061	0.025	0.049
34	Tra Vinh	MRD	0.414	0.200	0.386	0.039	0.023	0.034
35	Kien Giang	MRD	0.421	0.220	0.377	0.037	0.025	0.030
36	Bac Lieu	MRD	0.422	0.221	0.374	0.036	0.027	0.028
37	Nam Dinh	RRD	0.411	0.102	0.373	0.036	0.016	0.032
38	Binh Thuan	SE	0.412	0.232	0.369	0.038	0.030	0.030
39	Phu Yen	SCC	0.410	0.192	0.368	0.042	0.027	0.034
40	Quang Nam	SCC	0.382	0.190	0.355	0.038	0.025	0.032
41	Thai Binh	RRD	0.370	0.073	0.353	0.038	0.015	0.035
42	Can Tho	MRD	0.399	0.171	0.350	0.036	0.025	0.028
43	Quang Ninh	NU	0.540	0.107	0.348	0.054	0.015	0.031
44	Ca Mau	MRD	0.387	0.167	0.347	0.035	0.023	0.029
45	Hai Duong	RRD	0.382	0.096	0.343	0.036	0.016	0.031
46	Lam Dong	SE	0.454	0.153	0.338	0.051	0.020	0.032
47	Binh Dinh	SCC	0.385	0.183	0.336	0.032	0.025	0.025
48	Vinh Long	MRD	0.360	0.162	0.332	0.035	0.024	0.030
49	Ben Tre	MRD	0.339	0.152	0.323	0.036	0.021	0.033
50	Hai Phong	RRD	0.412	0.073	0.297	0.032	0.015	0.022
51	Long An	MRD	0.321	0.166	0.296	0.038	0.021	0.032
52	Khanh Hoa	SCC	0.375	0.130	0.286	0.038	0.019	0.025
53	Tien Giang	MRD	0.283	0.123	0.263	0.037	0.018	0.033
54	Binh Phuoc	SE	0.245	0.177	0.235	0.040	0.024	0.035

(table continues on following page)

Appendix 7D (*continued*)

			Poverty headcount			*Standard errors*		
	Province code	*Region*	*Rural*	*Urban*	*Total*	*Rural*	*Urban*	*Total*
55	Tay Ninh	SE	0.156	0.177	0.159	0.021	0.025	0.018
56	Da Nang	SCC	0.290	0.115	0.151	0.033	0.019	0.017
57	Ha Noi	RRD	0.331	0.014	0.149	0.032	0.005	0.014
58	Dong Nai	SE	0.155	0.122	0.145	0.022	0.020	0.017
59	Ba Ria-Vung Tau	SE	0.122	0.139	0.129	0.017	0.020	0.013
60	Binh Duong	SE	0.116	0.123	0.118	0.016	0.019	0.013
61	TP Ho Chi Minh	SE	0.096	0.038	0.048	0.022	0.012	0.011
	Total		0.441	0.110	0.365	0.010	0.002	0.011

Note: A poverty headcount of 0.430 for Ha Tay implies that 43 percent of the population in Ha Tay lives in households with per capita expenditures below the 1998 GSO/WB poverty line.

The region codes are NU = Northern Uplands, RRD = Red River Delta, NCC = North Central Coast, SCC = South Central Coast, CH = Central Highlands, SE = Southeast, and MRD = Mekong River Delta.

Source: Estimated from 1998 VLSS and 3 percent sample of 1999 Population and Housing Census.

Notes

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1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. The poverty headcount is defined as the proportion of the population with per capita expenditures below the poverty line.

3. Minot and Baulch (2002) show that using aggregated census data underestimates the incidence of poverty when it is below 50 percent and overestimates it when it is above 50 percent. The absolute size of the error, however, can be as low as 2 to 3 percentage points in some circumstances.

4. In 1998, the food poverty line was D (dong) 1,286,833 and the overall poverty line was D 1,789,871 per person a year. See annex 2 of Poverty Working Group (1999) for further details concerning the estimation of these poverty lines.

5. Between 1997 and 2000, MOLISA's area-specific poverty lines were D 45,000 per capita per month for rural mountainous regions and islands, D 70,000 for rural midland and delta regions, and D 90,000 for urban areas. Note that these poverty lines were developed for monthly rice equivalent income and cannot be applied to the income data collected by the VLSS.

6. This is accomplished with the "svymean" command. Stata calculates a linear approximation (a first-order Taylor expansion) of the sampling error variance based on information on the strata, the primary sampling unit, and the weighting factors. See Stata Corporation (2001b) for more information.

7. A coefficient of –0.772 implies that a one-unit increase in the explanatory variable is associated with a 7.4 percent reduction in per capita expenditure, because (exp–0.772) = 0.926 = 1–7.4 percent. However, for two reasons, care must be taken before inferring that larger households are worse off than smaller ones. First, there may be economies of scale in household size, so that larger households do not need the same per capita expenditures as smaller households to reach an equivalent level of welfare. Second, the measure of welfare used here does not take into account household composition, so if larger households have more children than smaller households, they might still have equivalent levels of expenditure per adult equivalent.

8. In common with other studies of ethnic minority issues using the VLSS, the Hoa (Chinese) are grouped with the Kinh (ethnic Vietnamese) households.

9. This study also experimented with using the number of years of education for the head of household and spouse as explanatory variables, but found that the level of education completed gave better results.

10. Education of the spouse may have other benefits, such as improved health or nutrition, that are not captured by the measure of welfare used in this analysis, per capita expenditure. Note that 11.4 percent of spouses in the VLSS are male.

11. Although information on the employer of household heads is available in both the census and the VLSS, the categories they use to describe different categories

of employers differ substantially and cannot be reconciled. For this reason, a set of dummies for employer of the household head was not included in the predictive regressions.

12. Because the permanent housing dummy enters both as a separate variable (*Ihouse*_1) and in the interaction term *htypla1* (=*Ihouse*_1 × ln(*area*)), the marginal effect is calculated as $\beta_{Ihouse\_1} + \beta_{htypla1} \times \ln(area)$. The marginal effect is evaluated at the mean values of ln(*area*), which are 3.72 in rural areas and 3.66 in urban areas.

13. The census did not collect information on the area of houses made of temporary materials, so housing area cannot be used to help predict expenditures for these households.

14. More specifically, this variable refers to whether the household said that electricity was the main source of lighting for the house.

15. There are three factors that complicate using the VLSS for estimating provincial poverty. First, three provinces are not included in the VLSS sample. Second, in the remaining provinces, the sample size is small: most provinces have fewer than 100 households, and some have as few as 32. Third, the sample (and hence the sampling weights) is not designed to produce precise estimates at the provincial level. For example, the proportion of urban households in each province is not accurate, even after applying sampling weights.

16. A 6 percentage point gap refers to a gap greater than 5.5 percent and less than or equal to 6.5 percent.

17. Because the geographic areas in which Programs 133 and 135 operate are reasonably distinct, we have combined them into one list of "poor and remote communes" for our analysis of the potential of targeting. This list was then matched to commune information in the VLSS to identify households living in areas identified as poor by MOLISA or the Committee for Ethnic Minorities in Mountainous Areas.

18. Note that this is the poverty estimate from applying MOLISA's poverty lines (see endnote 5) to household rice equivalent income, and it is not directly comparable with the estimates of the poverty headcount in this chapter.

19. See Conway (2001) for a careful account of the often highly variable way in which this exercise is implemented at the commune level.

20. ROC curves can be linked to the occurrence of Type I and Type II errors familiar from conventional statistical hypothesis testing (known as "false positives" and "false negatives" in epidemiology and medicine and as *F* and *E* errors in the targeting literature). Sensitivity is one minus the probability of a Type I error (incorrectly classifying a poor household as nonpoor), and one minus the specificity of a test is the same as the probability of a Type II error (incorrectly classifying a nonpoor household as poor). In many respects, this is akin to describing whether a glass is half empty or half full, in that both are simply different methods of presenting the same data.

21. This is rather similar to the problems encountered in making unambiguous comparisons of inequality when the Lorenz curves cross or in making comparisons of inequality when cumulative income distribution curves cross.

22. Ownership of the dwelling in which a household lives was considered for inclusion in the list of asset-based targeting variables, but it was found to perform poorly because the vast majority of households in the 1998 VLSS sample (5,703 out of 5,999) own their own dwellings.

23. It may seem surprising that in a country with Vietnam's level of per capita income, radio and television ownership has such potential for targeting the poor. Radio and television ownership is, however, quite widespread throughout

Vietnam—with 53 percent of households owning a television and 45 percent of households owning a radio, according to the 1999 Population and Housing Census. Many of the televisions owned, especially in rural areas, are relatively inexpensive 14-inch, battery-operated televisions produced in China.

24. See Baulch (2002) for further details.

25. The need for updated census data is greatest if changes in poverty are principally associated with changes in household characteristics. The need for new household survey data is greatest if poverty changes are linked to changes in the coefficients of the expenditure regressions. Further research is needed into the relative importance of these two factors.

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8

Ethnic Minority Development in Vietnam: A Socioeconomic Perspective

Bob Baulch, Truong Thi Kim Chuyen, Dominique Haughton, and Jonathan Haughton

Vietnam is an ethnically diverse society. The Kinh (ethnic Vietnamese) majority, which accounts for 84 percent of the population, coexists with 53 smaller ethnic minority groups, some of which have fewer than 1,000 members (Dang, Son, and Hung 2000). Previous research using the Vietnam Living Standards Surveys (VLSSs), in which the Kinh are usually grouped together with the Hoa (Chinese), has shown that the remaining 52 ethnic minorities constitute the poorest, least educated sections of Vietnamese society (Vietnam Poverty Working Group 1999).[1] Furthermore, the gap in living standards between the Kinh and Hoa majority and the other ethnic minorities grew between 1992–93 and 1997–98 (the years when the closely comparable VLSSs were undertaken).[2] Geography, in particular the fact that many ethnic minorities live in remote and mountainous areas, explains only a part of the difference in living standards between these two groups. There are systematic differences in endowments and the returns to those endowments for members of the Kinh-Hoa majority and the ethnic minorities, most of which are in favor of the majority group (van de Walle and Gunewardena 2001). These and other more detailed qualitative studies (see in particular Huy and Dai [1999]; Jamieson, Cuc, and Rambo [1998]; and Winrock International [1996]) have led to an emerging consensus among donors and nongovernmental organizations (NGOs) that a new, more differentiated approach to ethnic minority policy is required in Vietnam.

This chapter seeks to contribute to this debate by examining and decomposing the latest quantitative evidence on disparities in living standards between and among the different ethnic groups in Vietnam. We first use a range of socioeconomic variables to examine the differences in living standards between the Kinh-Hoa majority and the other ethnic minorities, and how these changed between 1993 and 1998. This is followed by a more detailed examination, employing data from both the VLSSs and the 1999 Population and Housing Census, of socioeconomic differences among minority groups. A more nuanced picture starts to emerge, in which the ethnic groups that have done best are shown to be those that have assimilated most with Kinh society and the less assimilated groups (particularly those in the Central Highlands and the Hmong in the Northern Uplands) have been left behind.[3]

After a brief examination of government policy toward ethnic minorities, we turn to a more detailed explanation of why many ethnic minority households are so poor. Distinguishing between endowments (comprising both physical and human capital) and returns to those endowments, we separate the effects of each of these using the VLSS data. Expenditure regressions are estimated and decomposed, which show that even if ethnic minority households had the same endowments as the Kinh and Hoa, this would close no more than one-third of the gap in their living standards. Such diversity in the socioeconomic development experiences of the different ethnic minority groups indicates the need for a similar diversity in the policy interventions designed to assist them.

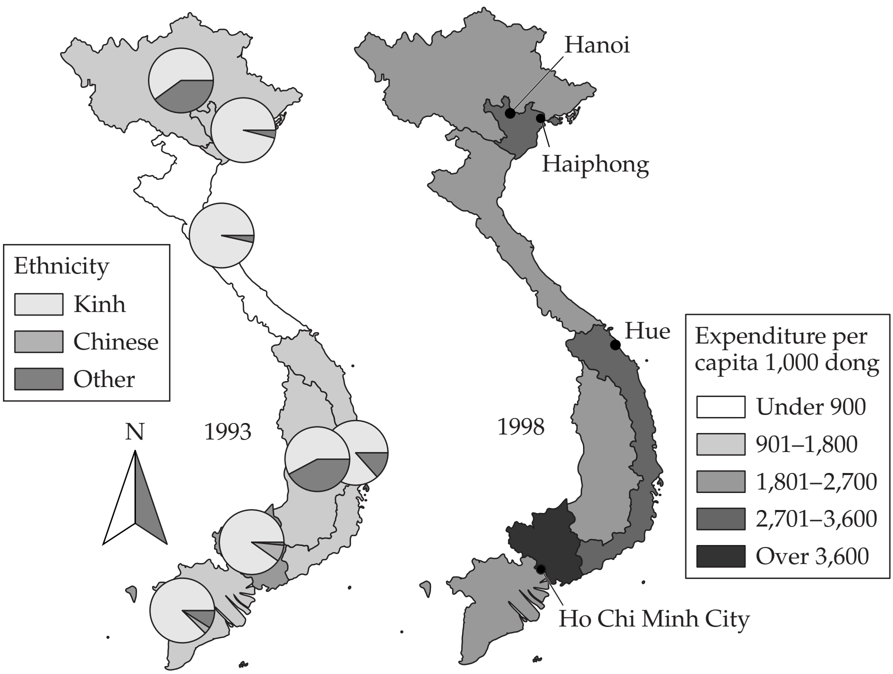
The Majority-Minority Gap in Living Standards

The clearest evidence of the gap in living standards between the Kinh-Hoa majority and the ethnic minorities comes from the VLSSs of 1993 and 1998. The 1993 survey covered 4,234 Kinh and Hoa households and 566 ethnic minority households; the sample sizes for the 1998 survey were 5,151 and 848 households, respectively. As can be seen from map 8.1, with the exception of the Chinese (Hoa), the ethnic minorities are concentrated in the more remote regions of Vietnam, especially the Northern Uplands and Central Highlands.

Where 54 percent of Kinh-Hoa had expenditures below the General Statistical Office (GSO)–World Bank poverty line in 1993, this proportion had dropped to 31 percent by 1998. During the same period, the poverty headcount among the remaining minorities fell from 86 percent to 75 percent. So despite constituting just 14 percent of the total population, ethnic minorities now make up 29 percent of all the poor in Vietnam (Vietnam Poverty Working Group 1999). Provincial-level poverty maps constructed by merging data from the 1998 VLSS with the 1999 Census show that there are 14 provinces with rural poverty headcounts of more than 60 percent (Minot and Baulch 2004). Of these 14 provinces, 12 have populations in which ethnic minorities make up more than half of the total.

A number of socioeconomic indicators related to the household are gathered together in table 8.1, which is based on the data from the 1993 and 1998 VLSSs. For 1993, the summary measures in table 8.1 are based on the full sample of 4,800 households. For 1998, data are presented for both the full sample of 5,999 households living in 194 communes and a subsample of 48 ethnically mixed communes.[4] This subsample can be used to examine

Map 8.1. Ethnicity and Expenditures



Sources: 1993 and 1998 VLSSs.

whether the living standards of ethnic minority households are worse than those of their Kinh and Hoa neighbors and so provides a crude way to control for the otherwise pervasive effects of geography. To test whether the values of each of these variables are the same for majority and minority households, we have computed *p* values based on *t* tests (for continuous variables) and chi-squared tests (for binary variables); these are displayed in the "Test" columns. The data for 1998 have been weighted to correct for the sampling design of the second VLSS (in which different households have different probabilities of being enumerated).

Table 8.1 shows that, with an annual per capita expenditure that averaged D (dong) 1.54 million (US$125) in 1998, minority households were far poorer than their Kinh and Hoa counterparts (D 3.0 million).[5] Although spending by the majority groups rose by 38 percent in real terms between 1993 and 1998, the increase for minority households was much smaller, at 18 percent. The lower living standards of minority households are partly due to the fact that they tend to be larger than Kinh households (5.4 versus 4.6 members in 1998) and are more likely to include young children (15 percent versus 10 percent); they are also more likely to span three generations (27 percent versus 18 percent). The fertility rate for minority women is about 25 percent higher than for Kinh and Hoa women (Desai 2000). Ethnic

Table 8.1. Characteristics of Majority and Minority Households, 1993 and 1998

	1993		*1998*					
	Full sample		*Full sample*			*Mixed communes only*[a]		
Indicator	*Kinh-Hoa*	*Minorities*	*Kinh-Hoa*	*Minorities*	*Test*	*Kinh-Hoa*	*Minorities*	*Test*
Sample size (weighted)	4,234	565	5,261	738		931	575	
Annual expenditure per capita (thousand dong, January 1998 prices)	2,142	1,299	2,952	1,536	0.00	2,742	1,604	0.00
Household size	4.89	5.52	4.61	5.41	0.00	4.71	5.37	0.00
Proportion of household that is								
Ages 0 to 6	0.16	0.20	0.10	0.15	0.00	0.11	0.14	0.01
Ages 7 to 16	0.22	0.23	0.23	0.27	0.00	0.24	0.27	0.05
Male, over age 16	0.28	0.27	0.30	0.28	0.00	0.29	0.28	0.06
Female, over age 16	0.35	0.30	0.37	0.31	0.00	0.36	0.31	0.00
Proportion of households consisting of								
One or two adults	0.07	0.03	0.10	0.04	0.00	0.10	0.04	0.00
Parent(s) and one child	0.15	0.12	0.14	0.07	0.00	0.11	0.07	0.02
Parent(s) and two children	0.21	0.15	0.24	0.18	0.01	0.25	0.19	0.04
Parent(s) and three or more children	0.38	0.44	0.33	0.41	0.00	0.35	0.41	0.15
Three-generation household	0.17	0.23	0.18	0.27	0.00	0.17	0.27	0.00
Other	0.02	0.03	0.02	0.02	0.78	0.02	0.02	0.68
Age of head of household, years	45.8	42.1	48.3	44.2	0.00	46.8	44.0	0.00
Proportion of female-headed households	0.28	0.16	0.28	0.17	0.00	0.26	0.17	0.01
Proportion of households interviewed in Vietnamese	1.00	0.47	1.00	0.79	0.00	1.00	0.89	0.00
Proportion of households in urban areas	0.22	0.04	0.27	0.02	0.00	0.25	0.02	0.00

a. Based on subsample that includes only those communes where Kinh-Hoa and minority households are present.
Sources: 1993 and 1998 VLSSs.

minority households are also less likely to be able to speak Vietnamese and are much less likely to live in urban areas (2 percent versus 27 percent).

Ethnic minority households are less served by the health system (Desai 2000). Just 47 percent of ethnic minority mothers in the 1998 VLSS sample sought prenatal care, compared with 70 percent for Kinh mothers. Furthermore only 30 percent of ethnic minority births were assisted by a physician or nurse-midwife, compared with 81 percent for the Kinh. Similarly, 75 percent of ethnic minority parents consulted a health care provider when a child (that is, ages 5–60 months) was sick, compared with 88 percent for Kinh households. Roughly 50 percent of minority children of ages one year or older have received the four main vaccinations, compared with about 60 percent for Kinh children.[6]

However, it is important not to overemphasize the contrasts, because an outside observer is more likely to be struck by the similarities between the sociodemographic characteristics of the two groups. For instance, Desai (2000) shows that contraceptive usage rates are broadly similar across ethnic groups: 55 percent of married women in ethnic minorities who were ages 15 to 44 reported that they use a modern method of contraception, compared to 59 percent among Kinh women and 35 percent among Chinese women.

Although the expenditure level of minority households is much lower than that of Kinh-Hoa households, the mean consumption of calories is only slightly lower (2,068 calories per day per capita for minorities versus 2,115 for Kinh). If adult equivalents are used, the difference (2,681 versus 2,695 calories) is negligible (Desai 2000, table 3.6). This helps explain the otherwise surprising finding that the mean body mass index of minority men is the same as that for Kinh men (19.9) and only slightly lower for minority women (19.6) than Kinh women (20.1). Indeed, Desai (2000, table 6.2) finds that a smaller proportion of minority men are severely malnourished (3.6 percent) than Kinh men (6.3 percent), although the gap is less evident for women (8.0 percent for minorities versus 9.4 percent for Kinh). Nonetheless, it remains the case that the children of ethnic minorities are more likely to be stunted, a measure of long-term malnutrition (Haughton and Haughton 1999).

In short, by Vietnamese standards, ethnic minority households look significantly different from Kinh-Hoa households. However, both fit groups broadly within Vietnamese norms, and both groups have experienced similar trends in living standards: rising expenditures, falling fertility and household size, and comparable levels of malnutrition.

Differences among Minority Groups

Expenditures

Not all ethnic minority groups are equally disadvantaged. This is an important point, because if ethnicity is used to help target government interventions such as food subsidies or scholarships, then there will be less wastage if the relevant targets can be identified more precisely. The practical problem here is that the VLSSs did not sample enough ethnic minority households to allow for much disaggregation; moreover, the 1993 VLSS codes allowed for only 10 different ethnic groupings rather than the standard official list of 54 distinct groups. The VLSS questionnaires also collected information only on the ethnicity of the head of the household. This does not allow analysis of, for instance, minority issues at the individual (as distinct from household) level or exploration of the extent of intermarriage between ethnic groups.

The best that one can do with the VLSS data under these circumstances is to separate households into a few relatively homogeneous categories based on the ethnicity of the head. We distinguish three of the main ethnic groups (Kinh, Hoa, and Khmer), together with a composite category for ethnic minorities that traditionally live in the Central Highlands and another for those that originate in the Northern Uplands. The relevant details are summarized in table 8.2, along with a listing of ethnic groups by composite category.

This disaggregation, crude as it may be, is helpful. The data in table 8.2 show clearly that the poorest group consists of the Central Highlands minorities. Their expenditure per capita was D 1.02 million in 1993, barely

Table 8.2. Key Indicators for Major Minority Groups, 1993 and 1998

	Poverty headcount (percent of people)		*Expenditure per capita (thousand dong, 1998 prices)*		*Household size*		*Sample size (weighted)*[a]		*Percent*
Ethnic group	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*of pop.*
Vietnam overall	55	36	2,043	2,751	4.97	4.71	4,799	5,999	
Kinh	52	30	2,105	2,899	4.86	4.60	4,145	5,030	83.9
Hoa (Chinese)	11	8	3,843	5,119	6.55	5.18	89	121	2.0
Khmer	70	57	1,521	1,882	5.44	5.33	89	122	2.0
Central Highlands minorities[b]	92	91	1,021	1,090	6.28	5.79	103	167	2.8
Northern Uplands minorities[c]	84	73	1,323	1,594	5.33	5.31	373	560	9.3

Note: One hundred thirty-two households coded as belonging to "Other" ethnic minorities in the 1993 VLSS and 39 households belonging to the "other" category in the 1998 VLSS have been subdivided between the last two groups in this table using the regional and religion variables. Details are available from the authors on request. The categories may not be strictly comparable between 1993 and 1998.

a. Unweighted sample size: Kinh, 5,172. Hoa, 131. Khmer, 95. Central Highland minorities, 193. Northern Uplands minorities, 411.

b. Central Highlands minorities: Ba-Na, Co-Ho, E-De, Gie-Tieng, Hre, Ma, Ra Glai, Xo-Dang.

c. Northern Uplands minorities: Dao, Hmong, Muong, Nung, Tay, Thai, San Diu, Dan Chay, Tho.

Sources: 1993 and 1998 VLSSs.

rising to D 1.09 million by 1998; this stagnation meant that the Central Highlands minorities saw their relative position fall, with an expenditure level that was half the national average in 1993 but little more than one-third of the national average by 1998. The poverty headcount for this group went from 92 percent in 1993 to 91 percent in 1998. This group missed the economic boom of the 1990s; thus, it is not surprising that dissatisfaction, which was also related to land and religious conflicts, bubbled over into the significant demonstrations by ethnic people in several places in the Central Highlands in February 2001 (Economist Intelligence Unit 2001).

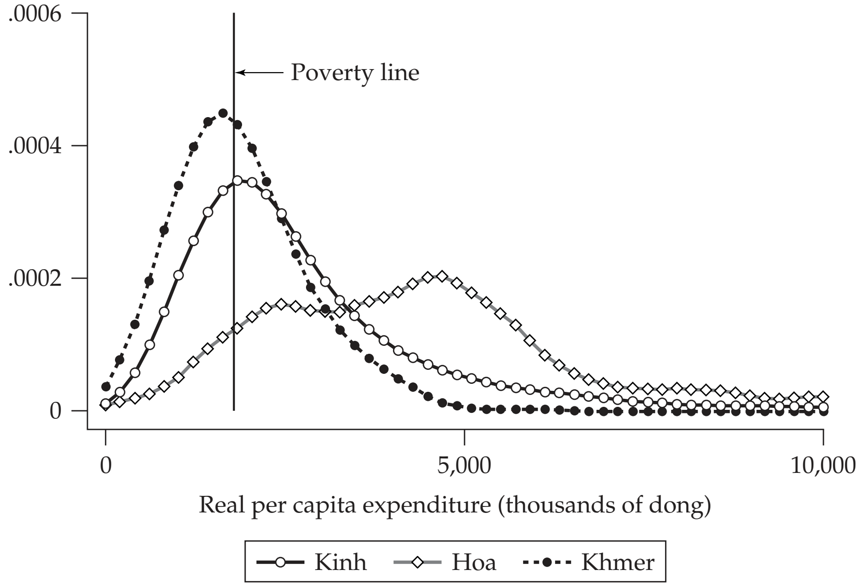
It is possible to get a more complete picture of the distribution of per capita expenditures by ethnic category from the kernel densities shown in figure 8.1. These may be thought of as histograms that have been smoothed to iron out minor irregularities in the data (Deaton 1997; Stata Corporation 1999) and draw the eye to the essential features of the distributions. In figure 8.1a, the kernel densities for the Kinh, Hoa, and Khmer are shown. The density for the Hoa stands out: its peak is far to the right of the other distributions, and there is a wider variation in per capita expenditures than the other four categories. The slightly bimodal distribution is due to the heavy, if partial, concentration of Hoa households in large urban areas, particularly in the Southeast. In contrast, the distribution of expenditures for Khmer households, which live primarily in the Mekong Delta, has a peak just below the GSO–World Bank poverty line, and most of the observations are highly concentrated in that vicinity. This indicates that as long as those regions continue to benefit from general economic growth, a large proportion of the Khmer should move out of poverty in the next five years or so.

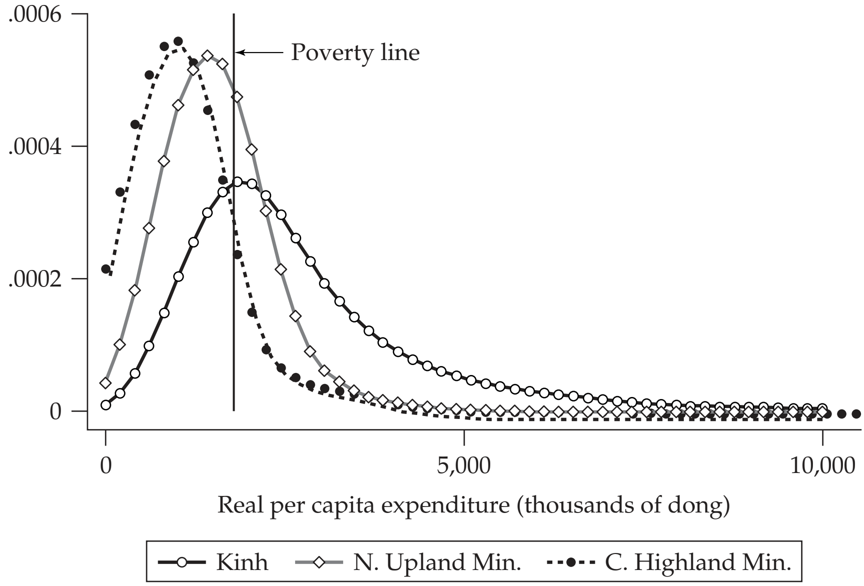
Figure 8.1b shows the kernel densities for the Central Highlands and Northern Uplands minorities, with that for the Kinh included for comparison purposes. The distributions of expenditures for Northern Uplands minorities, and especially for Central Highlands minorities, are even more highly concentrated than for the Khmer. The mode of the density for the Northern Uplands minorities is, however, relatively close to the poverty line, indicating that they are also likely to benefit from equitable economic growth. In contrast, the Central Highlands minorities are considerably poorer in expenditure terms than the other four categories, as both their density in figure 8.1b and the poverty headcounts in table 8.2 confirm. Exceptionally rapid growth, or other special measures, or both will therefore be needed if poverty is to be reduced significantly among the ethnic minorities indigenous to the Central Highlands.

Schooling

Although a finer breakdown by ethnic group is not possible using VLSS data, one can get greater precision using the 3 percent enumeration sample of the 1999 Population and Housing Census. Although the census data do not provide information on incomes or expenditure, they do allow one to construct gross and net school enrollment rates for the 12 ethnic groups for which there

Figures 8.1. Kernel Densities of Per Capita Expenditure for 1998





are at least 1,000 observations in the enumeration sample. School enrollment rates are usually highly correlated with income and may therefore be used as an approximate indication of the standard of living in a community.

Table 8.3 shows primary school enrollment rates by sex for each of the 12 ethnic groups with more than 1,000 children of primary school age

Table 8.3. Primary School Enrollment Rates by Ethnic Group and Sex, 1999

Ethnic group	*Gross (percent)*	*Net (percent)*	*Net (percentage of boys)*	*Net (percentage of girls)*	*Sample size*
Kinh	113.6	93.4	93.5	93.4	229,503
Hoa	122.6	93.7	94.5	92.9	2,361
Khmer	114.5	76.3	77.3	75.3	3,879
Central Highlands					
Gia-rai	126.3	66.4	67.6	65.1	1,695
Ba-na	108.9	57.8	55.0	60.4	1,335
Xo-dang	139.3	62.2	64.7	59.3	1,233
Northern Uplands					
Tay	135.4	94.7	94.9	94.4	11,079
Thai	135.5	83.9	87.2	80.5	5,004
Muong	133.4	94.5	94.9	94.0	3,851
Nung	136.6	89.3	89.7	88.9	5,010
Hmong	80.5	41.5	51.5	31.5	4,090
Dao	126.4	71.4	73.7	68.8	4,091
All Vietnam	115.4	91.4	91.7	91.0	280,262

Note: To be consistent with Vietnamese school enrollment procedures, these enrollment rates have been computed using calendar year of birth as stated in the census files to determine whether or not a child is of primary or lower secondary age. The net enrollment rate can fall by several percentage points if the child's actual age (for example, 6 to 10 years old for primary school) is used. Gross enrollment rate is total enrollment in level X per number of children eligible to attend level X. Net enrollment rate is total enrollment in level X of children eligible to attend level X per number of children of age eligible to attend level X.

Source: Based on the 3 percent enumeration sample of the 1999 Census.

included in the census 3 percent sample. By the standards of comparably poor countries, the primary school net enrollment rates (NERs) in Vietnam are quite high (91 percent).[7] However, primary NERs are below 70 percent for five ethnic groups: the Ba-na, Gia-rai, and Xo-dang in the Central Highlands and the Dao and the Hmong in the Northern Uplands, as table 8.3 shows. In addition to poverty and remoteness, one of the factors discouraging ethnic minority children in these groups from attending primary school is lack of instruction in ethnic minority languages (especially in the lowest grades).[8]

On average, primary school enrollments are relatively balanced between the sexes, with an overall primary NER of 91.7 percent for boys and 91.0 percent for girls. Again, this blurs differences at the level of individual ethnic minorities: for all groups except the Ba-na, primary NERs are slightly lower for girls than for boys, although in most cases the difference in the NER is small and not statistically significant. Three exceptions to this rule stand out: girls' primary NERs substantially lag those for boys among three ethnic groups in the Northern Uplands: the Dao (−4.9 percent), the Thai (−6.7 percent), and, in particular, the Hmong (−20.0 percent).

Table 8.3 also shows that primary school *gross* enrollment rates (that is, the number of pupils enrolled in primary school divided by the number of children eligible to attend primary school) are in some cases very high indeed. The implication is that a substantial proportion of Vietnamese children are starting primary school late and are repeating grades frequently—this is especially true of most ethnic minority children.

Table 8.4 summarizes lower secondary school enrollment rates by ethnicity and sex.[9] As expected, both gross and net lower secondary school enrollment rates are much lower than primary school enrollment rates. For Vietnam overall (in 1999), the net enrollment rate falls from 91 percent for primary school to 60 percent for lower secondary school. At the lower secondary level, there is a clear gap between the Kinh (65 percent) and all other groups (52 percent or less). Five ethnic groups—the Gia-rai, Ba-na, and Xo-dang in the Central Highlands and the Hmong and Dao in the north—have NERs at the lower secondary level of less than 20 percent, with that for the Hmong just under 5 percent. Overall, the lower secondary NER is essentially the same for boys and girls, but this hides some variation by ethnic group: among the Hmong and Xo-dang girls, lower secondary NERs are at

Table 8.4. Lower Secondary School Enrollment Rates by Ethnic Group and Sex, 1999

Ethnic group	*Gross (percent)*	*Net (percent)*	*Net (percentage of boys)*	*Net (percentage of girls)*	*Sample size*
Kinh	80.6	64.8	65.5	64.0	185,772
Hoa	71.0	51.7	50.4	53.1	1,989
Khmer	35.9	22.5	23.8	21.2	3,041
Central Highlands					
Gia-rai	37.1	14.9	15.2	14.5	1,354
Ba-na	20.0	8.9	9.0	8.9	1,024
Xo-dang	35.2	10.1	12.7	7.1	1,071
Northern Uplands					
Tay	77.0	51.0	47.1	55.2	9,082
Thai	55.2	32.1	33.6	30.5	4,402
Muong	76.7	52.3	50.8	53.9	3,265
Nung	61.8	39.2	37.0	41.6	4,055
Hmong	9.8	4.5	7.5	1.6	3,092
Dao	20.3	11.8	11.9	11.8	3,026
All Vietnam	76.2	60.0	60.5	59.3	226,649

Note: To be consistent with Vietnamese school enrollment procedures, these enrollment rates have been computed using calendar year of birth as stated in the census files to determine whether or not a child is of primary or lower secondary age. The net enrollment rate can fall by several percentage points if the child's actual age (for example, 6 to 10 years old for primary school) is used. Gross enrollment rate is total enrollment in level X per number of children eligible to attend level X. Net enrollment rate is total enrollment in level X of children eligible to attend level X per number of children of age eligible to attend level X. Total sample size for All Vietnam also includes ethnic groups not listed in the table.

Source: Based on the 3 percent enumeration sample of the 1999 Census.

least 5 percent lower than for boys, and for the Tay and Nung the female enrollment rates are at least 5 percent higher than for boys.

These findings on enrollment rates allow us to start to explore the extent to which different ethnic minorities are assimilated with the Kinh majority. If ethnic groups are classified according to the extent to which their school enrollment rates are similar to those of the Kinh, one might reasonably argue that the Hoa, Tay, Muong, Nung, and perhaps Thai are assimilating relatively fast, and the other minorities (the Dao and Hmong in the Northern Uplands, the Khmer in the South, and all the Central Highlands minorities) are assimilating much less rapidly. If this speculation is correct, then we might expect a relatively high degree of intermarriage among the first ("more assimilated") group than among the second ("less assimilated") group. We now examine this proposition.

Intermarriage

The 3 percent census enumeration sample, but not the VLSSs, allows us to measure the extent of intermarriage among the 12 main ethnic groups.[10] The results are summarized in table 8.5. The most striking finding is that Chinese are the most likely to marry partners of a different ethnic group; one-third of Chinese heads of household are married to a member of another ethnic group, primarily Kinh. The Nung and the Tay are also likely to intermarry,

Table 8.5. Intermarriage of Household Heads, 1999

	Married		
Ethnic group	*To member of another ethnic group (percent)*	*To Kinh partner (percent)*	*Sample size (unweighted)*
Kinh	0.9	99.1	339,633
Hoa	33.3	30.1	3,283
Khmer	11.4	10.9	4,196
Central Highlands			
Gia-rai	1.2	0.6	1,872
Ba-na	1.4	0.3	1,440
Xo-dang	2.0	0.2	1,536
Northern Uplands			
Tay	19.1	12.0	15,161
Thai	6.4	2.6	5,816
Muong	10.2	7.6	4,957
Nung	25.0	12.1	6,562
Hmong	0.8	0.5	3,676
Dao	6.5	4.1	4,225
All Vietnam	2.5	1.1	399,573

Note: Among household heads, 134,566 (23.6 percent) are single, widowed, separated, or divorced. Among married household heads, 9.5 percent are female. Total sample size for All Vietnam also includes ethnic groups not listed in the table.

Source: Authors' calculations based on the 3 percent enumeration sample of the 1999 Census.

with one in four Nung and one in five Tay heads married to a partner from a different ethnic group.

With the exception of the Thai, at least 10 percent of household heads in the more educated ethnic groups are married to someone from another ethnic group, typically Kinh. This is an intermarriage rate comparable to or higher than that of second-generation Italian-Americans and Jews in the United States in the middle of the 20th century (*The Economist* 2001). This suggests that the cultural and perhaps economic distance between these groups and the Kinh majority is relatively modest; we might speculate that these groups have embarked on a path of economic development that will lead to "assimilation" with the dominant group. The Khmer may also fit into this mold, although less clearly.

In contrast, the Thai appear to have chosen to keep their distance—a relatively low rate of intermarriage, particularly with Kinh partners—while emphasizing education. In this respect, they are following a similar path to the (ethnically similar) Tai in Xishuangbanna, a region of southern China that abuts Vietnam. The Tai's unwillingness to assimilate into mainstream Han culture has led to an increasing degree of economic marginalization (Hansen 1999).

The remaining ethnic groups, particularly the Central Highlands minorities and the Hmong in the Northern Uplands, have very low rates of intermarriage with members of other groups. It is perhaps surprising that the Hmong and the Dao, who live in overlapping mountainous areas and belong to the same Kadai subgroup, intermarry very infrequently. When the Dao do intermarry, it is most often with a Tay partner.

The low-intermarriage groups are also the groups for whom school enrollment rates are the lowest. It is unclear whether these groups' apartness is a matter of choice or an unintended consequence of linguistic and geographic barriers. We would, however, suggest that the most difficult challenge of public policy toward ethnic groups is bringing the less assimilated groups into the economic mainstream; most of the more assimilated ethnic groups are already halfway there.

Some anthropologists argue that it may be more socially acceptable for a Tay, Nung, or Dao man to marry a woman from one of the other Northern Uplands minorities than to marry a Kinh woman. However, the evidence from the 3 percent census enumeration survey does not bear this out: More than half of the Tay and Dao husbands, and almost half of the Nung husbands, who have married an outsider have Kinh wives.[11]

Religion

Religion is the final aspect of the assimilation of different ethnic groups into Kinh society that can be examined using the 1999 Census. This is a sensitive issue in Vietnam. The protests in the Central Highlands by ethnic minority groups in early 2001 were partly in response to official efforts to restrict religious practice in the region, especially among the growing number of evangelical Protestants.

Article 70 of the 1992 Constitution guarantees all Vietnamese citizens freedom of religion or nonbelief, but indirect controls and local restrictions often discourage particular religious groups (United Nations Economic and Social Council 1998). Furthermore, in the past, some religious groups (especially Protestant Christians in the Central Highlands and Northern Uplands) have been accused of being aligned with organizations whose aim is the overthrow of the state (Winrock International 1996) or were historically associated with opposition to the government (for instance, the Cao Dai). Although in recent years, the government's attitude toward religion has become noticeably more relaxed, many de facto regulations still exist; thus, the position of many religious communities is best described as one in which "circumscribed areas of freedom are emerging within a general framework of controls, limitations and even prohibitions" (United Nations Economic and Social Council 1998). For those minority groups that have large numbers of religious practitioners, these restrictions are an important source of irritation and even alienation from the central authorities.

Table 8.6 shows the percentage breakdown of professed religion at the time of the 1999 Census.[12] More than three-quarters of people in Vietnam stated they had no religion, with Buddhism, Christianity (mainly Catholicism), Cao Daism, and Hoa Hao (two indigenous religions that blend a number of Eastern and Western beliefs and practices), and Islam accounting for the remainder. Some of the smaller ethnic minorities are known to have their own, often animist-based, religions, and it is unclear how well these were enumerated in the census.

Table 8.6. Distribution of Ethnicity and Religion
(percent)

Ethnic group	*No religion*	*Buddhist*	*Christian*	*Other religion*
Kinh	77.7	10.9	7.9	3.3
Tay	99.3	0.3	0.1	0.0
Thai	99.6	0.0	0.1	0.0
Hoa (Chinese)	74.7	22.7	2.4	0.2
Kho-me (Khmer)	37.4	62.3	0.2	0.1
Muong	98.4	0.1	1.4	0.0
Nung	98.0	1.6	0.2	0.0
Hmong	95.2	0.1	4.5	0.0
Dao	99.2	0.2	0.3	0.0
Gia-rai	80.3	0.1	19.6	0.0
Ba-na	52.2	0.0	47.8	0.0
Xo-dang	71.3	0.0	28.6	0.0
All Vietnam	78.8	10.5	7.7	3.0

Note: "Other religions" include Cao Dai, Hoa Hao, and Islam.

Source: Authors' calculations from the 3 percent sample of the 1999 Census.

About three-quarters of the Kinh and Hoa stated that they practiced no religion; among practitioners, Buddhism is the most common religion, followed closely by Christianity. A significant number of ethnic groups, particularly in the Northern Uplands, profess essentially no religion, including the Tay, Thai, Muong, Nung, Dao, and Hmong.

However, a number of the Central Highlands minorities count a high proportion of believers: almost half of the Ba-na are Christian (mainly Protestants), as are substantial percentages of the Xo-dang and Gia-rai. A majority of the Khmer are practicing Buddhists. Islam has a significant number of adherents only among the Cham, and Cao Daoism and Hoa Hao are practiced mainly by the Kinh living in the Southeast and Mekong Delta. Just under 5 percent of the Hmong are Christian (most of whom are Protestants), though it seems likely that the Hmong's traditions of spirit worship have been overlooked in the census data.

Government Policy toward Minority Groups

To provide some context for the subsequent discussion, we now briefly summarize government policy toward ethnic minorities. The main vehicle for implementing government policies on ethnic minorities is the Committee for Ethnic Minorities in Mountainous Areas (CEMMA). This is a cabinet-level committee, established in 1993, that is charged with identifying, coordinating, implementing, and monitoring projects geared toward ethnic minority development. CEMMA has a budget of D 7.9 trillion (US$546 million) to be spent on its main programs and projects over the five-year period through 2005; if realized, this would amount to a substantial US$50 per ethnic minority household per year. However, since 1998, CEMMA has been criticized for various instances of corruption. In February 2001, 13 CEMMA officials were disciplined by the Communist Party for "violating regulations on management" (Cohen 2001). In March 2001, the 11th plenum of the Central Committee of the Party disciplined CEMMA chairman Hoang Duc Nghi (Xinhua 2001). Cohen (2001) has written that "at the heart of CEMMA's failings is a top-down approach. . . . Ethnic minorities rarely participate in planning development projects, and rarely know what they are entitled to once projects are implemented."

In addition, under Program 133, the Ministry of Labor, Invalids and Social Affairs (MOLISA) coordinates a Hunger Eradication and Poverty Reduction program that is designed to combat poverty by providing additional resources to the poorest communes in the country. Given the high levels of poverty among ethnic minorities, this program necessarily helps ethnic minority households disproportionately, even though MOLISA's list of poor communes includes many in lowland and midland areas. The main weakness of this program is that it is not sufficiently targeted. By spreading its largesse—about D 410 billion (US$28 million) annually—so thinly, it provides only limited help to the poorest households, which dissipates its effectiveness as an antipoverty program. The bluntness of the targeting is clear from the numbers compiled by van de Walle (2004) in this volume. She reports that in 1998, 71 percent of the richest rural communes had a poverty alleviation program, compared with 89 percent for the poorest rural communes (table 6.16), and poverty alleviation programs touched villages with 84 percent of the rural poor and 76 percent of the nonpoor (table 6.6). Meanwhile, large numbers of poor people living in nonpoor communes are excluded from receiving many benefits (Minot and Baulch 2004).

A wide range of government interventions designed to help the ethnic minorities have been introduced since 1993. These interventions include subsidies for the cost of transporting essential goods to remote areas; funds for resettlement and sedentarization; subsidies for salt, reforestation funds, the provision of potable water, road maintenance and upgrading, the provision of livestock and seedlings to farmers; gifts of radios to remote households; subsidies for connecting villages to the national grid; and the provision of educational scholarships.

Government policy is not, however, universally supportive of ethnic minorities. On the one hand, there is official interest in maintaining (*bao ton*) and developing (*phat huy*) cultural identity, particularly dances, folklore, and modes of dress. On the other hand, the standard textbooks tend to emphasize, and even glorify, Kinh culture and history. Similarly, the expansion of education has at last led to a rapid rise in enrollment rates for ethnic minority children. However, Vietnamese remains the dominant language of instruction, and most officially sanctioned textbooks are in Vietnamese. There is an ongoing tension between the willingness to accept differences (*cong nhan*) and cultural assimilation or Vietnamization (*dong hoa*).

The most important rural development policies have not helped, and may have hurt, many ethnic minority households. The government discourages drug production, which reduces the income of some growers in the Northern Mountains. Agricultural extension and research tend to favor lowland rice over upland crops (Huy and Dai 1999). The formalization of land rights has tended to squeeze slash-and-burn farmers, especially because traditional land and forest use rights are poorly defined and frequently not recognized by the formal legal system (Huy and Dai 1999). Government subsidies have encouraged people to move to the "New Economic Zones" in the Central Highlands. Even though only half of the (mostly Kinh) migrants to those zones have stayed there, the in-migration has contributed to tension with the indigenous ethnic minorities in the Central Highlands (especially over land).

There is strong interest among donors and NGOs in projects that would alleviate poverty. These efforts have the effect of helping ethnic minority households, although not explicitly. There are also a number of projects, or components of projects, that are explicitly geared toward ethnic minorities.[13] With NGO support, an Ethnic Minority Forum (and now working group) was established in 1993 and serves as a locus for sharing experiences and lessons learned from the many efforts that are geared toward ethnic minority development.

Explaining the Divergence between Majority and Minority Living Standards

Why are Vietnam's ethnic minority households so poor? Following other studies using the VLSS, we measure material living standards using expenditure per capita. So our question becomes: Why is expenditure per capita so low, and growing so slowly, among ethnic minority households? The standard economic explanations may be grouped into two.

First, people may be poor if they lack endowments. The main factors of production are land, physical capital, and human capital (education). To the extent that a household lacks these endowments, it is likely to be relatively poor. Table 8.7 summarizes some of the main variables on household endowments. It shows that although ethnic minority households tend to have a relatively large quantity of land, this land is generally of poorer quality (reflected in part by the relatively low holdings of irrigated land).[14] Ethnic minority households are likely to be poorly endowed with capital, as reflected by their lack of access to credit and lower receipts of remittances; in rural areas, the value of farm tools owned by Kinh households is twice as high as the value of those owned by ethnic minority households. As would be expected from the school enrollment data, ethnic minority households also have lower levels of education than the Kinh-Hoa majority. For households that remain in farming, it may not make sense to acquire more education, but the modest level of education also serves to reduce the number of economic opportunities open to them elsewhere in the country.

Second, people may be poor because of their knowledge, customs, or culture—meaning that they do not use the available factors of production as efficiently as possible or because they face discrimination, and so they would have more difficulty getting a good job than another, equivalently qualified individual. Either of these would lead to the same result, which is low "returns on characteristics." For instance, a poorly educated farmer from an ethnic minority may not be able to get a high return on land because he or she does not know how to cultivate high-yielding crop varieties, or because the local agricultural extension agent cannot speak the local language or never visits.

Ethnic minority people have low endowments, and poor returns to characteristics, in part because many of them live in remote areas and are disconnected from the rest of the economy. Traditionally, remoteness is seen as a geographic concept. Households living in remote areas find it expensive to buy inputs or to bring their goods to market. If the density of population is low, it is harder to provide schooling and other amenities. But remoteness may also be thought of as a social concept, so that some households may be distant from their neighbors because of barriers of language or culture. The ethnic minority households in rural areas that do not speak Vietnamese have per capita expenditures (D 1.074 million) that are only three-fifths as high as those of their Vietnamese-speaking counterparts (D 1.641 million), according to the 1998 VLSS. Many minority groups also feel remote from the

Table 8.7. Endowments of Majority and Minority Households, 1993 and 1998

	1993		*1998*					
	Full sample		*Full sample*			*Mixed communes only*		
Indicator	*Kinh-Hoa*	*Minorities*	*Kinh-Hoa*	*Minorities*	*Test*	*Kinh-Hoa*	*Minorities*	*Test*
Sample size (weighted)	4,234	565	5,261	738		931	575	
Annual expenditure per capita (thousand dong, January 1998 prices)[a]	2,142	1,299	2,952	1,536	0.00	2,742	1,604	0.00
Proportion of households receiving foreign remittances	0.06	0.02	0.06	0.01	0.00	0.04	0.01	0.01
Proportion of households receiving domestic remittances	0.20	0.11	0.23	0.09	0.00	0.20	0.10	0.00
Land area cultivated (meters^2) per household[b]	5,004	8,002	5,469	11,747	0.00	7,628	12,035	0.00
Portion of which is								
Irrigated land[b]	1,531	569	2,704	2,403	0.52	3,176	2,886	0.65
Perennial crops[b]	682	959	1,079	1,454	0.39	1,164	1,284	0.61
Forest land[b]	170	1,112	505	4,630	0.00	1,044	5,027	0.00
Value of farm tools/household (thousand dong)[b]	486	216	425	213	0.00	484	216	0.00
Years of education of head of household	6.58	4.72	7.36	5.53	0.00	7.36	6.04	0.01
Years of education of best-educated member	9.04	6.57	9.36	6.94	0.00	9.21	7.55	0.00

Note: Mixed communes are those with sampled households from both the Kinh-Hoa majority and ethnic minority groups.

a. Weighted by household weights and size.

b. Rural households only.

Sources: 1993 and 1998 VLSSs.

process of policymaking and decisionmaking; the recent (April 2001) elevation of Nong Duc Manh, an ethnic Tay, to the position of General Secretary of the Communist Party is an exception to this rule. Remoteness is more likely to be a problem if there are additional barriers—administrative, social, or other—that prevent households from migrating in response to better opportunities elsewhere.

Several measures of remoteness are summarized in table 8.8. Children from ethnic minorities have to travel farther to school. Their parents have to travel farther to go to a market, hospital, post office, or factory. Their families are less likely to live in a village or commune that is served by public transport, electricity, or telephone. These effects are particularly dramatic for households living in minority-only villages, where on average the closest market is 13.5 kilometers away. Only 11 percent of minority-only villages have phones.

Although they use a somewhat different vocabulary, Vietnamese social scientists typically point to similar causes of poverty among the ethnic minorities. Ethnologist Bui Van Dao (personal communication, March 2001) argues that ethnic minorities are persistently poor because of "objective reasons" (isolated villages, poor soils, inadequate water, unsuitable climate), "subjective reasons" (low educational levels, population pressure, shortage of capital, slow technical change), and "institutional reasons" (government policy insufficiently targeted, overlapping programs, top-down administration).

Pham and Tuan (1999) come up with a similar list, but they add that the sociopolitical institutions and customs of ethnic minorities are "still backward" and "subversive forces" have "abused" religion and ethnicity "to destroy national unity." Implicit in this diagnosis is that the solution is for ethnic minorities to assimilate. This is the most widely held view in official circles. The reference to national unity is important, because a number of the ethnic minority groups worked closely with the Americans during the war in the 1960s and 1970s, and their political reliability is still considered to be suspect.

Others have argued that ethnic minorities are poor because they have been trapped in a downward spiral: Population growth puts pressure on the natural carrying capacity of the uplands, which leads to environmental degradation and poverty (Jamieson, Cuc, and Rambo 1998). This in turn leads to social, cultural, and economic marginalization and increased dependence on nonlocal support systems (NGOs, government subsidies), which make it even harder for them to rise out of poverty. Jamieson, Cuc, and Rambo stress this last component. Decisionmaking, they argue, is too centralized and remote. It also occurs without adequate representation of local people, which in turn fuels distrust and misunderstanding.

Much less has been written about how minority people characterize and explain their own poverty. As part of a participatory poverty assessment, a recent study in Lao Cai found that people place great emphasis on the lack of natural resources, particularly high-quality land and reliable water supplies, in explaining their own poverty (Vietnam-Sweden Mountain Rural

Table 8.8. Community Remoteness Variables for Majority and Minority Households, 1998

	Full sample			*Mixed communes only*			*Nonmixed communes*
Remoteness variable	*Kinh-Hoa*	*Minorities*	*Test*	*Kinh-Hoa*	*Minorities*	*Test*	*Minorities*
Proportion with primary school in village	0.35	0.43	0.43	0.38	0.43	0.66	0.42
Km to nearest primary school	1.4	2.0	0.02	1.8	1.9	0.70	2.4
Km to nearest lower secondary school	1.9	3.0	0.01	2.5	2.6	0.83	6.5
Km to nearest upper secondary school	5.0	8.0	0.03	n.a.	n.a.	n.a.	9.1
Km to district center	8.8	18.9	0.00	9.1	16.5	0.04	29.1
Km to nearest post office	4.2	10.1	0.01	5.2	6.7	0.12	25.0
Proportion with factory within 10 km	0.63	0.48	0.13	0.55	0.54	0.95	0.23
Proportion with any market in the commune	0.48	0.19	0.00	0.38	0.21	0.03	0.12
Km to closest market	1.5	5.8	0.00	2.4	4.0	0.01	13.5
Proportion with electricity	0.96	0.70	0.00	0.95	0.83	0.04	0.11
Proportion with public transport available	0.48	0.31	0.05	0.41	0.31	0.41	0.29
Proportion with phone in commune	0.66	0.29	0.00	0.54	0.33	0.06	0.11
Km to closest phone	1.4	8.2	0.01	2.7	4.5	0.14	24.4
Km to nearest hospital	8.3	13.6	0.06	8.5	11.2	0.15	25.5
Proportion living in villages where births are usually at home	0.19	0.60	0.00	0.33	0.53	0.06	0.89

n.a. Not applicable.

Sources: 1993 and 1998 VLSSs.

Development Project 2000). Bui Minh Dao also argues that many ethnic groups explain poverty on the basis of superstitions (*tam linh*). People become rich thanks to spiritual support, or they are poor because they are encountering a bad time (*van han*).

Although a listing of the possible causes of poverty is certainly useful, such an exercise does not give a good sense of what the most influential factors might be. In an important study based on the 1993 VLSS data, van de Walle and Gunewardena (2001) examine the relative contributions of characteristics, the return to characteristics, and geography in explaining why ethnic minority households are poorer than the rest of society. They use the Blinder-Oaxaca decomposition (described below) to determine the extent to which the lower expenditure levels of minority households is due to weaker characteristics (that is, lower educational levels, poorer quality of land) and how much is due to lower returns on these characteristics. Using expenditure regressions estimated for households living in rural areas of northern and central Vietnam, they find that about half of the difference in expenditure per capita between the two groups is due to differences in their characteristics and endowments, with the remainder attributable to the lower return to characteristics obtained by minority households. Some writers interpret the portion of the expenditure differential due to return to characteristics as a measure of discrimination. However, this is not entirely satisfactory, because the differences in characteristics between majority and minority households may themselves be the result of unequal treatment in the past. Nor is discrimination the only possible explanation of the expenditure differential—other unobserved factors, including cultural history, could play a role.

Do the findings of van de Walle and Gunewardena still hold? They used data from 1993, when restrictions on in-country migration had only just been eased and were still of some importance. In the next section, we apply their model to the 1998 VLSS data using both the simple majority-minority split and the disaggregation into composite categories (Kinh, Hoa, Central Highlands minorities, and Northern Uplands minorities) developed above. We find that the differences in returns to characteristics by ethnicity are generally stronger than they were in 1993; certainly they remain very important.

Decomposition Analysis Updated

To explain the gap between the living standards of majority and minority households, we begin by estimating regressions in which the dependent variable is the log of expenditure per capita (ln E) and the independent variables consist of household- and community-level endowments and characteristics (X). Formally, we regress

$$\ln(E_{ijk}) = X_{ijk}\beta_{jk} + \eta_{jk} + \varepsilon_{ijk}$$

where the observations are for the ith household in the jth ethnic group in the kth commune. Here the η_{jk} are fixed, commune-level effects and ε_{ijk} is a random error with zero mean. Separate regressions may be estimated for each ethnic group. For instance, indexing the Kinh and Hoa majority with *a* and the ethnic minorities with *b*, it can be shown that

$$\ln \bar{E}_a - \ln \bar{E}_b = (\bar{X}_a - \bar{X}_b)\beta_a + \bar{X}_a(\beta_a - \beta_b)$$

$$\text{Total difference} = \text{Characteristics} + \text{structure}$$

where the $\ln \bar{E}$ terms represent the mean log of expenditure per capita and the X_i give the mean characteristics of each group. This is the Blinder-Oaxaca decomposition (Blinder 1973; Oaxaca 1973), which separates the differences in expenditure per capita into the part that is due to the different characteristics of the two groups and another component that reflects "structural" differences between the two groups. Note that the decomposition shown here uses the parameters for group *a*, but this choice is arbitrary. One could equally well use the parameters from the equations estimated for group *b*, and this will generally give a different decomposition. When fixed effects are included (the η_{jk} terms) in the regressions, they drop out of the decomposition provided that the equations for each group are estimated for communes where there are both majority and minority households—in our terms, the "mixed commune sample."

Our regression results are set out in appendix 8A for the full sample and appendix 8B for the mixed-commune sample (which includes only the 48 communes with both majority and minority households). The dependent variable is the log of per capita expenditure. Separate equations are estimated, using the Stata statistical package, for the Kinh and Hoa majority and for ethnic minority households.[15] In each case, we estimate a version of the equation with commune-level fixed effects and another without these effects. The regressions are weighted by the inverse of the probability that a household is sampled, and they also account for clustering and stratification of the 1998 VLSS (see Stata Corporation [1999, Vol. 4, pp.18–30]).

There is clear evidence that the minority and majority regressions are structurally different, in the sense that at least some of the coefficients are not the same in the two cases. For the full dataset, a Chow test of the equality of coefficients is rejected at the 1 percent level both for the case of no fixed effects ($F(20,164) = 14.09$) and when there are fixed effects ($F(20,164) = 2.75$); in the latter case, we are testing for the equality of all the coefficients except for the commune fixed effects dummies. When the sample is reduced to those communes that include both majority and minority households, the Chow test rejects the null hypothesis of equal coefficients at the 1 percent level when there are no fixed effects ($F(21,18) = 6.29$), but when fixed effects are included, the equality of the noncommune coefficients is rejected only at the 5 percent level ($F(21,18) = 2.64$). This hints at the possibility that much of the explanation for the differences in per capita expenditure level between majority and minority households is due to the fixed location effects.

Further evidence that the factors that influence Kinh-Hoa households differ from those that affect ethnic minority households comes from estimates of multiple adaptive regression spline (MARS) models. These models allow for nonlinearities as well as interactions among the variables in the models, but they aim to identify parsimonious sets of basis functions (Friedman 1991). Separate MARS models were estimated for Kinh-Hoa and for ethnic minority households, and these yielded very different models (see appendix 8C for details). For Kinh-Hoa households, the MARS model shows (among other things) that education has the most dramatic effect on living standards for those who have little or no land. For the ethnic minority households, the MARS model shows that the profitability of land is closely associated with complementary family labor inputs—the ethnic minorities need large families to make their land productive.

By and large, the regressions in appendixes 8A and 8B accord with our prior expectations. Larger households have lower per capita expenditure levels. For both minority and majority households, an extra household member is associated with a drop in per capita expenditure of about 7 percent. Having a higher proportion of adults in the household also raises per capita expenditures, an effect that is significantly stronger for majority than minority households (as may be seen from the "*p*, eq. coeff." Column in appendix 8A, which gives the *p* values for a test of coefficient equality; where the coefficients differ between majority and minority households, they are shown in bold face).

Education, as proxied by the number of years of education of the best-educated household member who is not in school, is also a significant predictor of expenditures, but the results differ depending on whether the full sample or only the sample of households in mixed communes is used. Using the full sample, the relative return to education (as measured by the percentage change in expenditure per capita relative to a change in the numbers of years of education achieved by the best-educated household member) is higher for minority than majority households, up to seven years of education. Beyond that point, the relative return to education is slightly higher for majority households. However, when one confines the sample to only those living in mixed communes, then the relative return to education is higher for majority households.[16] A plausible interpretation is that education brings a high return to ethnic minority households when they also are free to migrate, an effect that is best seen when using the full sample. However, when migration is limited (for legal, linguistic, institutional, or cultural reasons), it is more difficult to find profitable outlets for additional education. Thus, the efficacy of education as a way to raise the living standards of ethnic minorities depends fundamentally on the degree to which they are geographically mobile and are willing to become assimilated.

The quality of education received by children from ethnic minority groups may also be poorer. In 1998, their curriculum was shorter and their instruction was most often in Vietnamese (a foreign language for many minority children). It is plausible that minority children need to have at least several years of schooling before they are able to acquire the language and other skills needed for inclusion into the economic mainstream.

Finally, when the sample is confined to households in ethnically mixed communes, access to land appears to play a bigger role, especially for minority households. Minority households, when asked, tend to emphasize the importance of land as a cause of poverty (Vietnam-Sweden 2000). The regression results in appendix 8B help one to understand why this might be so. Confining the sample to households in ethnically mixed communes and allowing for fixed effects, an extra hectare of irrigated land is associated with additional expenditure per capita of approximately D 2 million, both for majority and for minority households. An extra hectare of irrigated land would raise the per capita expenditure of a typical Kinh-Hoa household by 13 percent, but it would boost expenditures for a minority household by 25 percent on average. It is hardly surprising, then, that ethnic minority households put more emphasis on access to land as a way out of poverty.

In table 8.9, we present the main results of our decomposition analysis. This decomposes the sources of differences in per capita expenditure levels between pairs of ethnic groups into a component that is due to different characteristics (age, education, land, gender, location, and so forth) and a component that may be interpreted as reflecting different returns to characteristics. To interpret the table, consider the first line: the difference in predicted per capita expenditures between the Kinh-Hoa majority and minority groups is D 1,173,000 (in January 1998 prices). Of this difference, 44 percent is a result of minority households having less education, fewer remittances, and other characteristics than the Kinh-Hoa majority; the remaining 56 percent is attributable to differences in returns to those characteristics. So if the characteristics of minority households could be boosted up to the level of the majority, then almost half of the expenditure gap would disappear. However, there would still be a substantial gap because of the lower returns to characteristics of ethnic minorities: Even if minority households had the same characteristics as the Kinh-Hoa majority, they would still be substantially poorer.

The magnitude of the components due to different characteristics and returns to characteristics is substantially different, depending on which group is used as the reference and which sample is used. If the sample is confined to those communes where there are both Kinh-Hoa and minority households (the mixed communes), we again find that about 45 percent of the expenditure per capita differential is attributable to differences in characteristics. However, when the equation is estimated with commune fixed effects (section 3 of table 8.9), almost two-thirds of the difference in per capita expenditure is due to differences in characteristics. In other words, when we compare Kinh-Hoa with minority households within a given commune, much of the gap between the groups is due to such factors as differences in education. Thus, minority households are poor in part because they lack education and other assets, but also because they are disproportionately located in poorer communes.

Only 19 of the households surveyed by the 1998 VLSS consisted of ethnic minority households in urban areas (out of a total urban sample of 1,200

Table 8.9. Decomposition of the Sources of Ethnic Inequality, 1998

Location	*Reference equation*	*Per capita expenditure of reference group (thousand 1998 dong)*	*Percentage of difference due to different characteristics*	*Percentage of difference due to different returns to characteristics*	*Number of observations*
All Vietnam	Kinh-Hoa	2,651	44	56	5,294
	Other minorities	1,478	31	69	698
All Vietnam (mixed)	Kinh-Hoa	2,456	45	55	993
	Other minorities	1,563	29	72	510
All Vietnam (mixed, fixed)	Kinh-Hoa	2,456	66	34	993
	Other minorities	1,563	54	46	510
Rural areas	Kinh-Hoa	2,254	29	71	4,377
	Other minorities	1,460	38	62	679
Rural areas	Kinh-Hoa	2,254	28	72	4,377
	Central Highlands minority	1,012	34	66	191
Rural areas	Kinh-Hoa	2,254	26	74	4,377
	Northern Uplands minority	1,551	16	84	402
Urban areas	Kinh	4,249	−80	180	1,484
	Hoa	5,426	−61	161	112

Note: For each pairwise comparison, the decomposition based on the Kinh-Hoa (or, for urban areas, the Kinh) equation is reported first, and the results based on the minority equation follow on the next line. The per capita expenditures are geometric mean values.

(Mixed) = regressions based on data from communes having both minority and nonminority households.

(Fixed) = regressions that include community fixed effects.

Source: Based on the 1998 VLSS.

urban households). Thus, it may make more sense to confine the sample to rural areas and compute the Blinder-Oaxaca decomposition for this subset. The results are shown in sections 4–6 of table 8.9. For minority households overall, and for the Central Highlands minorities, about one-third of the differences in per capita expenditure is attributable to differences in characteristics such as education or age. This proportion is closer to one-fifth for Northern Uplands minority groups. Even if this group had the same characteristics as the Kinh-Hoa majority, four-fifths of the per capita expenditure gap would remain.[17] Here, as elsewhere, we are reluctant to ascribe the differences in returns to characteristics to labor market discrimination: so few people living in the generally somewhat remote villages where minority households live are engaged in the labor market, whether or not they belong to an ethnic minority.

Table 8.9 also reveals an interesting result when the living standards of the urban Kinh and the urban Chinese are decomposed. The Chinese are more affluent, but they actually have lower levels of education and other observable expenditure-raising characteristics than do the Kinh. Thus, the difference in per capita expenditure between the two groups is entirely due to the higher returns to characteristics that Chinese households enjoy. Formally, our model must be missing some important, and possibly unobservable, determinant of expenditures: An obvious candidate is the strength of business bonds and mutual aid within the Chinese community.

Whichever set of estimates is used, differential returns to characteristics appear to be central. Van de Walle and Gunewardena (2001) reached broadly similar conclusions using the 1993 VLSS, albeit with greater weight on returns to characteristics. We should, however, add that their results are not directly comparable with ours because van de Walle and Gunewardena used a slightly different set of regressors and excluded households living in urban areas plus the Southeast and Mekong Delta regions from their sample.

Overall, this analysis points toward an important, general policy implication. If our concern is to close the gap between minority and majority living standards, while maintaining ethnic identities, then it will not be sufficient simply to improve minority education or provide minority households with more land. Such endowment-increasing measures would certainly help expand income-earning opportunities for the ethnic minorities. However, our decomposition analysis shows that ethnic minority households appear to generate their expenditures in quite different ways from the majority. This means that antipoverty programs that are geared to minority groups will have to be different from those geared to the majority.

Summary and Conclusions

We conclude by drawing together the main strands of our analysis and examining their implications for ethnic minority policies in Vietnam. Using data from the 1998 VLSS, we have shown clearly that Kinh and Hoa (majority) households have substantially higher living standards (as measured by per capita expenditure) than ethnic minority households. This gap is also reflected in lower school enrollment rates, higher fertility, and poorer access to health services by minority households. However, ethnic minority households do not appear to be more malnourished than the population at large.

The sample size of the 1998 VLSS allows a crude breakdown of the 54 ethnic groups into five broad categories: the Kinh, Hoa, Khmer, and two composite categories, the Central Highlands minorities and the Northern

Uplands minorities. Based on this categorization, we find that both the Kinh and Hoa experienced rapid growth in their per capita expenditures between 1993 and 1998 and are now markedly materially better off than before. The Khmer and Northern Uplands minorities also experienced reasonable growth in per capita expenditures during the 1990s and now have expenditures distributions that are clustered at or just below the poverty line. This indicates that as long as economic growth is distributed equitably in the future, rapid and significant reductions in poverty are likely to be experienced by these groups in the next five years or so. In contrast, the poorest people are members of the Central Highlands minorities, whose average level of expenditure per capita has remained stagnant since 1993.

For a finer disaggregation of the ethnic minorities, we turned to the 3 percent enumeration sample of the 1999 Census, where we can distinguish 12 separate ethnic groups with adequate sample sizes. The census data do not include information on expenditures or incomes, but they do allow us to compute gross and net school enrollment rates and examine patterns of intermarriage and religious observance. Although school enrollment rates are generally high in Vietnam, they are low for the Central Highlands minorities and some of the Northern Uplands minorities (especially the Hmong). These are also the ethnic groups that are least likely to intermarry and are the most likely to be religious. Because the high intermarriage–nonreligious groups (such as the Tay and Nung and, to a lesser extent, the Thai) are also the groups where school enrollments are the highest, we hypothesize that these are the ethnic groups that have assimilated the most with the Kinh and Hoa majority.

Why are ethnic minority households so poor? They may lack endowments (physical and human capital) or they may have low returns on their endowments, perhaps because of discrimination or for cultural or informational reasons. The low endowments and returns thereon are in turn partly due to the remoteness of many ethnic minority households. To tease out the relative importance of the main effects, we estimate and decompose a set of expenditure equations. The results of these decompositions suggest that geographic and cultural remoteness is important. More important, our decomposition analysis shows that even if minority households had the same endowments as Kinh households, this would close no more than one-third of the gap in living standards. This implies that, for some reason, minority households have a lower return to their endowments than the Kinh and Hoa majority.

There are thus at least two paths to prosperity for the ethnic minorities. One path is to assimilate, both economically and culturally, with the majority group, and in effect obtain the same return on endowments as the majority. This is the path that some ethnic groups, such as the Tay, Nung, and Muong, appear to be following quite successfully. A second path, pursued by such groups as the Khmer and Thai (and possibly the Dao), is to integrate economically with the Kinh while retaining their own group's cultural identity. However, a third group of ethnic minorities, comprising almost all the minorities that are indigenous to the Central Highlands plus the Hmong, does not appear to be benefiting from the rising living standards experienced by the majority. If this third group of ethnic minorities is not to be left further behind by the growth process, specific interventions need to be designed that are appropriate to their circumstances, needs, and aspirations. The government of Vietnam and development agencies should recognize that the interventions that work to reduce poverty among the Kinh and Hoa majority will not be effective for all other minority groups. Abstractly, the diversity of the socioeconomic development experiences of the different ethnic groups calls for greater diversity in the antipoverty and other policy interventions designed to assist them. Concretely, this will require far more input from ethnic minority households, and more decentralization in antipoverty programs, than has occurred up to now.

Appendix 8A Regression Estimates of Expenditure Equations, Full Sample of Households, 1998
(dependent variable is log of per capita expenditure)

	Full sample, no fixed effects					*Full sample, fixed effects*[a]				
	Kinh-Hoa		*Minority*			*Kinh-Hoa*		*Minority*		
Independent variables	*Co-efficient*	*p*	*Co-efficient*	*p*	*p, eq. coeff.*	*Co-efficient*	*p*	*Co-efficient*	*p*	*p, eq. coeff.*
Household demographics										
Household size	–0.037	0.00	–0.079	0.00	0.00	–0.069	0.00	–0.075	0.00	0.48
Proportion of household members ages 7–16 years	0.475	0.00	0.609	0.00	0.31	0.454	0.00	0.487	0.00	0.38
Proportion of household members male over 16	**0.958**	0.00	**0.497**	0.00	0.00	**0.589**	0.00	**0.362**	0.00	0.07
Proportion of household members female over 16	0.864	0.00	0.558	0.00	0.06	0.582	0.00	0.349	0.01	0.35
Three-generation household	–0.105	0.02	–0.182	0.15	0.55	–0.194	0.00	–0.303	0.00	0.18
Parents and one child	0.025	0.65	–0.108	0.38	0.28	–0.134	0.00	–0.182	0.05	0.24
Parents and two children	–0.031	0.76	–0.178	0.14	0.22	–0.186	0.00	–0.272	0.01	0.23
Parents and three children	–0.133	0.00	–0.225	0.09	0.49	–0.222	0.00	–0.341	0.00	0.10
Other household structure	–0.077	0.17	–0.303	0.03	0.09	–0.229	0.00	–0.301	0.01	0.35
Age of household head	**0.016**	0.00	**–0.001**	0.86	0.05	0.008	0.02	0.009	0.12	0.80
Age of head, squared (÷1,000)	**0.185**	0.00	**0.001**	0.99	0.02	0.092	0.00	0.080	0.15	0.59
Gender of head (female = 1)	**0.068**	0.00	**–0.066**	0.02	0.00	–0.021	0.14	–0.048	0.04	0.27

Household education, remittances										
Maximum years of education of adults in household	**−0.012**	0.12	**0.028**	0.07	0.03	0.015	0.02	0.025	0.01	0.10
Years of education squared	**0.003**	0.00	**−0.000**	0.82	0.00	0.001	0.00	0.000	0.51	0.11
Household receives remittances (yes = 1)	0.123	0.00	0.112	0.04	0.86	0.061	0.00	0.093	0.02	0.14
Household land										
Irrigated land, ha	**−0.211**	0.00	**0.392**	0.00	0.00	**0.126**	0.00	**0.254**	0.00	0.03
Other annual land, ha	−0.295	0.00	−0.173	0.15	0.38	0.088	0.01	0.339	0.03	0.18
Perennial land, ha	0.156	0.00	0.177	0.11	0.85	0.152	0.00	0.168	0.08	0.73
Forest land, ha	−0.030	0.55	0.075	0.02	0.08	0.065	0.05	0.068	0.11	0.93
Other agricultural land, ha	−0.419	0.04	−0.103	0.42	0.18	0.039	0.67	0.194	0.00	0.27
Irrigated land, squared	**0.057**	0.00	**−0.046**	0.14	0.01	−0.008	0.09	−0.029	0.17	0.18
Other annual land, squared	0.059	0.00	0.085	0.04	0.56	−0.006	0.36	−0.077	0.22	0.39
Perennial land, squared	−0.006	0.03	0.011	0.65	0.47	−0.007	0.00	−0.005	0.77	0.55
Forest land, squared	**0.009**	0.11	**−0.008**	0.02	0.01	−0.002	0.56	−0.007	0.13	0.43
Other agricultural land, squared	0.182	0.04	0.021	0.41	0.08	0.003	0.94	−0.022	0.13	0.99
Constant	**6.794**	0.00	**7.146**	0.00	0.00	**7.870**	0.00	**7.526**	0.00	0.00
Statistics										
R^2	0.32		0.44			0.63		0.64		
Number of observations	5,294		698			5,294		698		

Note: Pairs of coefficients highlighted in bold face are statistically different at the 5 percent level. "*p*, eq. coeff." tests for the equality of coefficients across the two equations.

a. Coefficients on commune fixed effects are not shown here.

Source: Based on the 1998 VLSS.

Appendix 8B Regression Estimates of Expenditure Equations, Mixed Commune Sample of Households, 1998
(dependent variable is log of per capita expenditure)

	Mixed commune sample, no fixed effects					*Mixed commune sample, fixed effects*[a]				
	Kinh-Hoa		*Minority*			*Kinh-Hoa*		*Minority*		
Independent variables	*Co-efficient*	*p*	*Co-efficient*	*p*	*p, eq. Coeff.*	*Co-efficient*	*p*	*Co-efficient*	*p*	*p, eq. Coeff.*
Household demographics										
Household size	−0.034	0.11	−0.083	0.00	0.06	−0.065	0.00	−0.084	0.00	0.23
Proportion of household members ages 7–16 years	0.480	0.00	0.709	0.00	0.16	0.481	0.00	0.526	0.00	0.28
Proportion of household members male over 16	0.882	0.00	0.510	0.00	0.11	0.562	0.00	0.405	0.00	0.48
Proportion of household members female over 16	0.939	0.00	0.502	0.00	0.06	0.602	0.00	0.299	0.05	0.41
Three-generation household	−0.138	0.22	−0.268	0.02	0.37	−0.207	0.01	−0.314	0.00	0.37
Parents and one child	0.045	0.57	−0.200	0.12	0.11	−0.146	0.04	−0.215	0.06	0.33
Parents and two children	−0.053	0.50	−0.256	0.03	0.15	−0.196	0.02	−0.290	0.01	0.39
Parents and three children	−0.126	0.22	−0.355	0.00	0.07	−0.238	0.01	−0.382	0.00	0.18
Other household structure	**0.047**	0.75	**−0.323**	0.03	0.03	−0.176	0.03	−0.318	0.01	0.24
Age of household head	0.023	0.01	0.005	0.53	0.09	0.014	0.09	0.011	0.06	0.44
Age of head, squared (÷1,000)	0.237	0.01	−0.023	0.77	0.06	−0.138	0.09	−0.090	0.11	0.40
Gender of head (female = 1)	0.019	0.68	−0.075	0.01	0.11	−0.02	0.48	−0.041	0.07	0.47

Household education, remittances										
Maximum years of education of adults in household	0.004	0.83	0.024	0.12	0.43	0.039	0.01	0.024	0.08	0.94
Years of education squared	0.002	0.03	0.000	0.83	0.14	−0.068	0.92	0.000	0.73	0.83
Household receives remittances (yes = 1)	0.171	0.00	0.075	0.13	0.23	0.089	0.02	0.078	0.06	0.74
Household land										
Irrigated land, ha	**−0.060**	0.47	**0.369**	0.00	0.00	**0.122**	0.04	**0.298**	0.00	0.00
Other annual land, ha	−0.236	0.02	−0.169	0.14	0.61	**0.035**	0.51	**0.446**	0.00	0.02
Perennial land, ha	0.145	0.03	0.176	0.18	0.82	0.144	0.06	0.302	0.01	0.71
Forest land, ha	−0.041	0.44	0.037	0.12	0.23	−0.001	0.98	0.035	0.37	0.44
Other agricultural land, ha	−0.009	0.98	0.048	0.30	0.83	0.142	0.47	0.169	0.01	0.65
Irrigated land, squared	0.024	0.09	−0.042	0.18	0.06	**−0.012**	0.28	**−0.040**	0.05	0.05
Other annual land, squared	0.042	0.02	0.082	0.03	0.31	0.003	0.72	−0.105	0.12	0.11
Perennial land, squared	−0.007	0.18	−0.049	0.41	0.47	−0.009	0.08	−0.146	0.02	0.12
Forest land, squared	**0.012**	0.04	**−0.005**	0.07	0.02	0.006	0.10	−0.004	0.37	0.09
Other agricultural land, squared	−0.066	0.73	−0.021	0.13	0.81	−0.005	0.97	−0.030	0.01	0.42
Constant	**6.502**	0.00	**7.211**	0.00	0.00	**6.501**	0.00	**7.575**	0.00	0.00
Statistics										
R^2	0.31		0.41			0.63		0.62		
Number of observations	993		510			993		510		

Note: Pairs of coefficients highlighted in bold face are statistically different at the 5 percent level. "*p*, eq. coeff." tests for the equality of coefficients across the two equations.

a. Coefficients on commune fixed effects are not shown here.

Source: Based on the 1998 VLSS.

Appendix 8C Multiple Adaptive Regression Spline Models

The models of expenditure presented in appendixes 8A and 8B are essentially linear, include a large number of variables, and do not take account of possible interactions among variables. Could one build a more parsimonious model? To answer this, we turned to the multiple adaptive regression spline (MARS) methodology (Friedman 1991).

Given a set of variables that are specified by the researcher, MARS mines the data for nonlinearities and interactions. More specifically, it creates a piecewise linear function for each continuous independent variable, starting with too many change points (knots) and then pruning the number of knots using a backward procedure. For categorical variables, MARS arranges the categories for the best fit possible. It then looks for suitable interactions between independent variables. The result is a set of basis functions, which are transformations of independent variables taking into account nonlinearities and interactions. MARS then estimates a least-squares model using the base functions as independent variables. Because the models are so nonlinear, the results are typically presented with the aid of graphs.

For this study, the dependent variable is the log of real per capita expenditure; separate MARS models were estimated for the Kinh-Hoa majority and for minority households. For the Kinh-Hoa majority, the basis functions were determined to be the following:

Table 8C.1. Basis Functions for MARS Model of Log of Real Per Capita Income, Kinh and Chinese Households

BF1 = max(0, IRRLAND − 131.000);
BF2 = max(0, 131.000 − IRRLAND);
BF3 = max(0, WORKED98 − 6.000) × BF2;
BF4 = max(0, 6.000 − WORKED98) × BF2;
BF5 = max(0, HHSIZE − 6.000);
BF6 = max(0, 6.000 − HHSIZE);
BF7 = max(0, NIRRLAND − 400.000) × BF2;
BF8 = max(0, 400.000 − NIRRLAND) × BF2;
BF9 = max(0, PAGE17M − 0.250) × BF5;
BF10 = max(0, 0.250 − PAGE17M) × BF5;
BF11 = max(0, NIRRLAND − 120.000);
BF12 = max(0, 120.000 − NIRRLAND) ;
BF13 = max(0, HEADAGE − 43.000);
BF14 = max(0, 43.000 − HEADAGE);
BF15 = max(0, WORKED98 + .258859E − 06) × BF12;
BF16 = (REMIT = 0) × BF12;
BF18 = max(0, PELAND + .186998E − 04) × BF1;
BF19 = max(0, PELAND − 300.000) × BF2;
BF20 = max(0, 300.000 − PELAND) × BF2.

Note: IRRLAND = area of irrigated land, in m^2. WORKED98 = years of education achieved by head of household. HHSIZE = number of household members. NIRRLAND = area of nonirrigated annual land, in m^2. PAGE17M = proportion of household consisting of males 17 and older. HEADAGE = age of head of household. REMIT = value of remittances received by household. PELAND = area of land planted in tree crops.

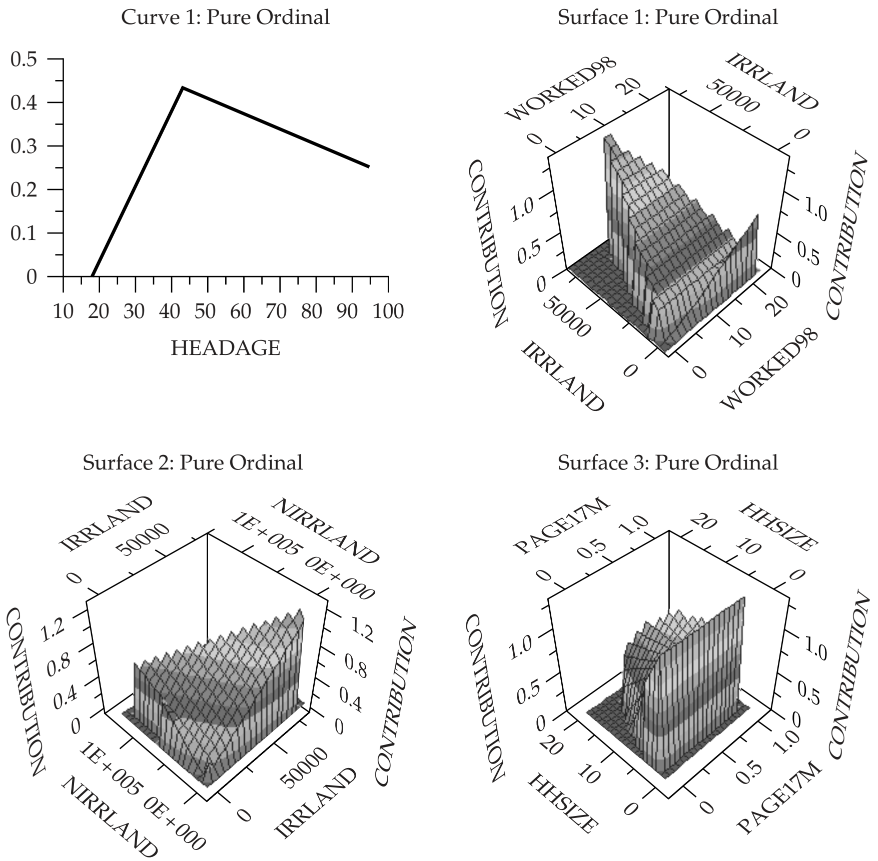
The final model for Kinh-Hoa was:

$$Y = 7.471 + .139911E - 04 \times BF1 - 0.001 \times BF2 + .282305E - 03 \times BF3 - .198950E - 03 \times BF4 - 0.045 \times BF5 + 0.120 \times BF6 + .389904E - 07 \times BF7 + .633461E - 05 \times BF8 + 0.175 \times BF9 - 0.690 \times BF10 + .438774E - 05 \times BF11 - .435589E - 03 \times BF12 - 0.004 \times BF13 - 0.017 \times BF14 + .219940E - 03 \times BF15 - .761529E - 03 \times BF16 + .212414E - 08 \times BF18 + .607371E - 07 \times BF19 + .388523E - 05 \times BF20.$$

This ordinary least squares model had an adjusted R^2 of 0.43, much better than the R^2 of 0.31 that we found for the model in appendix 8A. The MARS model achieves this with just eight variables (see table 8C.1) and so helps one to focus just on the essential elements.

Three insights emerge, which can best be explained with the help of the graphs in figure 8C.1. First, as the age of the household head rises to 43, households become better off; after that, older heads are associated with poorer households (panel 1 in figure 8C.1). Second, more land planted with annual crops ("annual land"), both irrigated and unirrigated, is associated with higher per capita income. Only for households with no land does the educational level of the household head have an important effect on income,

Figure 8C.1. Results of the Multiple Adaptive Regression Spline Model for Kinh-Hoa Households



Note: HHSIZE = number of household members. WORKED98 = years of education achieved by head of household. IRRLAND = area of irrigated land, in m^2. HEADAGE = age of head of household. PAGE17M = proportion of household consisting of men aged 17 or older. NIRRLAND = area of nonirrigated annual land, in m^2.

Source: 1998 VLSS.

suggesting that more education (and perhaps a move to an urban area) might be a substitute for more land (panels 2 and 3 in figure 8C.1). This raises the intriguing possibility that as population pressure leads to greater scarcity of land, there will be a stronger incentive to acquire more education, which in due course will increase the opportunities that emerge in an increasingly urban and nonagricultural society. Third, as household size rises, households are poorer (as measured by per capita expenditure); however, for larger households, this effect is moderated if there is a high proportion of adult males (panel 4 in figure 8C.1).

The MARS model for minority households looks quite different, although many of the same variables come into play. The basis functions, and subsequent model, are as shown in table 8C.2.

Table 8C.2. Basis Functions for MARS Model of Log of Real Per Capita Income, Minority Households

BF1 = max(0, HHSIZE − 8.000);	BF11 = max(0, 48.000 − HEADAGE) × BF3;
BF2 = max(0, 8.000 − HHSIZE);	BF13 = max(0, 11080.000 − FLAND) × BF6;
BF3 = max(0, WORKED98 − 5.000);	BF14 = max(0, PAGE0716 + .120596E − 07) × BF6;
BF4 = max(0, 5.000 − WORKED98);	BF15 = max(0, OTHELAND − 6500.000) × BF4;
BF6 = max(0, 18000.000 − IRRLAND);	BF16 = max(0, 6500.000 − OTHELAND) × BF4;
BF7 = max(0, PELAND + .252347E − 04) × BF6;	BF18 = max(0, 360.000 − OTHELAND) × BF2;
BF8 = max(0, HHSIZE − 3.000) × BF6;	BF19 = max(0, NIRRLAND − 3994.000);
BF9 = max(0, 3.000 − HHSIZE) × BF6;	BF20 = max(0, 3994.000 − NIRRLAND);

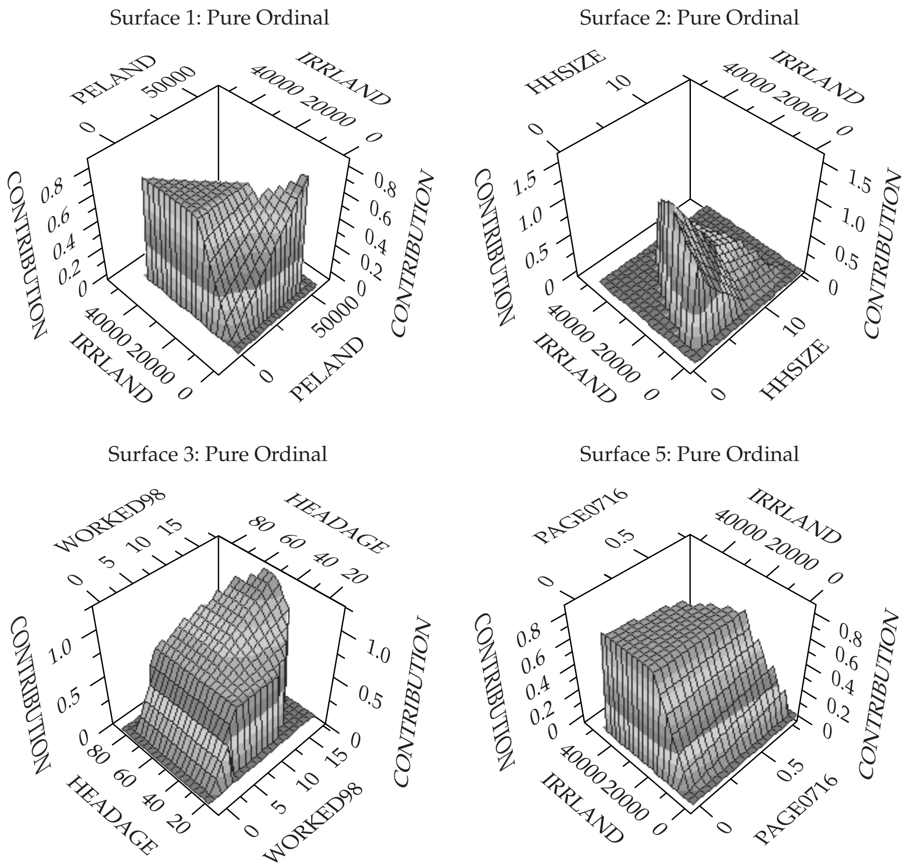
Note: HHSIZE = number of household members. WORKED98 = years of education achieved by head of household. IRRLAND = area of irrigated land, in m^2. PELAND = area of land planted in tree crops. HEADAGE = age of head of household. FLAND = area of forest land operated by household. PAGE0716 = proportion of household ages 7 to 16. OTHELAND = area of land in other uses (that is, not annual, perennial, or forest). NIRRLAND = area of nonirrigated annual land, in m^2.

$$\begin{aligned} Y = 7.349 &- 0.061 \times BF1 + 0.193 \times BF2 + 0.046 \times BF3 - 0.137 \times BF4 \\ &- .486490E-04 \times BF6 + .120914E-08 \times BF7 + .344804E-05 \times BF8 \\ &+ .101408E-04 \times BF9 - 0.002 \times BF11 - .723555E-09 \times BF13 \\ &+ .171787E-04 \times BF14 + .252554E-05 \times BF15 + .163910E-04 \times BF16 \\ &- .987590E-04 \times BF18 + .194643E-04 \times BF19 + .305935E-04 \times BF20. \end{aligned}$$

In this case, the fit of the MARS model ($R^2 = 0.46$) is close to that of the conventional model ($R^2 = 0.44$), but the MARS model is more parsimonious. Not surprisingly, the more land households have under irrigation or perennial crops, the better off they are (panel 1 in figure 8C.2); irrigated land has a particularly large effect on per capita consumption levels. However, the ability to use irrigated land profitably requires complementary labor inputs, particularly from the household, as panel 2 in figure 8C.2 shows.

The third panel in figure 8C.2 shows classic age and educational effects. Reading along the age axis, one sees that income rises quickly, reaching a plateau once the head of the household is 48 years old. The effect is particularly pronounced for households with highly educated heads. Looking along the education axis, we see that more education is associated with higher living standards. Finally, the presence of a high proportion of

Figure 8C.2. Results of the Multiple Adaptive Regression Spline Model for Minority Households



Note: HHSIZE = number of household members. WORKED98 = years of education achieved by head of household. IRRLAND = area of irrigated land, in m^2. PELAND = area of land planted in tree crops. HEADAGE = age of head of household. PAGE0716 = proportion of household ages 7 to 16.

Source: 1998 VLSS.

adolescents in the household appears to be associated with a slightly lower return on irrigated land (panel 4 in figure 8C.2).

Notes

1. The Hoa make up approximately 2 percent of the population of Vietnam, live predominantly in urban areas, and, as will be shown below, are highly assimilated with the Kinh.

2. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

3. In conformity with usual academic usage, we use "assimilate" to mean the selective and voluntary adoption by minority groups of the economic strategies, livelihood practices, and cultural norms common among the majority group. The adoption of such strategies, practices, and norms is selective because they need to be compatible with the socioeconomic conditions of the minorities, and it is voluntary because the decision on whether to adopt them is made, usually on an individual or household basis, by the ethnic minorities themselves. As such, our usage of the word "assimilate" would best translate into Vietnamese as *hoa dong* or *hoa nhap*.

4. The full 1998 VLSS sample also included 140 communes with only Kinh or Hoa households and 6 communes where only ethnic minorities were surveyed.

5. The prices are those of January 1998. The exchange rate in January 1998 was D 12,290 to US$1.

6. The vaccinations are for tuberculosis, diphtheria-pertussis-tetanus, polio, and measles.

7. Primary school in Vietnam extends for five years, from roughly the ages of 6 through 10, although eligibility to attend primary school is determined on the basis of the calendar year of a child's birth and not on his or her age.

8. Only 10 of the 334 primary schools surveyed in the 1998 VLSS taught any lessons in ethnic minority languages. Of these 10 primary schools, 7 were in the Mekong Delta or Southeast.

9. Lower secondary school covers four years, from approximately age 11 until age 14.

10. These calculations assume monogamous marriages (de facto or de jure). Polygamy is known to have been common among affluent members of certain ethnic groups (such as the Kinh and the Hmong) in the past, but it is now officially prohibited. None of the households enumerated in the 1999 Census recorded polygamous marriages.

11. Eleven percent of Tay husbands are married to Kinh wives (compared with 4.8 percent with Nung wives), and 11.2 percent of Nung husbands have Kinh wives (and a further 11.2 percent have Tay wives). Among the Dao, of the 6.2 percent of husbands who intermarry, 3.8 percent are married to Kinh women and a further 1.5 percent are married to Tay, Hoa, or Muong wives.

12. Note that the census included two questions on religion, the first asking if an individual follows a religion and a follow-up question inquiring if he or she practices this religion. Table 8.6 is based on responses to the first question.

13. Examples: United Nations Development Programme (UNDP)–supported Ethnic Minority Development project (VIE/94/013–VIE/96/010), UNDP–International Fund for Agricultural Development-supported Ha Giang Development Project for Ethnic Minorities (VIE96/027), Swedish International Development Authority (SIDA)–supported Minority Rural Development Project, SIDA-supported Vietnam-Sweden Inter-Forest (social forestry) Project, and UNDP Regional Project—Highland People.

14. In 1992, rural Kinh and Hoa households cultivated an average of 724 m^2 of "good quality" land, of which 615 m^2 was irrigated; for ethnic minorities, the overall figure was 178 m^2, of which just 62 m^2 per household was irrigated. "Good quality" land is defined as land that yields four tonnes or more of paddy (or equivalent) per hectare per year.

15. We also estimated separate equations for urban Kinh and urban Hoa and for rural Kinh and rural Hoa, rural Khmer, rural Central Highlands minorities, and rural Northern Uplands minorities. The detailed results are not reported here, but were used in the decompositions reported in table 8.7.

16. A similar effect was found by van de Walle and Gunewardena (2001) using the 1993 VLSS.

17. The Khmer have been excluded from our decomposition analysis because of the small number (95) of Khmer included in the 1998 VLSS, as well as problems of missing data for some of the Khmer households that were sampled.

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Part III

Progress in Health and Education in Vietnam in the 1990s

9

Poverty and Survival Prospects of Vietnamese Children under *Doi Moi*

Adam Wagstaff and Nga Nguyet Nguyen

In the mid-1980s, under a policy known as *Doi Moi* ("renovation"), Vietnam started dismantling its command economy, creating in its place a market-oriented domestic economy and opening its doors to international trade, foreign direct investment, and development assistance. Under *Doi Moi*, Vietnam has achieved impressive rates of economic growth (5–10 percent a year) and has reduced levels of absolute poverty (Glewwe, Gragnolati, and Zaman 2000). *Doi Moi* was also accompanied by a reduction in the scale and quality of public health services (at least in some areas), the introduction of user fees, and the encouragement of a private health sector (World Bank and others 2001). Some have expressed concerns that these developments may be having damaging effects on health outcomes, especially among poorer households (Dahlgren 2000). The broad issue this chapter addresses is how one dimension of human development—child survival—has changed under *Doi Moi*. In doing so, special attention is paid to the situation facing poor households.

- By international standards, and especially given its relatively low per capita income, Vietnam has achieved substantial reductions in, and low levels of, the infant mortality rate (IMR) and under-five mortality rate (U5MR). By the mid-1980s, its rates were among the lowest in the developing world. The first issue this chapter will address is, has this reduction in child mortality been sustained under *Doi Moi*? The Vietnamese government's own goal was to reduce the IMR to 30 per 1,000 (that is, 30 per 1,000 live births) by the year 2000. There is some debate over the exact level of the IMR in Vietnam and hence over whether the government's goal for 2000 has been achieved. The evidence on recent trends in child mortality is assessed from a variety of sources, and some new estimates are derived from the 1993 and 1998 Vietnam Living Standards Surveys (VLSSs).[1]

- The second question is, what are the socioeconomic differentials in child survival? Previous research by one of the authors (Wagstaff 2000) suggests that, by international standards, inequalities in IMR and U5MR between poor and better-off children were extremely low in Vietnam. These results were based, however, on VLSS data covering survival and deaths among children over the period 1984–93. It is quite possible—and indeed the fear has been expressed by some—that gaps in child survival prospects between the poor and better-off may have started to widen in Vietnam. In this chapter, data from the 1998 VLSS will be used to measure the extent of socioeconomic inequalities in child mortality over the period 1989–98. By comparing inequalities over the periods 1984–93 and 1989–98, it can be seen if any recent reductions in child mortality have been evenly spread across the population, or whether the gains have been concentrated on better-off children.
- The third question to be addressed is, what factors have caused the recent changes in child mortality and any changes in inequalities in child mortality? What role, for example, has economic growth played? Have changes in the health care sector affected child survival prospects, and if so to what extent? Have changes equally affected all groups? These questions may be answered by estimating child survival models that link child survival to the underlying determinants of survival, such as the child's age and gender, the education level of the mother, the income of the household, its water and sanitation, and variables capturing the success of local health services in delivering key maternal and child health interventions (immunization and prenatal care). A decomposition analysis is then undertaken to see how different factors contribute to the overall decline in mortality and the changing inequalities.
- Finally, how are child survival prospects likely to evolve over the next 15 years? Vietnam is currently preparing a Poverty Reduction Strategy Paper (PRSP) to qualify for continued development assistance through the International Development Association. In the PRSP, countries not only set out their poverty reduction strategies but also commit themselves to achieving targets for poverty and human development indicators.[2] The targets being set by other countries include the IMR and U5MR, because these are among the seven key Millennium Development Goals (MDGs).[3] The latter involve, among other things, a reduction by all countries of the IMR and U5MR by two-thirds by 2015. This chapter addresses the issue of whether such a reduction is possible for Vietnam and whether commitment to such a path would be realistic for Vietnam's PRSP. To do this, the survival model described briefly above is used and projected forward to 2015, making assumptions about income growth, as well as the evolution of water and sanitation, and health services.

The section that follows this brief background reviews the evidence on recent trends in child survival at the population level. The next section, "Changing Inequalities in Child Mortality under *Doi Moi*," explores trends in socioeconomic inequalities in child survival. The following section outlines the empirical model used in the remainder of the chapter. The section titled "Causes of the Recent Changes in Child Survival in Vietnam" presents and discusses the parameter estimates and then uses these parameter estimates to explain recent changes in the levels of and inequalities in child mortality. The next section uses the model to explore likely trends in child survival up to 2015—the year by which the MDGs are supposed to be reached. Finally, this chapter concludes with a discussion of the issues raised by the findings and discusses some policy options.

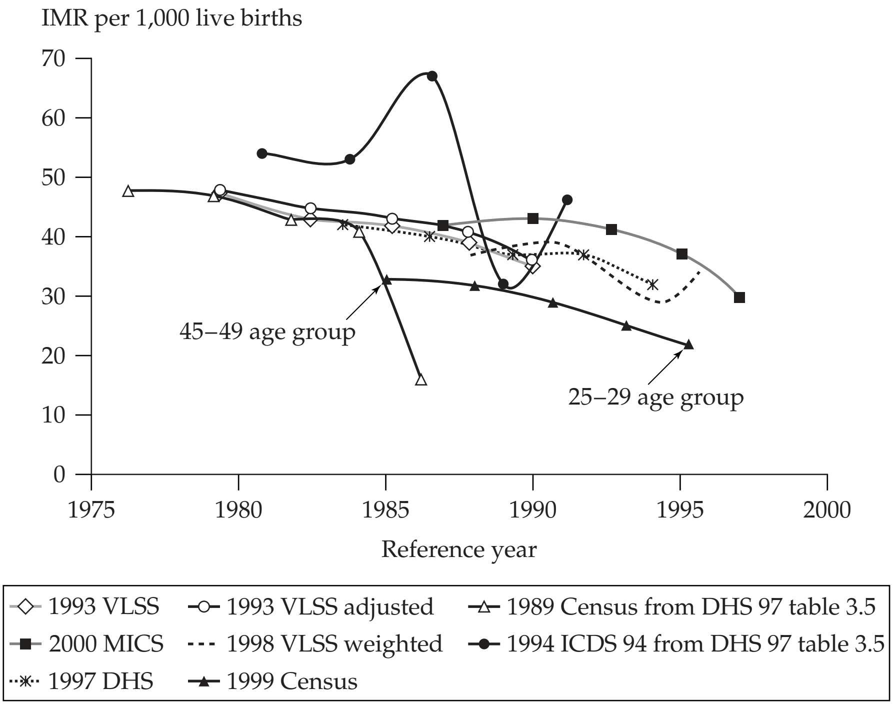
Recent Trends in Child Mortality in Vietnam

A number of sources are available for estimation of recent trends in the IMR and U5MR in Vietnam. Published estimates include those based on the 1989 Census, the 1994 Inter-Censual Demographic Survey (ICDS), the 1997 United States Agency for International Development–funded Demographic and Health Survey (DHS) (Government of Vietnam 1999), the 1999 Census (Central Census Steering Committee 2000), and the 2000 United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Survey (MICS) (Government of Vietnam 2000).[4] In addition, fertility histories were collected in the 1993 and 1998 VLSSs, and IMR and U5MR are reported based on these surveys. In the censuses, the ICDS, and the MICS, incomplete fertility histories were collected—women of fertile age were asked how many children they had ever given birth to and how many of these were still alive, but not the dates of birth and death (if applicable) of these children. Such data require that mortality estimates be estimated using the so-called indirect estimation method, which involves taking the data on fertility and proportions of children surviving and superimposing them on model life tables. In the DHS and VLSSs, by contrast, complete fertility histories were obtained—women reported when each child was born and if and when any of these children died. With such data, mortality estimates can be obtained using standard life table methods (the direct method of mortality estimation) and standard errors can be computed for the estimates. The complete fertility history is clearly more demanding in terms of recall than the incomplete fertility history, but it potentially leads to more accurate estimates. Of course, because the data also contain the information collected in the incomplete fertility history, the indirect method can also be used, so that the direct and indirect estimates for the DHS and VLSSs can be compared.

Indirect Estimates of Infant and Under-Five Mortality in Vietnam

This section compares the published estimates from the 1989 and 1999 Censuses, the 1994 ICDS, and the 2000 MICS with indirect estimates computed

Figure 9.1. Indirect Estimates of the Infant Mortality Rate



Note: DHS = Demographic and Health Survey. ICDS = Inter-Censual Demographic Survey. IMR = infant mortality rate. MICS = Multiple Indicator Cluster Survey.

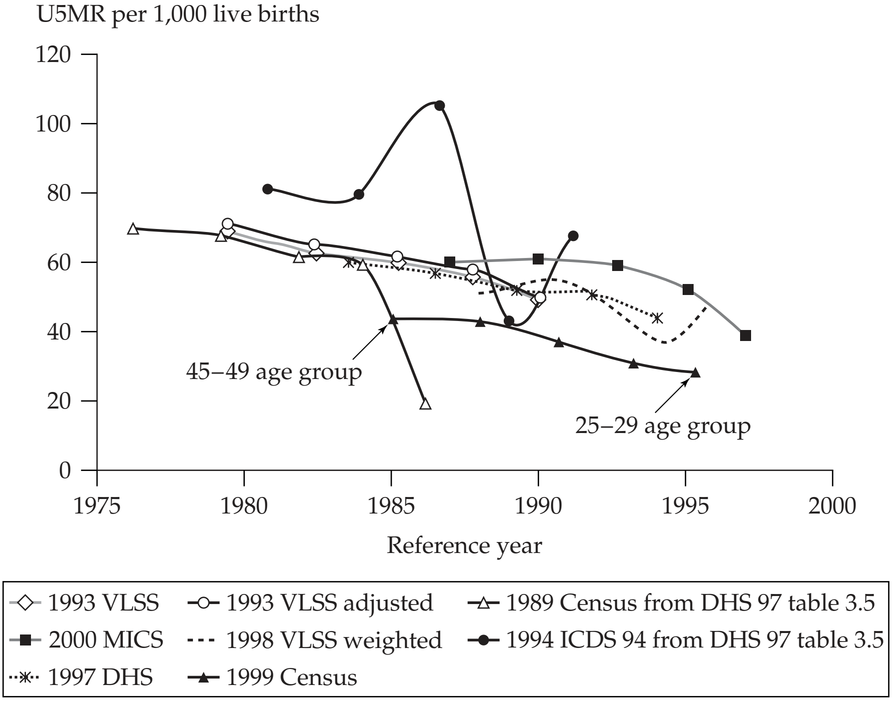
Sources: VLSS: authors' calculations; other surveys: as indicated in legend.

from the 1997 DHS and the 1993 and 1998 VLSSs. These indirect estimates are then compared with estimates obtained using the direct method from the DHS and the two VLSSs.

Figures 9.1 and 9.2 show the IMR and U5MR obtained from the censuses and the household surveys using the indirect method (United Nations 1983). This involves superimposing on model life tables the data on live births and deaths. Estimates were obtained using the computer program QFIVE (United Nations 1983). (See appendix 9A for the full technical details and assumptions made in their derivation.) With the indirect method, separate mortality estimates are obtained for women in different age groups; the age bands typically used in these exercises are 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, and 45–49. Obviously, the rates among the older age groups capture mortality rates in earlier periods than those among the younger age groups. Typically, the rates among the youngest group—and often those among the second-youngest group as well—are ignored on the grounds that they reflect the higher risks associated with pregnancies among younger women.

One striking feature of both figures is the high level and odd pattern to the estimates derived from the ICDS. Hill and others (1999) noted this in

Figure 9.2. Indirect Estimates of the Under-Five Mortality Rate



Note: DHS = Demographic and Health Survey. ICDS = Inter-Censual Demographic Survey. MICS = Multiple Indicator Cluster Survey. U5MR = under-five mortality rate.

Sources: VLSS: authors' calculations; other surveys: as indicated in legend.

their analysis of trends in child mortality in Vietnam and decided to discard the ICDS-based estimates. The 1989 Census also gives some rather implausible numbers for the 25–29 and 30–34 age groups. The other estimates give a clear picture of declining IMR and U5MR, with little sign of any stagnation in recent years. There is clearly some uncertainty, however, over the actual levels of the IMR and U5MR.

Direct Estimates of Infant and Under-Five Mortality Rates in Vietnam

The mechanics of the direct method are illustrated in table 9.1 for data from the 1998 VLSS, where—for the purpose of the table—children born in the previous 10 years were included. This resulted in 5,316 children being selected. The first row of column 4 indicates that 195 children were withdrawn during the first six months (the interval used in this example), meaning that 195 children were born within the six months before the survey and therefore had fewer than six months of exposure. The assumption is that these 195 children were, on average, exposed for only half of the six months,[5] so that the total number of children exposed during the first six months was

Table 9.1. Life Table from the 1998 Vietnam Living Standards Survey

1 Start of interval	2 End of interval	3 Entering interval (number)	4 Withdrawn during interval (number)	5 Exposed to risk (number)	6 Deaths (number)	7 Cumul. proportion surviving at end	8 Mortality rate $_{x}q_{0}$	9 Std. error of cumul. proportion surviving	10 Relative std. error	11 Hazard rate
0.0	0.5	5,316	195	5,219	114	0.9782	21.8	0.0020	0.0917	0.044
0.5	1.0	5,007	159	4,928	15	0.9752	24.8	0.0022	0.0887	0.006
1.0	1.5	4,833	176	4,745	12	0.9727	27.3	0.0023	0.0842	0.005
1.5	2.0	4,645	190	4,550	4	0.9719	28.1	0.0023	0.0819	0.002
2.0	2.5	4,451	198	4,352	15	0.9685	31.5	0.0025	0.0794	0.007
2.5	3.0	4,238	189	4,144	0	0.9685	31.5	0.0025	0.0794	0.000
3.0	3.5	4,049	226	3,936	13	0.9653	34.7	0.0026	0.0749	0.007
3.5	4.0	3,810	228	3,696	0	0.9653	34.7	0.0026	0.0749	0.000
4.0	4.5	3,582	232	3,466	4	0.9642	35.8	0.0027	0.0754	0.002
4.5	5.0	3,346	286	3,203	0	0.9642	35.8	0.0027	0.0754	0.000

5,316, less half of 195, or 5,219 (column 5). Of the 5,316 born during the previous 10 years, 114 died during the first six months, so that the proportion surviving was (5,219 − 114)/5,219, or 0.9782. The mortality rate for the first six months, ${}_{0.5}q_0$, is equal to $(1 - 0.9782) \times 1{,}000$, or 21.8 per 1,000 births.

The number of children starting the second six months of life is 5,316 − 195 − 114, or 5,007 (see the second row of table 9.1). Of these, 159 are exposed fewer than six months—they were born less than one year before the survey. Of the 4,928 children exposed to the risk of death in the second half of their first year of life, 15 died before their first birthday, giving a cumulative proportion of children surviving from birth to their first birthday of 0.9752. Column 7 thus shows the survival function, $S(t)$. Thus, the IMR (an infant being a child younger than one year old) is 24.8 per 1,000 live births. Column 9 gives the standard error of the cumulative proportion surviving or, equivalently, the standard error of the mortality rate from birth to the end of the interval in question. Column 10 gives this expressed as a proportion of the mortality rate. The final column shows the hazard rate, $\lambda(t)$—the rate at which $S(t)$ decreases over time, $-\mathrm{d}\ln S(t)/dt$. Finally, the bottom row of column 8 gives the U5MR, ${}_5q_0$, which in this case is 35.8 per 1,000 live births, with a standard error equal to 7.5 percent of the mortality rate.

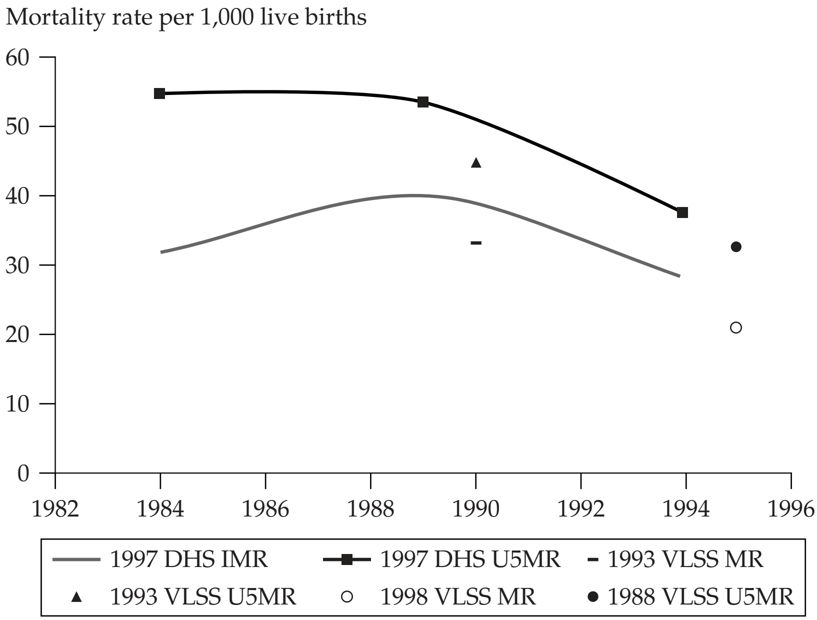
Figure 9.3 compares the IMR and U5MR estimates from the 1993 and 1998 VLSSs and the 1997 DHS. In each case, for ease of comparison, the rates shown are those computed using children born in five-year intervals. The markers in the chart are placed at the year in the middle of the five-year interval. In the case of the DHS, all the rates reported were computed using data in the 1997 DHS,[6] whereas in the case of the VLSS, the rates are shown for the corresponding VLSS. Thus, the rate for 1990 is computed on births recorded in the 1993 VLSS over the preceding five years, and the rate for 1995 is computed on births recorded in the 1998 VLSS in the five years before the survey.[7]

Two points are worth making here. First, the DHS and VLSS, once again, show a fair amount of consistency, especially the rates computed from the 1998 VLSS, which are well in line with simple projections from the DHS estimates. Second, the directly estimated rates are somewhat lower than the majority of the indirectly estimated rates, including those from the DHS and VLSS themselves. The direct estimates are, however, close to the unadjusted 1999 Census-based estimates shown in figures 9.1 and 9.2.

Key Points

The first key point to emerge from this discussion is that the IMR and U5MR appear to have continued to fall under *Doi Moi*—there is no sign in the data of any decrease in the rate of reduction. The second key point is that the IMR would appear to have fallen below the target figure for 2000 of 30 per 1,000. Indeed, the evidence suggests that this target was probably reached in the mid-1990s, and the figure now may well be around 25 per 1,000 or even below that number.

Figure 9.3. Direct Estimates of Infant and Under-Five Mortality Rates



Sources: VLSS: authors' calculations; other surveys: as indicated in legend.

Changing Inequalities in Child Mortality under *Doi Moi*

Previous research by one of the authors (Wagstaff 2000) suggests that by international standards, inequalities in the IMR and U5MR between poor and better-off children were extremely low in Vietnam. These results were based, however, on VLSS data covering survival and deaths among children over the period 1983–92. The question is whether under *Doi Moi* a gap in survival prospects between poor and better-off children has opened up. Have the apparent continued gains in child survival under *Doi Moi* been spread equally across the population?

Data and Methods

There are two sources of data that shed light on this issue. First, the earlier analysis of the 1993 VLSS can be replicated using the 1998 VLSS data. As in the earlier VLSS analysis, deaths over the preceding 10 years are included in the analysis of the 1998 VLSS data.[8] Households are ranked by equivalent household consumption in the analysis of the 1993 and 1998 VLSS data, and then the children born during the preceding 10 years are sorted into quintiles. These quintiles are therefore quintiles of live births. Quintile-specific life tables are thus produced for each year, and thereby quintile-specific IMR and U5MR are obtained.

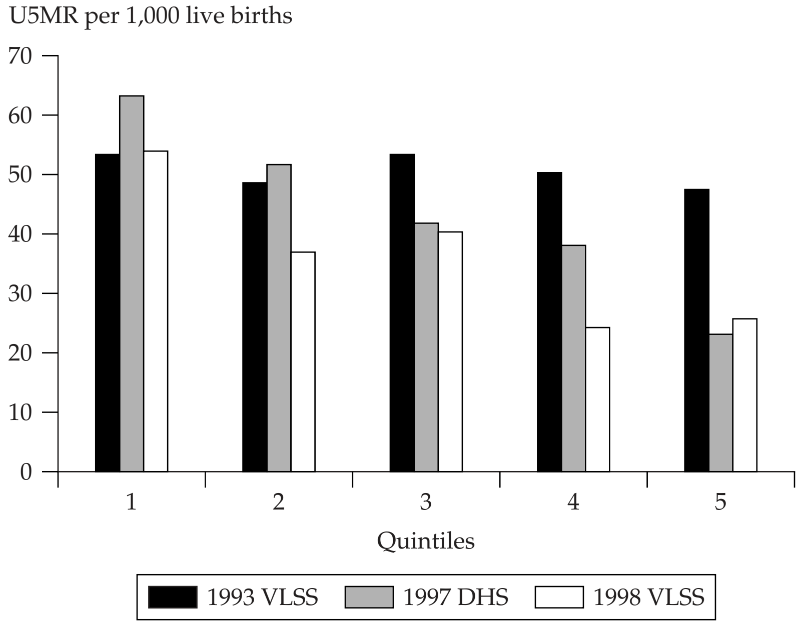
Second, these two sets of VLSS results can be compared with the DHS-based results reported by Gwatkin and others (2000). These show IMR and

U5MR for different quintiles of wealth, where the wealth measure is obtained by means of a principal components analysis on a variety of indicators of household living standards[9] along the lines proposed by Filmer and Pritchett (1999). A point to bear in mind is that the quintiles in Gwatkin and others (2000) are quintiles of *households*, not of live births. This makes comparison of the VLSS and DHS results somewhat awkward, because the lower-wealth groups have higher fertility rates and hence have a share of live births that is in excess of their population share. This problem can be overcome, however, using concentration curves (Kakwani, Wagstaff, and van Doorslaer 1997; Wagstaff, Paci, and van Doorslaer 1991). In this case, these are formed by ranking live births by the living standards of the child's household and then plotting the cumulative percentage of live births so ranked on the horizontal axis and the cumulative percentage of deaths (infant or under-five) on the vertical axis. If deaths are concentrated among poorer households, the resultant curve—the concentration curve—will lie above the diagonal, or line of equality. The farther above the line of equality it lies, the greater the degree of concentration of deaths among poorer households.

Results on Trends in Socioeconomic Inequalities

Figure 9.4 shows, for the 10-year period preceding each of the three surveys, the U5MR for each quintile of living standards. Over the period 1983–92,

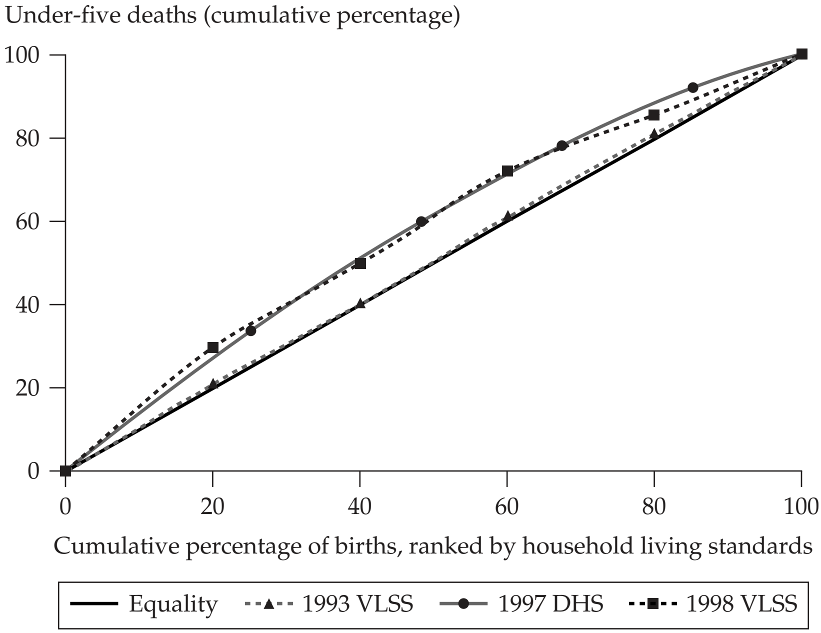
Figure 9.4. Trends in Under-Five Mortality, by Consumption Quintile



Note: U5MR = under-five mortality rate.

Sources: VLSS: authors' calculations; DHS: Gwatkin and others (2000).

Figure 9.5. Concentration Curves for Under-Five Mortality



Sources: VLSS: authors' calculations; DHS: Gwatkin and others (2000).

there was very little difference between the survival prospects of poor and better-off children in Vietnam. By contrast, over the periods 1987–96 and 1988–97, there were marked inequalities between the poor and better-off. The VLSS data are more directly comparable, because in each year the quintiles are quintiles of live births, and the ranking variable is the same (equivalent consumption). The VLSS results suggest that the national reductions in child mortality uncovered in the previous sections have not been spread evenly across the Vietnamese population—the upper socioeconomic groups have seen appreciable reductions in child mortality, but the poorer Vietnamese children have seen little improvement in their survival prospects in recent years. The problem of the DHS data being quintiles of households can be overcome by using the concentration curve device. Figure 9.5 shows the concentration curves for the U5MR; the nonalignment of the markers for the DHS data with the quintile cutoffs reflect the higher fertility of poorer households. It is striking how close the 1997 DHS and the 1998 VLSS concentration curves are to one another and how far they are from the curve for the 1993 VLSS.

Key Points

There are just two key points that can be inferred from this discussion. First, both the 1997 DHS data and the 1998 VLSS data indicate that inequalities in child survival between poor and less poor children now exist in Vietnam. Second, these inequalities appear to be a recent phenomenon—they were not evident in the 1993 VLSS data. Under the recent years of *Doi Moi*, reductions in child mortality have not been spread evenly, being heavily concentrated among the better-off. Poorer Vietnamese children do not appear to have seen any appreciable improvement in their survival prospects in recent years.

Modeling Child Survival in Vietnam

The estimates discussed above suggest that the IMR and U5MR continued to fall during the past decade in Vietnam at the population level, but these improvements were heavily concentrated among better-off children. This section will outline and estimate a model intended to help explain these differential changes in survival prospects.

The Basic Model

Child survival could be modeled using either a production function (an equation linking survival to the proximate determinants of survival, such as usage of health care, dietary and sanitary practices, and so on) or a reduced-form or demand equation for child survival (an equation linking survival to the variables that influence households in the choices they make over the proximate determinants of survival) (Schultz 1984). The authors in this case opt for the demand equation and thus link survival to household resources and variables affecting the "shadow price" of child survival (Grossman 1972). The coefficients in the equation reflect both technology and behavior. For example, if piped water and private inputs in child health production are substitutes, an increase in piped water might reduce spending on private inputs in child health production so much that health falls (Jalan and Ravallion, 2001). Variables that lower the shadow price of child survival—such as parents' education, the local availability and quality of medical services, health insurance coverage, and so on—should increase the household's demand for child survival.

By contrast, variables that raise the shadow price of survival—such as poor local sanitary conditions and bad environment—would be expected to be negatively associated with survival in the survival demand function. Increases in mean survival time could be due to either movements along the demand equation (rising incomes allowing households to feed their children better) or shifts in the demand equation (households being able to buy more or better-quality food from a given amount of income).

The complete fertility history data over the first 10 years of life are used here to estimate the determinants of child survival. It makes sense in such a context to use a duration model. Similar to Lavy and others (1996), a Weibull model is used with covariates (Greene 1997). Let $S(t)$ be the survival function at time t, and $\lambda(t)$ be the hazard rate at time t. The latter measures the rate at which the survival function decreases over time and is therefore equal to $-d\ln S(t)/dt$. The basic Weibull model assumes the existence of a basic time-invariant hazard rate, λ, to which the hazard rate at time t is linked by equation 9.1:

$$\lambda(t) = \lambda p(\lambda t)^{p-1} \tag{9.1}$$

where p is a parameter, with $p < 1$ indicating that $\lambda(t)$ falls continuously over time, and $p > 1$ indicates the opposite. In the case of child survival, it is likely that p will be less than one, because $S(t)$ drops sharply in the first year and then starts to level out. It is linked to the basic hazard, λ, and the parameter p by the function in equation 9.2:

$$S(t) = e^{-(\lambda t)p}. \tag{9.2}$$

Thus, a higher basic hazard reduces the proportion of children surviving to any specific age. The econometric model then seeks to explain variations in λ. The model takes the form of equation 9.3:

$$-\ln \lambda_i = \beta x_i \tag{9.3}$$

where λ_i is the basic hazard rate for child i, β is a vector of parameters, and x_i is a vector of determinants of child survival. Notice the dependent variable is decreasing in the hazard and hence increasing in survival duration—a positive β thus indicates a longer life. Although the hazard rate is unobserved at the individual level, survival times *are* observed. Using this information, a maximum likelihood estimator can be derived, the application of which results in estimates of the coefficient vector β as well as the parameter p. This estimator takes into account any censoring—children who were alive in 1993 (or 1998) but had not yet reached their 10th birthday and who had therefore not been exposed to the risk of death for the full 10-year period over which the Weibull model is estimated.

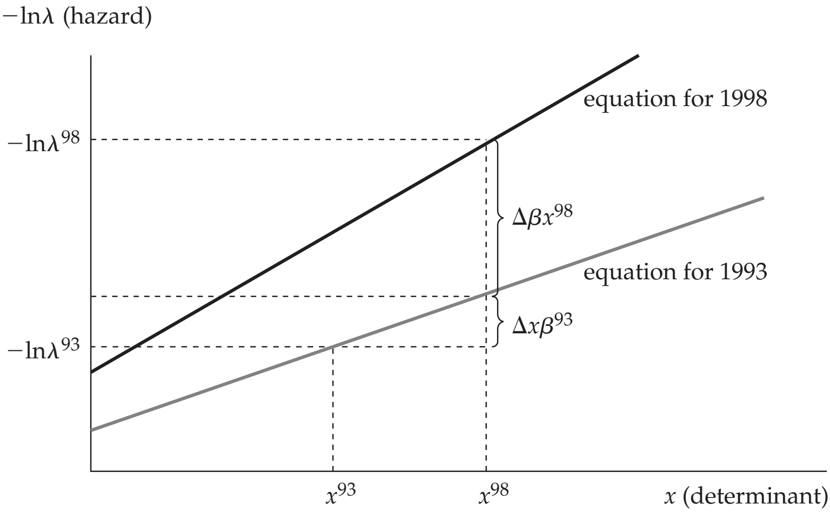
Decomposing Sources of Change

The interest is in uncovering the reasons behind the uneven distribution of child survival improvements across socioeconomic groups. By using an Oaxaca-type decomposition (Oaxaca 1973) over time, a distinction can be made between two sources of mortality decline: movements along a regression equation and shifts in it (see figure 9.6). The increase from $-\ln \lambda_{93}$ to $-\ln \lambda_{98}$ in the figure represents an improvement in survival prospects. If Δ is used to denote change, this is seen as the result of a move along the 1993 equation, giving rise to a change in $-\ln \lambda$ equal to $\Delta x\ \beta_{93}$, and then a shift from the resultant point on the 1993 equation to the final point on the 1998 equation, giving rise to a further change in $-\ln \lambda$ equal to $\Delta\beta\ x_{98}$. Thus, as shown in equation 9.4:

$$\Delta[-\ln \lambda] = \Delta x \cdot \beta_{93} + \Delta\beta \cdot x_{98}. \tag{9.4}$$

Alternatively, the final point in figure 9.6 could have been reached by first shifting from the 1993 equation to the 1998 equation, giving rise to a

Figure 9.6. Decomposing the Sources of Changes in Child Mortality



change in $-\ln\lambda$ equal to $\Delta\beta\ x_{93}$, and then moving along the 1998 equation to the final point, giving rise to a further change in $-\ln\lambda$ equal to $\Delta x\ \beta_{98}$. Thus, an alternative decomposition can be shown in equation 9.5:

$$\Delta[-\ln\lambda] = \Delta x \cdot \beta_{98} + \Delta\beta \cdot x_{93}. \tag{9.5}$$

The left-hand side (LHS) in each case can be interpreted as the negative of the percentage change in the hazard between 1993 and 1998; thus, a rise in this quantity indicates improved survival prospects.[10] The first term on the right-hand side (RHS) indicates the percentage change in the hazard attributable to changes in the means of the covariates, and the second term on the RHS indicates the percentage change in the hazard attributable to changes in the coefficient vector.

The decomposition could be undertaken for the sample as a whole to understand the sources of the continued decline in child mortality at the population level, but it can also be applied to different socioeconomic groups. Of particular interest here is understanding why mortality has declined among better-off children but not among poor children. To investigate this, the births in the sample are divided into two groups: the poorest quartile of children (the poor) and the most well-off three quartiles (the nonpoor). The smaller decline in mortality among poor children may be due to any or all of four reasons: (1) the poor experienced less advantageous changes in the x's; (2) changes in the x's mattered less for the poor, because they face a worse set of coefficients linking survival determinants to survival outcomes; (3) the poor experienced less advantageous changes in the β's; and (4) changes in the β's mattered less to the poor, because they have worse determinants to start with. Thus, in a similar vein to Makepeace and others (1999), a decomposition can be written for the *differential* change in mortality across poverty groups, as in equation 9.6:

$$\Delta[-\ln \lambda^{NP}] - \Delta[-\ln \lambda^{P}] = D_1 + D_2 + D_3 + D_4 \tag{9.6}$$

where the LHS indicates how much more $-\ln \lambda$ has risen for the nonpoor as compared with the poor, and

$$D_1 = \left(\Delta x^{NP} - \Delta x^{P}\right)\beta_{98}^{NP}$$

$$D_2 = \left(\beta_{98}^{NP} - \beta_{98}^{P}\right)\Delta x^{P}$$

$$D_3 = \left(\Delta \beta^{NP} - \Delta \beta^{P}\right)\Delta x_{93}^{NP}$$

$$D_4 = \left(x_{93}^{NP} - x_{93}^{P}\right)\Delta \beta^{P}.$$

Terms D_1–D_4 correspond to points (1)–(4) above. There is no reason, of course, why D_1, D_2, D_3, and D_4 should all be positive—it may well be that some changes made a smaller reduction in mortality among the nonpoor (one or more of the terms in equation 9.6 might be negative).

Components (1) and (4) are straightforward to rationalize—it is expected that the poor and nonpoor will have different mean values of the x's in any one year, and these means may change differently across the two consumption groups. Jalan and Ravallion (2001) develop a theoretical model that rationalizes differential β's across the poor and nonpoor. In their model, child health depends on parental inputs and other inputs (such as piped drinking water). If parental inputs and, say, piped water are complements, parents will increase their own inputs when piped water increases, and it is likely that child health will increase. Jalan and Ravallion also show that if parents' inputs and water are complements, the impact of water on health is likely to rise with income, and if they are substitutes, the impact of water on health may well fall with income. All this applies equally to other nonparental inputs, such as sanitation.

If the β's differ across the poor and nonpoor at any time point, it seems likely that they may also change differently over time in the two groups—hence D_3 in equation 9.6 may be nonzero. This possibility was explored, but the estimated model in which the β's were allowed to change differently across the two consumption groups produced predicted values of the IMR and U5MR that were a long way from the actual values (see table 9.4). They therefore settled on a model that allows D_1, D_2, and D_4 to be nonzero but D_3 is constrained to be zero. This allows for poor and nonpoor children to experience different changes in the means of the health determinants, as well as for them to have different values of and different impacts of these determinants at the relevant time point. This does not allow, however, for differential changes in the impacts of the determinants. In the Weibull model used here, the x's, a 1998 dummy, a vector of interactions between the x's, the 1998 dummy, a dummy indicating whether the child is poor, and a vector of interactions between the x's and the "poor" dummy are all included. In so doing, the parameter p is constrained to be constant over time. Tests revealed this to be a reasonable assumption.

Data and Variable Definitions

Three sets of variables are included in this survival demand equation—child-level, household-level, and community-level variables (see table 9.2 for variable definitions). At the level of the child, the child's gender and age are included. The hazard is likely to decrease with age, at least up to a point.

Table 9.2. Variable Definitions, Means, and Standard Deviations

	1993		*1998*	
Variable	*Mean*	*Standard deviation*	*Mean*	*Standard deviation*
Regional (omitted Mekong Delta)				
Northern Uplands	0.18	0.38	0.21	0.41
Red River Delta	0.23	0.42	0.17	0.37
North Central Coast	0.15	0.35	0.16	0.37
Central Coast	0.10	0.30	0.11	0.31
Central Highlands	0.04	0.20	0.06	0.24
Southeast	0.10	0.31	0.10	0.30
Child's characteristics				
Boy	0.52	0.50	0.51	0.50
Child's age	5.12	2.84	5.69	2.77
Household characteristics				
Log equivalent household consumption	8.12	0.52	8.38	0.55
Years schooling of mother	6.45	3.79	6.68	3.88
Safe water	0.20	0.40	0.31	0.46
Acceptable sanitation	0.13	0.34	0.19	0.39
Community characteristics				
Vaccination coverage—nonself mean (percent)	45.54	27.06	62.11	30.11
Prenatal visit coverage—nonself mean (percent)	39.45	28.35	49.98	28.92
Medically trained delivery coverage—nonself mean (percent)	70.14	31.86	70.35	32.46
Facility delivery coverage—nonself mean (percent)	50.93	37.45	53.93	37.94

Source: 1993 and 1998 VLSSs.

From previous research, the coefficient on "boy" would be expected to be negative. Among the household-level variables, the number of years of schooling of the mother, the logarithm of equivalent household consumption, and dummies indicating whether the household had safe drinking water and satisfactory sanitation facilities are included.[11] The equivalence scale used was simply the square root of the number of household members, which allows for economies of scale in household production but not for differences in food and other requirements across people of different ages and genders. Consumption was measured in the same way in each year, and the 1993 data were expressed in 1998 prices using the Vietnam consumer price index. For the drinking water and sanitation dummies, this study aimed to get as close as possible to the UNICEF definitions (Government of Vietnam 2000), though in the case of sanitation, the figures are probably somewhat conservative.[12]

At the community level, six regional dummies (the omitted region is the Mekong Delta) and variables intended to capture the local quality and availability of medical services are included.[13] The latter variables are not straightforward to define. Several recent studies (including Lavy and others [1996] and Thomas, Lavy, and Strauss [1996]) have included variables capturing whether or not local health facilities had drugs and essential medicines in stock, the numbers of nurses and other medical staff, and so on. This approach is not unproblematic, especially in the present context. In urban areas, it is far from clear which facilities should be included in an assessment of input availability, and indeed most facility surveys undertaken alongside a household survey do not collect such information in urban areas. The VLSS is no exception to this pattern. Furthermore, even in rural areas, there is the scope for missing important potential providers of services—especially in the private sector, which is often not included in such assessments. This is problematic in the case of the VLSS, where the focus in the facility survey (which in any case was only undertaken in 1998) was on commune health centers. Recently, these have diminished in importance as other providers—including private physicians—have increased in importance.

There is one other problem, which concerns the ability of inventory-type facility surveys to capture the ability of facilities to deliver services. Childhood immunization—which clearly is potentially very important in the context of child survival—is a case in point. In Vietnam, immunization in rural areas is typically delivered through a concerted outreach campaign over a limited time, with the necessary equipment (refrigerators, cold boxes, vaccines, and so on) being borrowed or procured for the period of the campaign. An inventory approach is ill equipped to capture the ability of a facility to deliver such a service.

Key Points

In light of these problems, the local availability and quality of medical care were measured by variables that capture the output of the local health care facilities.[14] The focus is on primary care (preventive) activities; the quality of local services' coverage rates and average use rates of certain key maternal and child health services in the child's village are included as proxies. Such services include vaccinations (the full course of four key vaccinations for measles, diphtheria-pertussis-tetanus, polio, and tuberculosis; prenatal visits (two or more visits); and deliveries by medically trained personnel and in medical facilities. The rates and the averages were computed from household data on services used in respect of last-born children. Because the number of observations can be fairly small in each village, the nonself (or dropout) mean, not the actual mean, was computed. This reduces the likelihood of endogeneity and ensures that the variables are the arguments of a demand function and not a production function.

Causes of the Recent Changes in Child Survival in Vietnam

The decomposition method is now applied to try to uncover the reasons for the faster decline in mortality among better-off children over the 1993–98 period.

Estimation Results

Table 9.3 shows the parameter estimates of the model. The *p* values are based on standard errors adjusted for clustering at the village level.[15] Nonpoor children living in the Central Highlands and Southeast have significantly better survival prospects than those living in the Mekong Delta, but living in these areas significantly *reduces* survival prospects for the poor. This does not change over time, and none of the other regional coefficients are significant. Nonpoor children living in the Central Highlands and Southeast have significantly better survival prospects than those living in the Mekong Delta, but among the poor, living in these areas significantly reduces survival prospects. This does not change over time, and none of the other regional coefficients are significant. These results do not appear to be inconsistent with findings from Baulch and others (2004 [chapter 8 in this volume]) on ethnic minority development in Vietnam. They find that Northern Uplands minorities and the Khmer seem to be doing well out of a strategy of assimilating (both economically and culturally) with the Kinh-Hoa majority, but other groups in that region are attempting to integrate economically while retaining distinct cultural identities. By contrast, Central Highlands minorities and the Hmong have largely been left behind by the growth process. Such diversity in socioeconomic development, coupled with the fact that 67 percent of the poor in the Central Highlands were minorities in 1998, can help to explain why, other things being held constant, the poor in the Central Highlands had worse survival prospects than those living in the Mekong Delta and the poor in the Northern Uplands did not.

As for other explanatory variables, the child's gender and age have no significant effect on survival prospects—this is true for 1993 and 1998 and

Table 9.3. Weibull Parameter Estimates

	Base		*Year interactions*		*Poor interactions*	
Variable	*Coeff.*	*p value*	*Coeff.*	*p value*	*Coeff.*	*p value*
Northern Uplands	2.054	0.13	−2.862	0.17	−0.418	0.87
Red River Delta	−0.087	0.95	−1.170	0.62	−3.129	0.21
North Central Coast	−0.067	0.96	0.695	0.78	0.857	0.73
Central Coast	0.609	0.66	−1.134	0.58	−0.998	0.67
Central Highlands	2.573	0.06	−2.550	0.23	−4.412	0.06
Southeast	2.869	0.04	−2.704	0.20	−5.827	0.06
Child = boy	−0.657	0.31	−0.877	0.37	−1.405	0.17
Child's age	−0.094	0.46	−0.061	0.74	0.084	0.62
Log equivalent household consumption	−1.099	0.18	1.034	0.40	0.072	0.97
Years schooling of mother	0.294	0.01	−0.118	0.51	−0.017	0.94
Safe water	1.920	0.06	0.212	0.89	−2.619	0.15
Acceptable sanitation	0.490	0.64	−1.995	0.20	2.714	0.36
Vaccination coverage	0.032	0.06	−0.012	0.52	−0.009	0.67
Prenatal visit coverage	0.000	1.00	0.005	0.82	−0.058	0.03
Medically trained delivery coverage	−0.017	0.27	0.008	0.68	0.071	0.00
Facility delivery coverage	0.016	0.31	0.003	0.88	−0.010	0.72
Constant	19.600	0.01	−4.968	0.62	−0.512	0.97
Wald test of joint significance	35.53[a]	0.00	17.70	0.41	31.97	0.02
p value	0.236					

a. Excludes constant term in Wald test of joint significance.

Source: 1993 and 1998 VLSSs.

for the poor and nonpoor. Consumption, of itself, has no significant effect, but the evidence suggests its impact may have risen over time—albeit not significantly. The effect of consumption appears through the interaction terms, several of which *are* significant. The mother's education significantly improves survival prospects for the children, and there is no significant difference across consumption groups or over the two time periods. This is consistent with several other studies of child survival (Guilkey and Riphahn 1998; Hobcraft, McDonald, and Rutstein 1985; Lee, Rosenzweig, and Pitt 1997; Merrick 1985), though some studies have found little evidence of a link (Benefo and Schultz 1996, Lavy and others 1996). Having access to satisfactory drinking water also significantly improves a child's survival prospects. Again, this is consistent with several previous studies (Merrick 1985; Ridder and Tunali 1999), but the effect is not found everywhere (Benefo and Schultz 1996; Lee, Rosenzweig, and Pitt 1997). At the 15 percent level, the effect of drinking water is lower among the poor (indeed it is negative)—this difference is consistent with an earlier study of child mortality (Esrey and

Habicht 1988) and with recent work on child morbidity (Jalan and Ravallion 2001). Satisfactory sanitation, by contrast, has no significant effect on survival prospects, and the evidence suggests that, if anything, this effect is larger (though not significantly so) among the poor. The lack of significance of the sanitation coefficient is consistent with some recent studies (Lee, Rosenzweig, and Pitt 1997), but not others (Ridder and Tunali 1999), and the tendency toward a larger effect among the poor is consistent with Esrey and Habicht (1988), who found a larger effect of sanitation among the better-educated.

In the effects of the health service variables, vaccination coverage in the child's village is associated with significantly better survival prospects—a result that is consistent with previous studies using different methods (Koenig and others 1990). There is no significant difference over time or across consumption groups, which goes against some recent work in Bangladesh that suggests that the poor benefit more from vaccination (Koenig, Bishai, and Khan 2001). The only significant coefficient on the prenatal visit coverage variable is that on the interaction with the poor dummy, which is negative. Taken at face value, this implies a negative impact of such visits on child survival among the poor and no significant effect on the nonpoor. By contrast, among the poor, the coverage of medically attended deliveries has a positive and significant effect on survival prospects of poor children but not on those of nonpoor children. This is consistent with recent evidence from Brazil (Furquim de Almeida and others 2000), which suggests that home births carry a higher neonatal mortality risk, but only among poorly educated mothers. All else being constant, coverage of facility deliveries has no significant effect on child survival, holding constant the proportion of deliveries by medically trained personnel.

The Wald tests at the bottom of table 9.3 indicate that although the x's are jointly significant, and the interactions between the x's and the "poor" dummy are jointly significant, the interactions between the x's and the "year" dummy are *not* jointly significant. Dropping the year interactions from the model, however, produces predicted IMR and U5MR that are, on average, inferior to the predictions produced by the model in table 9.3 (see table 9.4). In what follows, the estimates reported in table 9.3 are maintained, and all reported coefficients are used in the decompositions.

Decomposition Results

Table 9.5 shows how the various determinants of child survival have changed over time for the poor and nonpoor. Some of these changes reflect sampling variability. Some households were in the 1993 VLSS but not in the 1998 VLSS and vice versa. Children older than age five in the 1993 VLSS would have been excluded from this study's 1998 sample of births even if they had been in the 1998 VLSS sample—because they would have been too old in 1998 for the 10-year window. Furthermore, in 40 percent of

Table 9.4. Predicted Infant and Under-Five Mortality Rates

	Mortality rates				*Rates expressed as percentage of estimated values*			
	1993		*1998*		*1993*		*1998*	
Indicator	*Poor*	*Nonpoor*	*Poor*	*Nonpoor*	*Poor*	*Nonpoor*	*Poor*	*Nonpoor*
Estimates from VLSS								
IMR	38.50	32.30	36.90	21.80	n.a.	n.a.	n.a.	n.a.
U5MR	55.90	49.10	51.10	31.40	n.a.	n.a.	n.a.	n.a.
Model in table 9.3								
IMR	34.30	35.20	34.60	23.36	89	109	94	107
U5MR	49.76	51.06	50.19	33.97	89	104	98	108
Model as in table 9.3 but no year interactions								
IMR	32.99	32.52	37.34	26.58	86	101	101	122
U5MR	47.86	47.18	54.12	38.62	86	96	106	123
Model with separate regressions for each year and poverty group								
IMR	35.45	34.10	24.02	24.07	92	106	65	110
U5MR	51.14	50.45	35.53	33.94	91	103	70	108

n.a. Not applicable.

Note: IMR = infant mortality rate. U5MR = under-five mortality rate.

Source: 1993 and 1998 VLSS.

Table 9.5. Means of Determinants of Child Survival, by Poverty Group

	Poorest quartile			*Most well-off three quartiles*		
Variable	*Mean 1993*	*Mean 1998*	*Change in mean*	*Mean 1993*	*Mean 1998*	*Change in mean*
Northern Uplands	0.23	0.34	0.11	0.17	0.17	0.00
Red River Delta	0.26	0.13	−0.14	0.22	0.18	−0.03
North Central Coast	0.21	0.18	−0.02	0.13	0.16	0.03
Central Coast	0.08	0.13	0.05	0.11	0.10	−0.01
Central Highlands	0.05	0.08	0.03	0.04	0.05	0.01
Southeast	0.05	0.02	−0.04	0.12	0.13	0.01
Child = boy	0.52	0.51	−0.01	0.51	0.51	0.00
Child's age	4.52	5.26	0.73	5.31	5.83	0.52
Log equivalent household consumption	7.52	7.76	0.24	8.31	8.59	0.27
Years schooling of mother	5.79	5.38	−0.41	6.67	7.12	0.45
Safe water	0.09	0.14	0.05	0.24	0.37	0.13
Acceptable sanitation	0.05	0.02	−0.02	0.16	0.25	0.08
Vaccination coverage	40.92	55.53	14.61	47.08	64.31	17.22
Prenatal visit coverage	30.24	39.57	9.32	42.51	53.46	10.94
Medically trained delivery coverage	62.73	57.27	−5.46	72.61	74.71	2.09
Facility delivery coverage	43.08	33.35	−9.73	53.54	60.79	7.25

Note: Calculations may not appear exact due to errors introduced by rounding.
Source: 1993 and 1998 VLSSs.

households in both VLSS samples, a different woman was randomly selected for the fertility questions, so the children (and their mothers) selected for the survival analysis in many panel households were different.

Some inconsistencies in responses among the panel households are also evident, and no attempt has been made to correct them. For instance, some people reported a lower completion schooling grade in 1998 than in 1993, and some households reported worse sanitation in 1998 than in 1993.

The socioeconomic profiles of the various regions have changed over time. Equivalent consumption in households with small children has risen for both the poor and nonpoor, but in the poorest quartile, the percentage increase has been marginally smaller than in the most well-off three quartiles (24 percent compared with 28 percent). In the poorest quartile, the data imply a decline in the average years of maternal schooling among families with small children, though the comments above need to be borne in mind. The proportions of poor and nonpoor households with satisfactory drinking water have increased equiproportionately for the poor and nonpoor. Access to satisfactory sanitation appears to have fallen among the poorest quartile in the period 1993–98. Vaccination coverage and prenatal visit coverage have increased for both consumption groups. By contrast, the proportion of babies delivered by medically trained persons and in medical facilities has fallen among the poorest quartile, while it has increased among the top three quartiles.

What caused the faster reduction in mortality between 1993 and 1998 among the better-off? Tables 9.6 and 9.7 show the results of the decompositions of mortality change for each poverty group, based on equations 9.4 and 9.5, respectively. For the purposes of this study, though, it is more important to determine the differential decline in mortality between the poor and nonpoor. Table 9.8, which presents the results of the decomposition in equation 9.6, shows that the more rapid decline in mortality among the nonpoor was roughly equally due to (a) the poor experiencing less advantageous changes in the determinants of child survival (D_1); (b) these changes mattering less for the poor, because they faced a worse set of coefficients linking survival determinants to survival outcomes (D_2); and (c) changes in coefficients mattering less for the poor, because they had worse determinants to start with (D_4).

D_1 captures the fact that the poor experienced less advantageous changes in the x's. The weights applied to these changes are the nonpoor coefficients in 1998. In D_1, differential changes in health service coverage stand out as the single largest contributory factor to the faster mortality decline among the better-off. This reflects the faster growth in vaccination coverage and prenatal visit rates among the nonpoor, as well as the fact that facility deliveries apparently declined among the poor but increased among the nonpoor. Offsetting these effects is the effect of the decline in deliveries attended by medical staff, which is given a negative weight by the nonpoor coefficient in 1998. Also noteworthy in D_1 are the parts played by water and mother's education. In the case of water, this stems from the faster growth of access to safe drinking water among the better-off and the positive coefficient on water among the nonpoor in 1998. In the case of mother's education, the positive contribution to D_1 reflects the decline in mother's education among the poor, compared with the increase among the better-off, and the positive coefficient on mother's education among the nonpoor in 1998. Differential growth of household consumption played a negligible part, as did differential changes in the regional distribution of children and differential changes in child characteristics. The offsetting effect of differential changes in satisfactory sanitation (coverage declined among the poor but increased among the better-off) is somewhat counterintuitive, reflecting the negative coefficient on sanitation among the nonpoor in 1998. However, it needs to be borne in mind that none of the sanitation coefficients in table 9.3 is statistically significant at conventional levels.

D_2 captures the fact that the changes in the x's mattered less for the poor, because they faced a worse set of coefficients. These coefficient differences are weighted by the change in the x's among the poor. Once again, health services stand out as the single largest contributory factor to the faster mortality decline among the nonpoor. In the cases of immunization and prenatal

Table 9.6. Decompositions of Changes in Survival, Based on Equation 9.4

	Poorest quartile			Most well-off three quartiles		
Indicator	*Percent change in hazard* $\Delta[-ln\lambda]$	*Change in determinants* $\Delta x\ \beta_{98}$	*Change in coefficients* $\Delta\beta\ x_{93}$	*Percent change in hazard* $\Delta[-ln\lambda]$	*Change in determinants* $\Delta x\ \beta_{98}$	*Change in coefficients* $\Delta\beta\ x_{93}$
Region	−0.768	0.417	−1.185	−1.124	0.069	−1.193
Child characteristics	−0.758	−0.026	−0.731	−0.846	−0.072	−0.774
Household consumption	7.774	0.002	7.772	8.576	−0.018	8.594
Mother's education	−0.746	−0.065	−0.681	−0.704	0.080	−0.784
Water	−0.004	−0.024	0.020	0.335	0.284	0.051
Sanitation	−0.122	−0.030	−0.093	−0.451	−0.127	−0.325
Health services	−0.445	−0.771	0.325	0.945	0.513	0.432
Constant	−4.968	0.000	−4.968	−4.968	0.000	−4.968
Total	−0.037	−0.497	0.460	1.763	0.729	1.033
Implied new IMR	34.60	38.49	30.83	22.76	29.72	27.69
Implied new U5MR	50.19	55.78	44.76	33.10	43.16	40.23

Note: IMR = infant mortality rate. U5MR = under-five mortality rate.

Source: 1993 and 1998 VLSSs.

Table 9.7. Decompositions of Changes in Survival, Based on Equation 9.5

	Poorest quartile			*Most well-off three quartiles*		
Indicator	*Percent change in hazard* $\Delta[-ln\lambda]$	*Change in determinants* $\Delta x\beta_{93}$	*Change in coefficients* $\Delta\beta\, x_{98}$	*Percent change in hazard* $\Delta[-ln\lambda]$	*Change in determinants* $\Delta x\beta_{93}$	*Change in coefficients* $\Delta\beta\, x_{98}$
Region	−0.768	0.630	−1.398	−1.124	0.053	−1.177
Child characteristics	−0.758	0.011	−0.768	−0.846	−0.045	−0.801
Household consumption	7.774	−0.245	8.018	8.576	−0.302	8.878
Mother's education	−0.746	−0.113	−0.633	−0.704	0.133	−0.837
Sanitation	−0.004	−0.034	0.030	0.335	0.256	0.079
Water	−0.122	−0.079	−0.043	−0.451	0.041	−0.493
Health services	−0.445	−0.564	0.119	0.945	0.626	0.319
Constant	−4.968	0.000	−4.968	−4.968	0.000	−4.968
Total	−0.037	−0.394	0.357	1.763	0.762	1.000
Implied new IMR	34.60	37.59	31.57	22.76	29.49	27.90
Implied new U5MR	50.19	54.48	45.83	33.10	42.83	40.54

Note: IMR = infant mortality rate. U5MR = under-five mortality rate.

Source: 1993 and 1998 VLSSs.

Table 9.8. Decompositions of Changes in Survival, Based on Equation 9.6

Indicator	D_1 *Different changes in x's* $(\Delta x^{NP} - \Delta x^{P})\beta_{98}^{NP}$	D_2 *Different levels of β's* $(\beta_{98}^{NP} - \beta_{98}^{P})\Delta x^{P}$	D_4 *Different levels of x's* $(x_{93}^{NP} - x_{93}^{P})\Delta\beta^{P}$	*Nonpoor-poor difference in* $\Delta[-ln\ \lambda]$
Region	0.038	−0.386	−0.008	−0.356
Child characteristics	0.028	−0.074	−0.043	−0.088
Household consumption	−0.002	−0.017	0.822	0.803
Mother's education	0.151	−0.007	−0.103	0.041
Water	0.181	0.127	0.030	0.338
Sanitation	−0.164	0.067	−0.232	−0.329
Health services	0.320	0.964	0.106	1.390
Constant	0.000	0.000	0.000	0.000
Total	0.552	0.674	0.573	1.800

Source: 1993 and 1998 VLSSs.

coverage, this reflects the larger impact among the nonpoor and the fact that the poor experienced a rise in coverage (Δx^P is positive in D_2). In the case of medically trained deliveries, it reflects the larger impact among the poor and the fact that the poor experienced a decline in coverage. In the case of facility deliveries, the contribution is negative, reflecting the smaller impact among the poor coupled with the decline in coverage in this group. Of these terms, only two (prenatal coverage and medical deliveries) are based on statistically significant differences in coefficients between the poor and nonpoor. The role of water is also noteworthy in D_2. This reflects the larger impact of water on survival prospects among the better-off—a difference that is significant at the 15 percent level—and the fact that water access increased among the poor. Of note, too, is the role of region, though the contribution reflects a variety of offsetting tendencies, and it should be borne in mind that only two of the interactions between the "poor" dummy and the regional dummies are significant.

D_4 captures the fact that the changes in coefficients over time mattered less for the poor than the nonpoor, because the poor had worse child survival determinants to start with. These differences in determinants are weighted by the changes in the coefficients (assumed in this exercise to be the same for the poor and better-off). Given the joint insignificance of the interactions between the x's and the year dummy in table 9.3, D_4 should not be interpreted too literally. Differences in levels of household consumption stand out as the largest single contributory factor—the poor, by definition, are worse off than the nonpoor—and the coefficient on consumption increased between 1993 and 1998, though not significantly so. A positive contribution is evident, too, from health services, reflecting the lower levels of coverage among the poor and the fact that, for the most part, the coefficient increased between 1993 and 1998. Again, however, the change was not significant.

Key Points

There is no single factor explaining the faster decline in mortality among better-off children in Vietnam over the period 1993–98. Rather, it was due to three sets of factors: (1) the poor experiencing less advantageous changes in the determinants of child survival; (2) these changes mattering less for the poor, because they faced a worse set of coefficients linking survival determinants to survival outcomes; and (3) changes in coefficients mattering less for the poor, because they started with worse determinants. These three factors made roughly equal contributions. In (1), differential changes in health service coverage stand out as the single largest contributory factor to the faster mortality decline among the better-off, though differential changes in mother's education and access to safe water were also important. In (2), health services were also a major factor, reflecting, among other things, the lower impact of prenatal visit coverage among the poor. But other coefficient differences also left their mark, including the smaller effect of drinking water among the poor. In (3), the lower levels of consumption and health service coverage among the poor meant that the increases in the impacts of these factors on survival resulted in smaller reductions in mortality among the poor. These increased impacts were not, however, significant at conventional levels, so that, statistically, the differential decline in mortality was due to just (1) and (2) above.

Child Survival Prospects to 2015

The next question is how child survival prospects are likely to evolve over the next 15 years. Vietnam is currently preparing a PRSP—Vietnam's Comprehensive Poverty Reduction and Growth Strategy (CPRGS)—to qualify for continued support through the International Development Association. Like other countries preparing PRSPs, Vietnam is setting out broad poverty reduction strategies as well as targets for poverty and human development indicators in its CPRGS. In other countries, these targets have included the IMR and U5MR, because these are among the seven key MDGs. The MDGs, involve among other things, a reduction by all countries of the IMR and U5MR by two-thirds by 2015. Is such a reduction possible for Vietnam? And would commitment to such a path be realistic for Vietnam's CPRGS?

Methods and Assumptions

Using the Oaxaca decomposition methodology, the hazard rate can be written for the year 2015 for the poor and nonpoor separately as shown in equation 9.7:

$$-\ln \lambda_{15}^{j} = -\ln \lambda_{98}^{j} + \left(x_{15}^{j} - x_{98}^{j}\right)\beta_{98}^{j} + \left(\beta_{15}^{j} - \beta_{98}^{j}\right)x_{15}^{j}, \quad j = \text{poor, nonpoor} \tag{9.7}$$

where the notation is self-evident. So, the (negative of the log of the) hazard in 2015 will depend on the hazard in 1998, the change in the means of the determinants of survival during the period 1998–2015, and the changes in the impacts of these determinants over the same period. The first term on the RHS is known. The other terms are unknown, and some assumptions are required to operationalize the method.

Some assumptions must be made about the changes in the x's and the β's. For the nonpoor, the assumption with respect to the x's is that the annual average rate of growth (or decline) over the period 1993–98 will continue over the period 1998–2015, with two exceptions. First, the assumption is that there will be no further redistribution of young children across the seven regions in the model, and the child population is stable in the sense of showing no change in the age and gender composition. Second, the variables are restricted by capturing proportions to be in the interval [0,1]. Values in excess of one (or 100 percent) are replaced by one (or 100 percent) in the first year it exceeds the limit and for all years thereafter. For the top three quartiles, full coverage is achieved for water in 2010, for sanitation in 2015, for vaccinations in 2006, and for prenatal care in 2012. With respect to the β's, a more conservative assumption has been made: simply that $\Delta\beta$ for the entire period 1998–2015 will be the same as that for 1993–98.

For the poor, four scenarios are explored. In scenario A, the analogous assumptions are applied that were made above for the nonpoor: the x's grow or decline over the period 1998–2015 at the same annual rate as over the period 1993–98, subject to the qualifications as above; and $\Delta\beta$ for the entire period 1998–2015 will simply be the same as that for 1993–98. In scenario B, the poor group's β_{98} coefficient vector is used, but the poor are assumed to experience the same annual rates of growth of the x's as the nonpoor. In scenario C, the assumption is that the poor will experience the same growth rates as in scenarios A and B, but they will face the nonpoor group's coefficient vector β_{98}. Finally, in scenario D, the assumption is that the poor will experience the same growth rates and the same coefficient vector β_{98} as the nonpoor. The implied growth rates and terminal values of the x's are indicated in table 9.9 for scenario A.

Table 9.10 shows the result of the analysis of likely future trends in child survival. The implied values of the U5MR corresponding to the second and third terms on the RHS of equation 9.7 are the predicted values in the event that only the x's change or only the β's change. Thus, if for the most well-off three quartiles the β's were to change between 1998 and 2015 as they did in the period 1993–98, but the x's stayed at their 1998 values, the U5MR would fall from 34 per 1,000 in 1998 to 30.1 per 1,000 in 2015. If, by contrast,

Table 9.9. Assumptions Concerning Progress on Determinants of Survival

	Poorest quartile		*Most well-off three quartiles*	
Variable	*Average annual percentage change*	*Value at 2015*	*Average annual percentage change*	*Value at 2015*
Equivalent household consumption (log)	0.6	8.625	0.7	9.592
Years schooling of mother	−1.4	4.200	1.3	8.888
Acceptable sanitation	8.6	0.584	9.3	1.000
Safe water	−14.0	0.002	8.7	1.000
Vaccination coverage	6.3	100.000	6.4	100.000
Prenatal visit coverage	5.5	98.653	4.7	100.000
Medically trained delivery coverage	−1.8	42.033	0.6	82.283
Facility delivery coverage	−5.0	13.971	2.6	93.617

Note: Results—survival prospects to 2015.

Source: 1993 and 1998 VLSSs.

Table 9.10. Decompositions of Changes in Survival to 2015

Scenario	*Quartile*	*Value*	*Implied under-five mortality rate*	*Percentage change from 1998 value*
Baseline	Top 3			
	$-\ln \lambda_{98}$	15.86	33.97	
	$(x_{15} - x_{98})\beta_{98}$	1.95	21.55	−59
	$(\beta_{15} - \beta_{98})x_{15}$	0.44	30.69	−41
	$-\ln \lambda_{15}$	18.25	19.46	−63
A—poorest quartile's growth and coefficients	Bottom			
	$-\ln \lambda_{98}$	14.17	50.19	
	$(x_{15} - x_{98})\beta_{98}$	−4.20	129.50	127
	$(\beta_{15} - \beta_{98})x_{15}$	1.11	38.87	−32
	$-\ln \lambda_{15}$	11.08	101.28	78
B—poorest quartile's coefficients but top three quartiles' growth	Bottom			
	$-\ln \lambda_{98}$	14.17	50.19	
	$(x_{15} - x_{98})\beta_{98}$	−1.41	69.24	21
	$(\beta_{15} - \beta_{98})x_{15}$	0.92	40.63	−29
	$-\ln \lambda_{15}$	13.68	56.16	−1
C—poorest quartile's growth but top three quartiles' coefficients	Bottom			
	$-\ln \lambda_{98}$	14.17	50.19	
	$(x_{15} - x_{98})\beta_{98}$	1.64	34.37	−40
	$(\beta_{15} - \beta_{98})x_{15}$	1.11	38.87	−32
	$-\ln \lambda_{15}$	16.92	26.57	−53
D—coefficients and growth of top three quartiles	Bottom			
	$-\ln \lambda_{98}$	14.17	50.19	
	$(x_{15} - x_{98})\beta_{98}$	2.56	27.75	−51
	$(\beta_{15} - \beta_{98})x_{98}$	0.92	40.63	−29
	$-\ln \lambda_{15}$	17.65	22.41	−61

Note: Assumes that the infant mortality rate in 1990 is 40 per 1,000 and 36 per 1,000 for the poor and nonpoor, respectively, and that the under-five mortality rate figures for 1990 are 57 per 1,000 and 52 per 1,000 for the poor and nonpoor, respectively.

Source: 1993 and 1998 VLSSs.

the β's were to remain unchanged at their 1998 values, but the x's were to grow (or decline) at similar rates to those observed over the period 1993–98, the U5MR for the most well-off three quartiles would fall to 21.6 per 1,000. The net effect of both sets of changes is to reduce the U5MR by just under two-thirds below its 1990 value. These two sets of changes would, in other words, ensure that among the most well-off three-quarters of children in Vietnam, the MDG for U5MR would be hit.

In the case of the poorest quartile, the picture is quite different. Under the same two sets of assumptions as made above for the most well-off three quartiles, the U5MR among the poorest quartile would actually rise by

78 percent—a reduction in mortality due to beneficial changes in the β's being more than offset by deleterious changes in the x's. The prospects for the poor look somewhat better in scenario B, where they are assumed to experience the same growth rates in the x's as experienced by the nonpoor. But even in this case, the U5MR among the poorest quartile would barely change from its 1990 value. In both scenarios C and D, the prospects for the poor look decidedly better. In scenario C, where the poor are assumed to experience the same growth rates as in scenario A but are assumed to face the coefficient vector of the nonpoor, a 53 percent reduction in the U5MR between 1990 and 2015 is predicted. A 61 percent reduction is predicted in scenario D, where the poor are assumed to enjoy the nonpoor's growth rates and face the nonpoor's coefficient vector. In both scenarios A and B, what holds the poor back are the negative coefficients on the water and prenatal visit variables. Caution should be exercised in interpreting these negative coefficients too literally, but the results for contrast between the results for scenarios A and B, on the one hand, and scenarios C and D, on the other, do point toward the importance of ensuring that poor children benefit more from water and from prenatal visit programs than they appear to do at present.

Key Points

Achieving a reduction of two-thirds of the 1990 levels of child mortality in Vietnam as implied by the MDGs is very challenging. Even under quite optimistic assumptions about annual income growth, as well as the evolution of water, sanitation, and health services, projected levels of child mortality are likely to be higher than the targets by 2015. The key problem seems to be the slow recent progress among Vietnam's poor. Reversing the poor's backward moves along the survival demand curve (especially in relation to women's education and birth-related health services), and ensuring that it is not just the better-off who benefit from improvements that increase the impact of health determinants on child survival, would seem to be central to tackling this problem.

Discussion and Policy Implications

The previous analysis has shown that although child mortality for the population as a whole has continued to fall under *Doi Moi*, progress has been much faster at the top end of the income distribution. Indeed, the poorest quartile of children saw virtually no improvements in their survival prospects in the mid- to late 1990s. The recent slow rate of decline of child mortality among poorer Vietnamese children, which is apparently due to a variety of factors, makes it doubtful whether Vietnam will achieve the reductions in the IMR and U5MR envisaged by the MDGs. In this last section, we discuss some policy options for accelerating the pace of decline of child mortality among Vietnam's poor. These are somewhat tentative, given the lack of significance of some of the parameter estimates.

Table 9.11. Reversing Declines in Determinants of Survival among the Poorest Quartile

Indicator	*IMR*	*U5MR*
Values among poorest quartile in 1998	34.6	50.2
Mother's education back to 1993 value	34.1	49.4
Attended deliveries and deliveries at medical facility back to 1993 values	31.3	45.4
Both mother's education and deliveries back to 1993 values	30.8	44.8

Note: IMR = infant mortality rate. U5MR = under-five mortality rate.

Source: 1993 and 1998 VLSSs.

The previous sections of this chapter have shown that, in two key respects, the poorest 60 percent of Vietnamese children appear to have slipped backwards between 1993 and 1998—their mothers were less educated than their predecessors' mothers; and they were less likely to be delivered by trained birth attendants and in medical facilities. What would be the impact of reversing these declines on child survival prospects among the poorest quartile of Vietnamese children? In 1993, mothers in the bottom quartile averaged 5.8 years of schooling. In 1998, this figure had fallen to 5.4 years. In 1993, 62.7 percent of births in the poorest quartile were attended by a medically trained person, and 43.1 percent of births took place in a medical facility. In 1998, these figures had fallen to 57.3 percent and 33.3 percent, respectively. Applying the 1998 coefficient vector to the 1993 values of these variables, keeping the other variables at their 1998 values, gives an estimate of how far mortality would fall if these declines were reversed. Table 9.11 indicates that the impact on the U5MR of reversing the decline in maternal schooling would be smaller than the impact of reversing the decline in deliveries attended by medical personnel and deliveries in medical facilities. Reversing both sets of changes together would reduce the U5MR by around 5.4 per 1,000—an 11 percent reduction in the U5MR.

In terms of the effects of targeted improvements in health services, drinking water, and sanitation, the poorest quartile of children lag far behind the most well-off three quartiles, and closing these gaps—by bringing the poor up to the levels enjoyed by the better-off—seems likely to have a sizable effect on child mortality among the poor. Table 9.12 shows the effects of raising the levels among the poorest quartile of children to the levels enjoyed by the most well-off three quartiles of children. In each case, apart from drinking water, child mortality would fall. This reflects the fact that among the poorest quartile, all determinants except water are estimated to have beneficial effects on survival, as are most health services. The largest impact would derive from extending health service coverage among the poorest quartile to the level of coverage enjoyed by the most well-off three quartiles.

Table 9.12. Targeted Improvements in Health Services, Water, and Sanitation among the Poorest Quartile

Indicator	*IMR*	*U5MR*
Values among poorest quartile in 1998	34.6	50.2
Improving sanitation quality to level of top 3 quartiles	32.5	47.1
Improving drinking water quality to level of top 3 quartiles	35.5	51.5
Improving health service coverage to level of 3 quartiles	29.3	42.6

Note: IMR = infant mortality rate. U5MR = under-five mortality rate.

Source: 1993 and 1998 VLSSs.

The changes in table 9.12—although useful—are fairly small in absolute terms and relative to the reductions envisaged by the MDGs. For example, effecting all three sets of improvements in table 9.12 simultaneously would reduce the U5MR among the poorest quartile of children from 50.2 per 1,000 to 41.1 per 1,000—a reduction of 6 percent of the 1998 value. It is worth considering what other measures might be taken to accelerate further the decline in mortality among Vietnam's poor. Looking back at table 9.3, it is striking that when the coefficients differ significantly across the two consumption groups in all cases except one (medically trained delivery coverage) the poor fare worse. When variables contribute positively to child survival—such as living in the Central Highlands and the Southeast, good drinking water, and prenatal visit coverage—the impact is larger for the better-off. When variables contribute negatively to survival—as is the case with being male—the impact is larger in absolute size for the poor. The impact of medically trained deliveries runs counter to this pattern—this contributes positively to survival for the poor, but not for the better-off.

This pattern suggests that some effort could usefully be directed at exploring the reasons for the apparent gaps in impacts between the poor and nonpoor, and finding ways to reduce them. For example, the gap in the impact of drinking water may well reflect the fact that the nonpoor know better how to use water to promote the health of their children—for example, taking advantage of its plentiful supply to wash hands after defecation, before preparing meals, and before feeding their children. The gap in the gender impact may reflect a tendency for poor boys to be more likely to be involved than their better-off counterparts in accidents. The smaller impact of prenatal coverage among the poor probably reflects a failure of poorer households to take full advantage of such programs and to comply less with the instructions of the staff delivering them. The pace of mortality decline among Vietnam's poor can be accelerated by coupling targeted programs (changing the x's for the poor) with measures such as behavioral change and communication programs aimed at raising the impacts of these determinants (raising the β's of the poor).

The potential impact of behavioral change and communication programs and similar measures can be appreciated by considering what would happen if, in addition to implementing the three measures in table 9.12, a program succeeded in equalizing the impacts of the x's across the poor and nonpoor, by replacing the β's of the poor with those of the nonpoor. Under this scenario the U5MR for the poorest quartile of the population would fall not to 42.6 per thousand as in table 9.12, but to 36.1 per thousand—a reduction of 28 percent below the 1998 rate. This suggests strongly that a strategy for accelerating the mortality decline among Vietnam's poor should focus not just on improving their coverage of and access to drinking water to this group but also on enhancing the impacts among the poor of these key determinants of child survival.

Appendix 9A Computation of Indirect Estimates of IMR and U5MR

The indirect estimates pertaining to the 1989 Census, the 1994 ICDS, and the 1997 DHS were computed by the authors with the use of the computer program QFIVE (United Nations 1983) and using the data on children born and children surviving reported in table 3.5 (p. 32) of the 1997 DHS report (Government of Vietnam 1999). (The mortality estimates reported in the DHS report are computed using the direct method.) The "North" family of life tables was used throughout, as in Hill and others (1999). The IMR and U5MR reported in figure 3 (p. 46) of the MICS report (Government of Vietnam 2000) are used here. (Identical results are obtained if the data on children born and children surviving reported in table 2.2 [p. 92] of the MICS report are passed through the computer program QFIVE.)

The VLSS estimates are obtained using the same methods. One issue that arises in the context of both VLSSs is that of weighting. There are two parts of this issue. First, in both surveys, fertility histories were obtained from only one woman of fertile age per household. If women in households with more than one fertile woman are alike in their fertility histories to fertile women in the population at large, this will not create a problem. Desai (1998) has shown, however, that this is not the case. There are proportionally fewer women in the lower and upper age groups responding to the fertility module of the 1993 VLSS than there are in the VLSSs as a whole. Because death rates among children tend to be higher among women ages 15–19, 20–24, and 40–45 than among women in the age groups in between, the VLSS will tend to produce lower estimates of child mortality than is warranted unless some adjustment is made for the underrepresentation of younger and older women. A simple way of correcting for this is to weight respondents according to their degree of underrepresentation in the fertility data—that is, by a number that is the ratio of the number of women in the age group in the VLSS generally to the number of women in the age group responding to the fertility questions. This was done for 1993 and produced estimates that differed very little from those in table 9.2. The reason for this is that the fertility rates among younger and older women in Vietnam are relatively low, with only 0.036 of births in 1993 being to women ages 15–19 and only 3.79 of births to women ages 40–45. The relatively small number of births occurring to younger women is probably due in part to there being a fairly widely accepted consensus about the ideal age to start a family and in part to the widespread availability of abortion. The relatively small number of births to older women is probably in part a reflection of the official policy of discouraging more than two children per family.

The second part of the weighting issue is that, unlike the 1993 VLSS sample, the 1998 VLSS sample is not nationally representative. Of the 6,000 households surveyed in the 1998 VLSS, 4,305 were included in the 1993 VLSS sample. To make the households surveyed in 1998 nationally representative, the VLSS designers included household-level weights or expansion factors. These were applied to the fertility data throughout.

Notes

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1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.
2. See http://www.worldbank.org/poverty/strategies/review/index.htm.
3. See http://www.developmentgoals.org/.
4. In this chapter, data from the 1989 Census and the 1994 ICDS were taken from the other sources listed in the text.
5. It is because of this assumption that the choice of interval width matters. The mortality rates reported are, in fact, obtained using nonfixed intervals, with smaller intervals for the first year of life than later years. This is easily accomplished within the computer program Stata.
6. The rates are those reported in table 7.4 (p. 84) of the DHS report (Government of Vietnam 1999).
7. The 1998 VLSS estimates were based on data that were weighted using the sampling weights. The mortality estimates obtained from the 1998 VLSS for the 1988–92 period were somewhat lower than those obtained from the 1993 VLSS data for the same period.
8. As elsewhere in this chapter, the 1998 data are weighted using the sample weights.
9. In the case of Vietnam the list includes the following (mostly binary) indicators:

Utilities	Electricity
	Water: Piped drinking water in residence
	Water: Piped drinking water in public tap
	Water: Inside-well drinking water
	Water: River, canal, or surface drinking water
	Water: Rain for drinking water
	Water: Public well
	Water: Water from a tanker truck
	Water: Bottled water

Sanitation	Shared flush toilet
	Traditional pit latrine
	Ventilated, improved pit latrine
	Bush or field used as latrine
	Own flush toilet
Appliances	Radio
	Television
	Refrigerator
	Telephone
	Sewing machine
Building materials	Finished floor
	Concrete roofing
	Roof of galvanized iron or aluminum
	Earth or sand floor
	Rough wood or bamboo flooring
	Natural-material roofing
	Floor made of other materials
	Roof made of asbestos or iron sheeting
Transportation	Bicycle
	Motorcycle
	Car
	Boat
	Motor scooter
Other	Plowing machine
	Number of household members per sleeping room

10. The LHS is equal to $-[\ln(\lambda_{98}/\lambda_{93})]$.

11. An ethnic minority dummy was also included, but it was dropped because its coefficient was never significant. This is probably due to the concentration of the ethnic minorities in specific regions, for which the authors control.

12. Safe drinking water was defined here as tap or standpipe, deep dug well with pump, or rain water. Satisfactory sanitation was defined as flush toilet or latrine. Both differ slightly from the definitions used by UNICEF in its analysis of the MICS data, but the categories in the VLSS data are somewhat different from those in the MICS. For both water and sanitation, use of the original VLSS categories (rather than aggregating into safe dummies) was explored, but it was decided against in favor of the present approach, which has the merit of making for a straightforward interpretation.

13. An urban dummy was included, but it was dropped because its coefficient was never significant.

14. The variables used are not entirely under the control of the health system, so the term “output”—though often used in this context—is slightly misleading.

15. This adjustment of the standard errors invalidates traditional likelihood tests, hence the use of Wald tests in table 9.3.

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10

Child Nutrition, Economic Growth, and the Provision of Health Care Services in Vietnam

Paul Glewwe, Stefanie Koch, and Bui Linh Nguyen

Child malnutrition is pervasive in almost every low-income country. Among all developing countries, about 30 percent of all children younger than age five are underweight (low weight for age; see United Nations Development Programme [1998]). For the least-developed countries (those with low values for the United Nations' Human Development Index), this figure rises to 39 percent. Most economists would agree that economic growth could reduce child malnutrition in these countries. However, the size of this impact is uncertain and probably varies across countries. If the impact from economic growth is small, policymakers will need to look for health policies that have a larger impact on children's nutritional status.

Child nutrition is a key issue in Vietnam. It is one of the world's poorest countries, with an annual per capita gross national income (GNI) of about US$410 in 2001. It has a very high level of child malnutrition: In 1993, 50 percent of Vietnamese children younger than age five were stunted (low height for age), although the situation has improved since that time. The role of economic growth in improving children's nutritional status is particularly relevant for Vietnam because it had very rapid economic growth in the 1990s. Its annual rate of real economic growth since 1988 has been about 8 percent, or about 6 percent in per capita terms, yet at the same time it remains a very poor country with high rates of child malnutrition.

This chapter has two objectives. The first is to estimate the impact of economic growth on child nutrition in Vietnam, using data from two household surveys recently completed in Vietnam: the 1992–93 and 1997–98 Vietnam Living Standards Surveys (VLSSs).[1] A recent study of child nutrition in Vietnam, based on the 1993 data, found only a weak relationship between household income and child nutrition (Ponce, Gertler, and Glewwe 1998).

This suggests that Vietnam's rapid economic growth in the 1990s had little impact on children's nutritional status, yet the 1998 data show that the incidence of stunting for children under five declined from 50 percent in 1993 to 34 percent in 1998. Given this apparent contradictory evidence, this chapter seeks to clarify the role of economic growth.

One way to reconcile these findings is to investigate whether other factors, such as new public health policies, improved child nutrition in the 1990s. Thus, the second objective of this chapter is to examine the impact of various health programs in Vietnam on child nutrition. A very rich analysis is possible because the 1998 VLSS contains data on health infrastructure that were not collected in the 1993 VLSS.

The section following this brief background presents some basic information about child nutrition and economic growth in Vietnam in the 1990s. The data used and the analytical framework are then discussed. Estimates of the impact of household income on child nutrition are given in the next section, and estimates of the impact of health programs and health care prices are presented. The chapter closes with a brief summary of the results and several concluding comments.

Child Nutrition and Economic Growth in Vietnam

This section presents data on the nutritional status of Vietnamese children in the 1990s and Vietnam's economic performance during the same period. Before examining the data, it is useful to discuss methods for measuring children's nutritional status.

Measurement of Children's Nutritional Status

The nutritional status of children can be assessed using data on their age, sex, height, and weight. In particular, such data can be used to calculate three indicators of children's nutritional status: stunting (low height for age), wasting (low weight for height), and underweight (low weight for age). Each indicator describes different aspects of malnutrition.

Stunting is defined as growth in a child's height that is low compared with the growth in height of a reference healthy population. Slow growth in height over long periods of time causes children to fall further and further behind the height of the reference population. Thus, stunting is a *cumulative* indicator of slow physical growth. In developing countries, stunting is caused primarily by repeated episodes of diarrhea and other childhood diseases, as well as by insufficient dietary intake.

In contrast, wasting is an indicator of very recent malnutrition, which leads to weight loss. It indicates *current* nutritional problems, such as diarrhea, other childhood diseases, and insufficient dietary intake. Although stunting is usually not reversed—children who become stunted typically remain so throughout their lives—the weight loss associated with wasting can be restored quickly under favorable conditions.

The third indicator, underweight, can reflect stunting, wasting, or both. It does not distinguish between long-term and short-term malnutrition.

All three measures are commonly expressed in the form of *z* scores, which compare a child's weight and height with the weight and height of a similar child from a reference healthy population. More precisely, the *z* score for stunting (low height for age) of a child *i* is the difference between the height of that child, H_i, and the median height of a group of healthy children of the same age and sex from the reference population, H_r, divided by the standard deviation of the height of the same group of children (same age and sex) from the reference population, SD_r:

$$z\ score = \frac{H_i - H_r}{SD_r}.$$

Relatively short children have negative height for age *z* scores; thus, stunted children are commonly defined as those who have *z* scores of -2 or lower.

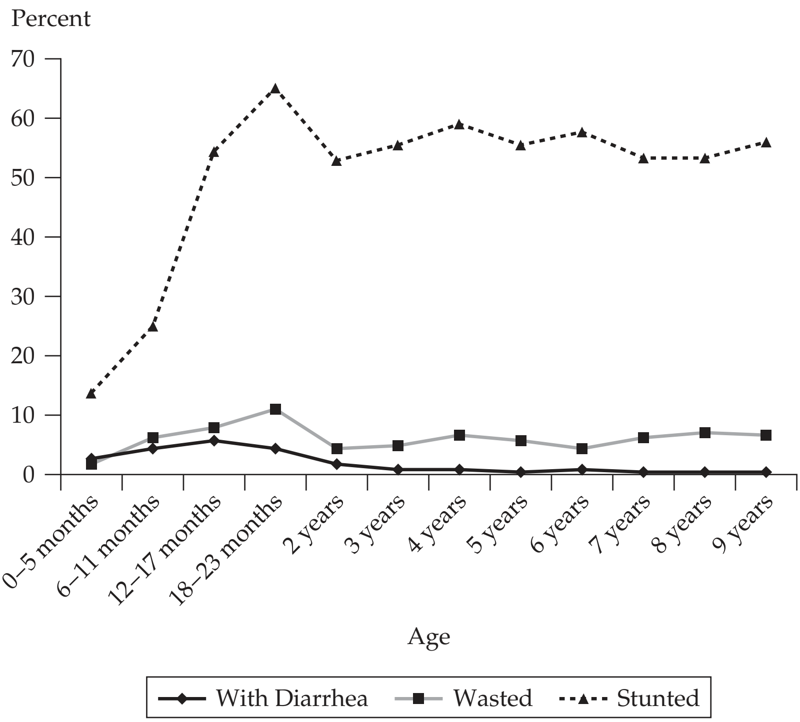
The *z* scores for underweight (low weight for age) children are calculated in the same way, using the weight of the child (instead of height) and the median weight (and standard deviation) of children of the same age and sex from a healthy reference population. The *z* scores for wasting (low weight for height) are obtained by comparing the weight of the child with the median weight (and standard deviation) of children from the reference population who have the same height as that child. The reference population was selected by the National Center for Health Statistics, in accordance with World Health Organization (WHO) recommendations (WHO 1983).

The two preferred anthropometric indexes for the measurement of nutritional status of children are stunting and wasting, because they distinguish between long-run and short-run physiological processes (WHO 1986). The wasting index has an additional advantage: It can be calculated without knowing the child's age. It is particularly useful in describing the current health status of a population and evaluating the benefits of intervention programs, because it responds more quickly to changes in nutritional status than does stunting. A disadvantage of this index, however, is that it classifies children with poor growth in both weight and height as normal (Gibson 1990). Stunting measures long-run social conditions because it reflects past nutritional status. Thus, the WHO (1986) recommends it as a reliable measure of overall social deprivation.

Children's Nutritional Status in Vietnam

Young children who receive sufficient breast milk, infant foods, and adult foods grow quickly and attain their potential weight and height, unless diarrhea or other illnesses intervene. In developing countries, children who fail to attain their potential growth typically suffer from inadequate dietary intake, illness, or both. During the first few years of life, the single most important factor is the incidence of diarrhea. Children who are exclusively breastfed are much less likely to be exposed to pathogens that lead to

Figure 10.1. Diarrhea, Stunting, and Wasting, 1993



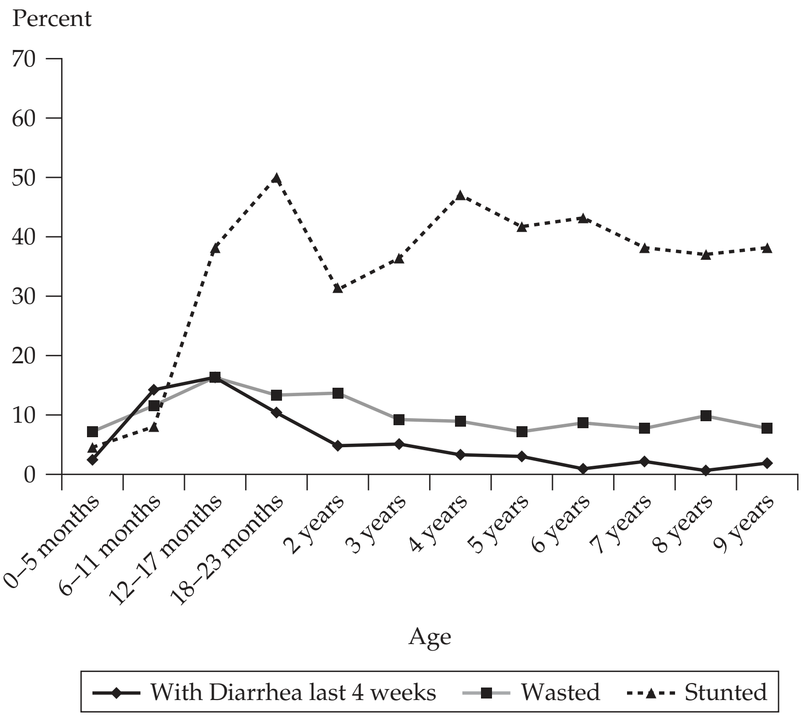
Source: Authors' calculations using the 1993 VLSS.

diarrhea and other gastrointestinal diseases; they also receive immunogens from breast milk. Yet when weaning foods are introduced, typically in the first three to six months of life, infants are exposed to many pathogens that often lead to diarrhea and other diseases. This typical pattern is found in the 1993 VLSS data. Figure 10.1 shows that the incidence of diarrhea (in the four weeks preceding the survey interview) in the first 18 months of life steadily rises to about 6 percent before declining to less than 1 percent among children ages 3 years and older.

Repeated bouts of diarrhea interfere with human growth, leading to low weight gain. This is seen in the data on wasting in figure 10.1. The incidence of wasting (defined as a weight-for-height z score below -2) is only about 2 percent among children ages 0–5 months who are still primarily breastfed. Yet wasting increases steadily during the first 2 years of life, peaking at about 11 percent for children ages 18–23 months. For children 2 years and older, wasting fluctuates around 5 percent; by this age, wasting is more likely caused by inadequate food intake because diarrhea is relatively rare.

The long-run consequence of diarrhea, other illnesses, and inadequate food intake is stunting. As seen in figure 10.1, stunting (defined as a

Figure 10.2. Diarrhea, Stunting, and Wasting, 1998



Source: Authors' calculations using the 1998 VLSS.

height-for-age *z* score below −2) rises dramatically during the first 2 years of life, from about 14 percent for children ages 0–5 months to 65 percent for children ages 18–23 months, and then settles down to about 55 percent for children ages 2–9 years. Thus, Vietnamese children follow the typical pattern, in that their worst bouts of malnutrition occur during the first 2 years of life, and as a consequence slightly more than one-half of them become stunted by age 2 and remain so for the rest of their lives.

This was the situation in the early 1990s. The situation in the late 1990s showed substantial improvements, at least in terms of stunting. Figure 10.2 shows the same general pattern, with wasting and diarrhea peaking in the second year of life, so that stunting again typically develops during the first two years of life, after which it remains relatively high. However, stunting in 1998 was less common than in 1993 for all age categories.

Figures 10.1 and 10.2 demonstrate typical patterns of malnutrition and show that stunting declined during the 1990s, but two anomalies stand out. First, diarrhea appears to have increased dramatically for almost all age groups. This apparent increase is spurious, because the question was asked differently in the two surveys. In the 1993 VLSS, each person was asked (or, for small children, parents were asked) whether he or she had been sick in the last four weeks and, if so, what illness. This underestimates the incidence of diarrhea for two reasons. First, some people may think of diarrhea as normal and so would answer that they had not been sick during the past four weeks. Second, persons suffering from more than one illness in the past four weeks were allowed to report only one illness. Thus, if a child had diarrhea and another illness, the other illness may have been reported instead of diarrhea. In the 1998 VLSS, all individuals were asked directly whether they had had diarrhea in the past four weeks, which resulted in a much higher reported incidence of diarrhea.

The second anomaly is that wasting appears to have increased, which is inconsistent with the dramatic decline in stunting. More specifically, the data show that, for each age category, average weight and height increased substantially between 1993 and 1998, indicating that the nutritional status of Vietnamese children greatly improved in that period. However, height increases were larger than weight increases, so that the change in weight for height indicates increased wasting. This suggests that examining changes in weight for height over time may provide a misleading picture of changes in children's nutritional status when overall nutritional status increases rapidly. Similar contradictory results over time have been found in Sub-Saharan Africa (Sahn, Stifel, and Younger 1999).

More information about the nature of malnutrition (as measured by stunting and wasting) is provided in table 10.1. The first three columns present data from the 1993 VLSS. At that time, the overall incidence of stunting for children ages 0–60 months was about 50 percent, and the incidence of wasting was about 6 percent. Stunting was most prevalent in rural areas, affecting about 53 percent of the population, while only 33 percent of urban children were stunted. This is not surprising, because real per capita expenditures in urban areas were almost double those of rural areas (dong [D] 1,899,000 compared with D 990,000), as seen in the third column. The figures on wasting are somewhat surprising in that they are almost the same for urban and rural children (5.7 percent and 5.9 percent, respectively).

Regional rates of stunting and wasting are also instructive. Vietnam has seven regions, as shown in table 10.1. The two regions with the highest rate of stunting in 1992–93 were the Northern Uplands and the North Central Coast. As one would expect, these two regions also had the lowest average per capita expenditures. Stunting was least common in the Southeast region, which includes the largest city in Vietnam (Ho Chi Minh City, formerly known as Saigon) and has the highest per capita expenditures. This strong correlation of stunting and per capita expenditures is not found in the data on wasting. Wasting is most common in the Mekong Delta (7.7 percent), even though it had the second highest per capita expenditures. The North Central Coast had the lowest incidence of wasting (4.1 percent), despite having the second lowest per capita expenditures. Overall, there is no clear correlation between wasting and per capita expenditures, which casts doubt on its use as an indicator of nutritional status.

Table 10.1. Stunting and Wasting by Region, Children 0 to 60 Months

	1993			*1998*		
Location	*Stunting (percent)*	*Wasting (percent)*	*Per capita expenditures (thousand dong)*	*Stunting (percent)*	*Wasting (percent)*	*Per capita expenditures (thousand dong)*
Northern Uplands	58.7	6.2	804	42.3	9.8	1,593
Red River Delta	54.2	5.4	1,049	26.6	11.0	2,462
North Central Coast	57.8	4.1	877	40.7	15.8	1,716
Central Coast	46.5	5.5	1,232	37.1	8.1	1,959
Central Highlands	52.7	5.5	983	43.3	6.8	1,855
Southeast	29.8	5.5	1,754	17.8	7.3	4,340
Mekong Delta	45.0	7.7	1,333	33.5	2.3	2,154
All urban	33.2	5.7	1,899	18.4	8.4	4,099
All rural	53.2	5.9	990	38.2	11.4	1,816
All Vietnam	50.2	5.8	1,128	34.6	10.8	2,227

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Columns 4–6 of table 10.1 present information from the 1998 VLSS. Per capita expenditures increased in real terms in all regions (although deflated numbers are not presented), and the incidence of stunting declined by almost one-third, from 50 percent to 35 percent. This decline is seen in both urban and rural areas and in all seven regions. The region with the largest percentage increase in per capita expenditures—the Red River Delta, which moved from fourth highest to second highest per capita expenditures—had the largest decline in stunting, from 54 percent to 27 percent.

In contrast, the wasting data are rather puzzling. Wasting increased in urban and rural areas of Vietnam and in all seven regions. It shows no clear relationship with income or with changes in income. Given that other indicators of child health show improvement over this period—for example, the infant mortality rate dropped from 44 to 39 (see Wagstaff and Nguyen [2004; chapter 9 in this volume] and World Bank [2001a])—the rest of this chapter will focus on the stunting data. Further explanation of the counterintuitive findings in the wasting data would probably require a detailed nutritional study, which is beyond the scope of this chapter.

Vietnam's Economic Performance in the 1990s

In the 1980s, Vietnam was one of the poorest countries in the world. A rough estimate of its GNP per capita in 1984 is US$117. This would place it as the second poorest country in the world, barely ahead of Ethiopia and just behind Bangladesh (as reported in World Bank [1986]). By 1999, Vietnam's GNP per capita had increased to US$370, so that it ranked 167 out of 206 countries (World Bank 2001b).

This rapid improvement in Vietnam's economic performance began in 1986, when the first *Doi Moi* ("renovation") economic policies started to transform Vietnam from a planned to a market-oriented economy. In particular, the government disbanded state farms and divided agricultural land equally among rural households, removed price controls, legalized buying and selling of almost all products by private individuals, stabilized the rate of inflation, and opened up the economy to foreign trade and investment (see Chapter 1 for a more detailed discussion of these policy changes). In the 1990s, Vietnam was one of the 10 fastest-growing economies in the world, with an average real gross domestic product growth of 8.4 percent per year from 1992 to 1998.

This rapid economic growth has led to a dramatic decline in the rate of poverty, from 58 percent in 1993 to 37 percent in 1998 (World Bank 1999). As seen in table 10.1, it also appears to have led to large decreases in the rate of stunting among Vietnamese children. Are these dramatic increases in the incomes of Vietnamese households the main cause of the large decreases in stunting among young children? Table 10.2 provides evidence. For each VLSS, households were divided into five groups of equal size on the basis of their per capita expenditures. The first group, quintile 1, is the poorest

Table 10.2. Malnutrition by Expenditure Quintiles, Children 0 to 60 months

Quintile	*1993*	*1998*	*1998 with 1993 quintile*
		Stunting (percent)	
1	58.6	41.3	45.0
2	59.1	42.1	38.6
3	45.3	32.6	41.6
4	44.4	27.5	34.0
5	29.2	14.2	18.5
		Wasting (percent)	
1	5.4	13.2	15.0
2	5.5	12.4	12.1
3	6.9	10.0	12.5
4	5.9	5.3	9.2
5	5.8	9.0	7.2

Source: Authors' calculations using the 1993 and 1998 VLSSs.

20 percent of the population. In 1993, about 59 percent of the children in that group were stunted. The second poorest group, quintile 2, had about the same rate. Quintiles 3, 4, and 5 had steadily lower rates of 45 percent, 44 percent, and 29 percent, respectively. The same pattern is seen in the 1998 VLSS; the incidence of stunting among the poorest quintile is 41 percent and steadily drops to 14 percent for the wealthiest quintile. This pattern, based on cross-sectional data, suggests that higher incomes reduce child malnutrition. In contrast, the data on wasting show no such pattern, adding to doubts about the informational content of this nutritional indicator, at least in the context of Vietnam.

The stunting data in table 10.2 show that stunting rates decline over time within each quintile. This suggests that something in addition to income growth was leading to reduced malnutrition in Vietnam in the 1990s. Yet these quintiles are not strictly comparable, because the poorest 20 percent of the population in 1998 had a higher income than the poorest 20 percent in 1993. The last column in table 10.2 adjusts for this difference, classifying households in the 1998 VLSS according to the quintile categories used in the 1993 VLSS. Even after this adjustment is made, there are still dramatic declines in stunting for households in the same expenditure group. This suggests that increased household income is not the only factor that improved the nutritional status of Vietnamese children. The rest of this chapter will examine this phenomenon more formally.

Data and Analytical Framework

The 1993 VLSS covered 4,800 households, and the 1998 VLSS covered 6,002 households. Both surveys are nationally representative. About 4,300 households were interviewed in both surveys and thus constitute a large, nationally representative panel dataset. In both surveys, the household questionnaire covered many different topics, including education, health (use of health care facilities and anthropometric measurements of all household members), employment, migration, housing, fertility, agricultural activities, small household businesses, income and expenditures, and credit and savings. In each year, community questionnaires were completed in rural areas (where about 80 percent of Vietnamese households live) and detailed price questionnaires were completed in both urban and rural areas. The 1998 VLSS also included health facility and school questionnaires. For further information on the VLSS, see the appendix to chapter 1.

These two surveys are well suited for examining the determinants of children's nutritional status. All household members, children and adults, were measured for height, weight, and arm circumference. The vast amount of household information, including detailed income and expenditure data, reduces problems of omitted variable bias. The panel data allow for estimation that controls for unobserved household fixed effects. Finally, the 1998 data include a large amount of information on the prices of medicines and the types of medical services (and their costs) provided by local health care facilities.

The data presented in the section above show changes over time but cannot explain what caused those changes, or more generally what determines children's nutritional status. Such causal analysis is much more difficult, and it requires a clear analytical framework to avoid drawing false inferences from the data.

The starting point for thinking about the determinants of a child's nutritional status is a health production function, because nutritional status is a major component of child health. In general, a child's health status (H) is determined by three kinds of variables: health inputs (HI), the local health environment (E), and the child's genetic health endowment (ε). Equation 10.1 shows child health status as a function (f) of these three types of variables:

$$H = f(HI, E, \varepsilon). \tag{10.1}$$

The child's genetic health endowment (ε) is defined as all (genetically) inherited traits that affect his or her health. It is exogenous (cannot be altered by the child or anyone else) but rarely observed in any data. The local health environment (E) consists of the characteristics of the community in which the child lives that have a direct effect on his or her health, such as the prevalence of certain diseases and the extent of environmental pollution. It is also exogenous, although one could argue that it is endogenous to the extent that households migrate to areas with healthier environments or take measures to improve the local health environment. (This issue will be discussed further below.) Finally, there are a wide variety of health inputs (*HI*) that the household provides to the child, including prenatal care, breast milk, infant formula, all other foods, medicines, and medical care. In addition, the quality of the household's drinking water, toilet facilities, and other hygienic conditions around the home can be treated as health inputs.

Researchers would often like to estimate a health production function, but it is almost impossible to do so: Complete data on health inputs and the local health environment are rarely available, and data on the child's genetic endowment are rarer still. This incompleteness may well lead to serious problems of omitted variable bias. Analysis is further complicated by the need to have this information not only for the current time period but for all past time periods of the child's life. A more practical alternative is to consider what determines health inputs and substitute out that variable from equation 10.1. In general, the health inputs that households choose for their children are determined by the household's income level (Y), the education levels of both parents (*MS* and *FS*, for mother's schooling and father's schooling), their preferences for child health (η), the local health environment, and the child's genetic health endowment. Equation 10.2 shows this relationship, depicted in terms of a function $g(\ )$:

$$HI = g(Y, MS, FS, \eta, E, \varepsilon). \tag{10.2}$$

Note that family size and the presence of other siblings are not included as determinants of health inputs. They are excluded because they are clearly endogenous, and including endogenous variables can lead to biased estimates unless suitable estimation methods, such as instrumental variables, are used. Thus, it is best to include in equation 10.2 only variables that are clearly exogenous. Of course, one could rightly claim that household income is endogenous; for example, parents may change their hours of work in response to the health status of their children. However, removing this variable from equation 10.2 would preclude estimation of the key relationship of interest in this chapter, so it is retained. The approach used to deal with possible estimation biases from retaining this variable is discussed below.

Substituting (10.2) into (10.1) gives the basic equation that this chapter attempts to estimate:

$$H = g(Y, MS, FS, \eta, E, \varepsilon). \tag{10.3}$$

The child's height-for-age z score will be used as the indicator of a child's health status, H. As mentioned above, both surveys have data on household income and expenditures. Household per capita expenditures will be used instead of household per capita income to measure Y, for two reasons. First, expenditure data are likely to be more accurate than income data (Deaton 1997). Second, expenditure data are more likely to reflect a household's permanent income, which is more appropriate in this case because Y represents the household's income stream since the child was born, not just current income.

The remaining variables in equation 10.3 merit further comment. The schooling of each parent is provided in both surveys, even for children no longer living with one or both parents (9 percent of the children in the sample are not living with their father, and 2 percent are not living with their mother). However, parental preferences for child health, η, are difficult to ascertain and no attempt was made to do so here. Dropping this variable from the estimation altogether is risky; doing so would relegate it to the error term, and it could be correlated with household income (which would lead to biased estimates of the impact of household income on child health). For example, some parents may be irresponsible, which often implies low preferences for child health and low income. This would lead to overestimation of the impact of income on child health. This chapter uses three approaches to deal with this problem. First, dummy variables representing different ethnic and religious groups are included to approximate, albeit only partially, preferences for child health. Second, in some estimates, instrumental variables are used for household per capita expenditures, which should eliminate some or perhaps even all of the bias due to correlation between income and unobserved preferences for child health. Third, some estimates presented below are based on panel data; if parental preferences can be specified as an additive fixed effect, that variable will be differenced out of the panel estimates.

The last two variables in equation 10.3 are the local health environment, E, and the child's innate healthiness (genetic health endowment), ε. The estimates presented in the section titled "Income Growth and Child Nutrition" use community fixed effects to control for all differences across communities, including differences in the local health environment. In "Health Programs and Child Nutrition," a different approach is used; data from the 1998 VLSS on local health conditions, medicine prices, and the availability of medical services are used to measure explicitly the impact of the local health environment on child health. Finally, consider the child's genetic health endowment, ε. In the cross-sectional estimates, this is partially represented by the height of each parent (which reflects both normal variation in height that is not associated with health status and the innate healthiness of each parent) and by the sex of the child (because girls are typically healthier than boys—note that this masks any sex discrimination that may be taking place). In estimates using panel data, the average healthiness of each household's children is treated as a fixed effect and thus is differenced out.

The last issue to address is the problem that household income is endogenous, which raises the possibility of simultaneity bias. In general, households make decisions about their children's health at the same time that they make decisions about income-earning activities, and these two decisions could be related. For example, parents whose children are chronically ill may decide to purchase costly medicines or medical services. To do this, some household members may work more hours to pay for those medicines. If so, ordinary least squares (OLS) estimates would tend to underestimate the impact of household income (expenditures) on child health because unobserved negative shocks to child health would increase household income. Alternatively, households may reduce hours worked because of a child's illness—for example, the mother may work fewer hours so that she can spend more time caring for the child. In this case, OLS would overestimate the impact of household income (expenditures) on child health.

Another problem with both household income and expenditure data is that they are often measured with random error, simply because it is difficult for households to report accurately their incomes and expenditures. This chapter uses household expenditures instead of household income because it is likely to be more accurate. However, even household expenditures may have a significant amount of measurement error, much of which will be random. This will lead to underestimation (attenuation bias) of the true impact of household expenditures on child health.

Instrumental variable methods can, in principle, remove the bias caused by either endogeneity or measurement error in the household expenditures variable. The difficulty is to find plausible instrumental variables—variables that are correlated with household income but uncorrelated with unobserved determinants of child health and uncorrelated with the measurement error in the household expenditure variable. Two plausible categories of instrumental variables are types of agricultural land allocated to the household and certain sources of nonlabor income. In Vietnam, agricultural land is tightly controlled by the government, and markets for land simply do not exist in most rural communities. (Fewer than 3 percent of households in the 1993 VLSS reported that they had bought or sold land in the previous year.) Thus, households' land assets are unlikely to be influenced by children's health status. Similarly, some types of nonlabor income are received regardless of children's health status. Thus, the following instrumental variables are used to predict households' per capita expenditures: irrigated land for annual crops, unirrigated land for annual crops, perennial cropland, water surface (fish ponds), and income from social funds, social subsidies, dowries, inheritances, and lottery winnings. Finally, relatives (more specifically, children of household members) living overseas may also indicate an additional source of income; although the amount of remittances sent by such relatives may respond to child illnesses, the existence of such relatives is unlikely to be affected by those illnesses. Two such variables are used: overseas relatives in other Asian countries and overseas relatives in Western countries.

As will be seen below, although these instrumental variables have statistically significant predictive power, they are rather weak in terms of the R^2 coefficient in the first-stage regressions. If the main problem is measurement error, as opposed to household expenditures being correlated with unobserved determinants of child health, then one could use household income as an instrumental variable for household per capita expenditures. In the regression results presented below, two sets of instruments are used: one without household income, which should be robust to both endogeneity and measurement error in the income variable, and one that adds income, which is robust to measurement error but is invalid if household income is endogenous with respect to child health.

Income Growth and Child Nutrition

This section presents estimates of equation 10.3 above. In all estimates, the dependent variable is the child's height-for-age z score, and the sample includes only children of ages 0–60 months. Separate estimates are presented for urban and rural areas. For cross-sectional estimates, results are given for both 1993 and 1998. The cross-sectional estimates are presented first, followed by panel data estimates.

Cross-Sectional Estimates

Table 10.3 presents estimates of equation 10.3, the determinants of child malnutrition (as measured by height-for-age z scores), for urban areas of Vietnam in 1993. The first column presents OLS estimates, which are likely to suffer from omitted variable bias because of unobserved characteristics of local communities (such as the local health environment). OLS estimates may also be biased because they do not account for endogeneity or measurement error in the household expenditure variable. The second column of estimates includes community fixed effects, which avoid bias due to unobserved community characteristics as long as those variables enter equation 10.3 in a simple additive form without interaction terms with household- or child-level variables. Yet fixed effects estimates are not robust to endogeneity or measurement error in the expenditure variable. The third and fourth columns use both community fixed effects and instrumental variables for household expenditures. The third column does not use household income as an instrument, so it should be robust to both measurement error and endogeneity, and the fourth adds household income as an instrument and thus controls only for measurement error.

Although the OLS estimates in the first column are likely to be biased, it is useful to begin with them because the results for many variables change only slightly when other estimation methods are used. As one would expect given the data in figures 10.1 and 10.2, the age of the child has a strong relationship to malnutrition as measured by stunting. In addition to a linear term (age in months), quadratic and cubic terms were added to allow for flexibility in this relationship. Mothers' height and fathers' height are both strongly and positively related to child health, which partially controls for unobserved children's health endowment but also reflects natural variation in height across a healthy population. For some mothers and fathers (4 percent of mothers and 16 percent of fathers), the height variable was missing. In this case, the parent is assigned the average height and a dummy variable is added to indicate this type of observation.

In all the regressions in table 10.3, girls in urban areas appear to be slightly healthier than boys, but this apparent advantage is never statistically

Table 10.3. Determinants of Child Malnutrition in Urban Areas, 1993

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Constant	−19.245***	n.a.	n.a.	n.a.	1.00
	(2.62)				
Age (months)	−0.223***	−0.221***	−0.220***	−0.219***	31.5
	(0.034)	(0.038)	(0.039)	(0.037)	
Age squared (months)	0.007***	0.007***	0.007***	0.007***	n.a.
	(0.001)	(0.001)	(0.002)	(0.001)	
Age cubed (months)	−0.00007***	−0.00007***	−0.00007***	−0.00006***	n.a.
	(0.00001)	(0.00002)	(0.00002)	(0.00002)	
Mother's height (centimeters)	0.051***	0.046***	0.046***	0.046***	153.0
	(0.010)	(0.012)	(0.012)	(0.012)	
Mother's height missing	0.905***	0.652**	0.666	0.721**	0.04
	(0.266)	(0.285)	(0.407)	(0.362)	
Father's height (centimeters)	0.051***	0.052***	0.052***	0.052***	162.4
	(0.012)	(0.013)	(0.013)	(0.013)	
Father's height missing	−0.252*	−0.257*	−0.257*	−0.251*	0.16
	(0.144)	(0.153)	(0.148)	(0.152)	
Female child	0.073	0.100	0.100	0.101	0.48
	(0.112)	(0.109)	(0.109)	(0.109)	
Log mother's years schooling	0.126	0.185*	0.180	0.162	1.95
	(0.098)	(0.105)	(0.132)	(0.128)	
Log father's years schooling	−0.114	−0.203**	−0.207*	−0.224*	2.09
	(0.100)	(0.92)	(0.118)	(0.122)	
Log per capita expenditures	0.493***	0.388***	0.441	0.502	7.34
	(0.108)	(0.140)	(0.443)	(0.308)	

(table continues on following page)

Table 10.3. (*continued*)

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Buddhist	−0.018	−0.207	−0.207	−0.204	0.30
	(0.129)	(0.158)	(0.164)	(0.162)	
Catholic	0.129	−0.114	−0.115	−0.121	0.14
	(0.215)	(0.327)	(0.331)	(0.337)	
Protestant	−1.992***	−2.356***	−2.346***	−2.306***	0.002
	(0.223)	(0.174)	(0.256)	(0.241)	
Other religion	−0.966***	−1.226	−1.221	−1.202	0.02
	(0.347)	(0.898)	(0.891)	(0.874)	
Chinese	−0.161	−0.612	−0.616	−0.631	0.11
	(0.218)	(0.401)	(0.405)	(0.405)	
Ethnic minority	0.386	0.251	0.267	0.325	0.02
	(0.642)	(0.657)	(0.736)	(0.681)	
R^2	0.283	0.351	0.351	0.350	n.a.
Overidentification test (p value)	n.a.	n.a.	0.284	0.364	n.a.
F test on excluded instruments	n.a.	n.a.	41.39	36.29	n.a.
Observations	415	415	415	415	

n.a. Not applicable.

*Statistically significant at 10 percent level.
**Statistically significant at 5 percent level.
***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses. 2SLSFE = two-stage least squares with community fixed effects.

a. Instrumental variables are irrigated annual cropland, unirrigated annual cropland, perennial cropland, and water surface; income from social funds, social subsidies, dowries, inheritances, and lottery winnings; and the existence of relatives in other Asian countries and in non-Asian countries.

b. The estimates add per capita household income to the instrumental variables in note a.

Source: Authors' calculations using the 1993 VLSS data.

significant. The impact of mothers' and fathers' schooling is usually not statistically significant, which is somewhat surprising, especially for mothers. One would think that better-educated mothers are more able to care for their children's illnesses, other things being equal. Perhaps better-educated women are also more likely to work outside the home, which could have negative consequences for their children's health, so that the net effect of the mother's education is zero. Finally, there are few differences across ethnic and religious groups in urban areas (the omitted groups are Vietnamese and "no religion"), the two exceptions are that Protestant households and households practicing religions other than Buddhism and Christianity had children who were significantly less healthy. Both groups are relatively rare in urban areas, and it is not clear what to make of this result; indeed, the result for Protestants is based on a single child and so should be treated with caution. Because the focus of this chapter is on the impact of household income and health care services, these apparent impacts of religion on child health will not be discussed further.

The discussion turns now to the impact of per capita household expenditures (expressed in natural logarithm) on child health. The OLS estimate is 0.493, which is fairly precisely estimated (the standard error of 0.108 yields a *t* statistic of 4.56). This is higher than the estimate of 0.22 found by Ponce, Gertler, and Glewwe (1998), but that study included older children (up to nine years old); thus, the estimates are not strictly comparable.

Even if household expenditures were exogenous and measured without error, the OLS estimate of the corresponding coefficient is likely to be biased by the correlation between household income and unobserved community differences. The basic problem is that wealthier communities may have a better health environment—for example, better sanitation and health care facilities. If these community characteristics have effects that are primarily additive, community fixed effects estimates will remove this bias. Such estimates are shown in the second column of table 10.3. As expected, the impact of household per capita expenditures is smaller, falling from 0.493 to 0.388. Yet the impact of household expenditures on child health is still statistically significant (the standard error is 0.140, yielding a *t* statistic of 2.77).

The last two specifications in table 10.3 attempt to correct for endogeneity and measurement error in household expenditures. The third column presents estimates that instrument household expenditures using the land asset and nonlabor income variables. Although these instrumental variables have strong explanatory power in the sense that they have a high *F* statistic (41.39), they do not by themselves explain a large percent of the variation of per capita household expenditures (the R^2 coefficient of a regression of the expenditure variable on the excluded instruments is only 0.08). Thus, although the coefficient on per capita expenditures does not change appreciably (it is 0.441), it is not statistically different from zero because the standard error has increased to 0.443. This imprecision implies that one can say almost nothing about the impact of household expenditures on child health in urban areas of Vietnam in 1993.

Somewhat higher precision can be obtained if one assumes that household expenditures are exogenous, so that the only estimation problem is measurement error. This allows per capita income to be used as an instrumental variable, which increases the precision of the estimates. When this is done, the coefficient rises slightly to 0.502. Although the standard error falls from 0.443 to 0.308, the coefficient is still quite imprecisely estimated and thus not significantly different from zero (*t* statistic of 1.63). Note finally that the standard overidentification test (see Davidson and MacKinnon [1993]) suggests that the instrumental variables are uncorrelated with the residual, although the power of the test to detect this problem may not be very high. Overall, it is difficult to estimate with any precision the impact of household expenditures on children's nutritional status in urban areas of Vietnam in 1993 once one accounts for the possibility that the expenditure variable may be endogenous and may be measured with error.

Cross-sectional results for rural areas of Vietnam in 1993 are reported in table 10.4. The age and parental height variables show the same patterns as in urban areas. As in urban areas, girls are somewhat healthier than boys, but the difference is not statistically significant. Mothers' schooling has a marginally significant negative effect in the OLS results, but this counterintuitive finding disappears in the fixed effects and two-stage least squares with fixed effects (2SLSFE) estimates. Fathers' schooling has a significantly positive effect in the fixed effects results, but this is not seen in the other specifications. Most estimates regarding religious and ethnic groups are statistically insignificant, except that, again, Protestant children are more malnourished and, in some specifications, ethnic minorities are more likely to be malnourished.

Focusing on the (log) household expenditure variable, the OLS results show a precisely estimated impact of 0.336 (the standard error is 0.072). As in urban areas, this figure declines, when community fixed effects are introduced, to 0.185 (with a standard error of 0.92).

The third column in table 10.4 specifies the expenditure variable as endogenous, using the land and nonlabor income variables as instruments. The point estimate is quite large, at 0.724, but the precision of the estimate is quite low because the standard error increases to 0.437. This imprecision is not surprising because a regression of household expenditures on the excluded instruments alone yields an R^2 coefficient of only 0.060. When (log) per capita income is added as an instrument, the coefficient drops to 0.500; although the standard error is smaller (0.305), this estimate is not quite significant at the 10 percent level (*t* statistic of 1.64). Finally, note that both 2SLSFE specifications easily pass the overidentification test.

The 1998 VLSS had a larger sample size, which may provide more precise estimates. The results for urban and rural areas are presented in tables 10.5 and 10.6, respectively. Many results for urban areas in 1998 are similar to those for 1993. The age effects and parental height impacts are similar, although somewhat weaker; the sex of the child and parental schooling show no consistently significant effects; and the impacts of the religion variables are

Table 10.4. Determinants of Child Malnutrition in Rural Areas, 1993

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Constant	−12.909***	n.a.	n.a.	n.a.	1.00
	(1.283)				
Age (months)	−0.207***	−0.205***	−0.209***	−0.208***	30.9
	(0.021)	(0.022)	(0.023)	(0.022)	
Age squared (months)	0.006***	0.006***	0.006***	0.006***	n.a.
	(0.001)	(0.001)	(0.001)	(0.001)	
Age cubed (months)	−0.00005***	−0.00005***	−0.00005***	−0.00005***	n.a.
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	
Mother's height (centimeters)	0.042***	0.040***	0.038***	0.039***	151.7
	(0.006)	(0.006)	(0.006)	(0.006)	
Mother's height missing	−0.013	0.018	0.002	0.009	0.03
	(0.114)	(0.219)	(0.215)	(0.215)	
Father's height (centimeters)	0.028***	0.023***	0.019**	0.021***	161.9
	(0.007)	(0.007)	(0.008)	(0.008)	
Father's height missing	−0.026	−0.007	0.004	−0.000	0.11
	(0.114)	(0.120)	(0.121)	(0.119)	
Female child	−0.084	−0.083	−0.079	−0.081	0.49
	(0.061)	(0.059)	(0.061)	(0.060)	
Log mother's years schooling	−0.086*	0.060	−0.029	0.008	1.63
	(0.050)	(0.055)	(0.086)	(0.073)	
Log father's years schooling	0.067	0.119**	0.034	0.069	1.82
	(0.058)	(0.060)	(0.090)	(0.076)	
Log per capita expenditures	0.336**	0.185**	0.724*	0.500	6.77
	(0.072)	(0.092)	(0.437)	(0.305)	

(table continues on following page)

Table 10.4. (*continued*)

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Buddhist	0.042	−0.050	0.006	−0.017	0.23
	(0.080)	(0.117)	(0.137)	(0.126)	
Catholic	−0.111	−0.220	−0.206	−0.212	0.09
	(0.125)	(0.136)	(0.139)	(0.140)	
Protestant	−0.248	−0.556***	−0.510***	−0.529***	0.01
	(0.157)	(0.058)	(0.091)	(0.078)	
Other religion	0.203	0.130	0.068	0.094	0.02
	(0.336)	(0.355)	(0.389)	(0.375)	
Chinese	0.076	0.297	0.144	0.208	0.01
	(0.250)	(0.343)	(0.384)	(0.370)	
Ethnic minority	−0.322***	−0.238**	−0.170	−0.198*	0.19
	(0.093)	(0.114)	(0.129)	(0.119)	
R^2	0.196	0.257	0.242	0.252	n.a.
Overidentification test (p value)	n.a.	n.a.	0.559	0.591	n.a.
F test on excluded instruments	n.a.	n.a.	10.84	16.59	n.a.
Observations	2,372	2,372	2,372	2,372	

n.a. Not applicable.

*Statistically significant at 10 percent level.
**Statistically significant at 5 percent level.
***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses. 2SLSFE = two-stage least squares with community fixed effects.

a. Instrumental variables are irrigated annual cropland, unirrigated annual cropland, perennial cropland, and water surface; income from social funds, social subsidies, dowries, inheritances, and lottery winnings; and the existence of relatives in other Asian countries and in non-Asian countries.

b. The estimates add per capita household income to the instrumental variables in note a.

Source: Authors' calculations using the 1993 VLSS.

Table 10.5. Determinants of Child Malnutrition in Urban Areas, 1998

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Constant	−15.028***	n.a.	n.a.	n.a.	1.00
	(2.306)				
Age (months)	−0.140***	−0.115***	−0.121**	−0.127***	31.6
	(0.034)	(0.039)	(0.047)	(0.041)	
Age squared (months)	0.004***	0.003**	0.003*	0.003**	n.a.
	(0.001)	(0.001)	(0.002)	(0.001)	
Age cubed (months)	−0.00003***	−0.00002*	−0.00003	−0.00003**	n.a.
	(0.00001)	(0.00001)	(0.00002)	(0.00001)	
Mother's height (centimeters)	0.038***	0.036***	0.034**	0.033**	152.5
	(0.013)	(0.013)	(0.015)	(0.013)	
Mother's height missing	−0.064	−0.080	−0.033	0.018	0.02
	(0.417)	(0.361)	(0.406)	(0.373)	
Father's height (centimeters)	0.041***	0.036***	0.034***	0.032***	162.5
	(0.010)	(0.011)	(0.012)	(0.011)	
Father's height missing	−0.140	−0.225	−0.206	−0.185	0.12
	(0.181)	(0.186)	(0.203)	(0.200)	
Female child	0.073	0.092	0.082	0.070	0.49
	(0.126)	(0.137)	(0.146)	(0.144)	
Log mother's years schooling	0.181**	0.138	0.059	−0.026	1.99
	(0.090)	(0.102)	(0.305)	(0.140)	
Log father's years schooling	−0.063	−0.139	−0.196	−0.256*	2.08
	(0.134)	(0.148)	(0.214)	(0.150)	
Log per capita expenditures	0.341***	0.146	0.401	0.674***	8.13
	(0.110)	(0.120)	(0.865)	(0.226)	

(table continues on following page)

Table 10.5. (*continued*)

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Mean*
Buddhist	−0.145	−0.120	−0.121	−0.122	0.25
	(0.116)	(0.150)	(0.146)	(0.143)	
Catholic	−0.061	0.070	0.078	0.087	0.07
	(0.185)	(0.172)	(0.170)	(0.169)	
Protestant	−0.641***	−0.806***	−0.842***	−0.881***	0.01
	(0.211)	(0.202)	(0.174)	(0.132)	
Other religion	−0.574*	−0.696**	−0.648	−0.597	0.01
	(0.301)	(0.338)	(0.452)	(0.492)	
Chinese	0.857***	0.966***	0.990***	1.016***	0.06
	(0.306)	(0.313)	(0.325)	(0.328)	
Ethnic minority	0.862	1.134	1.132	1.129	0.01
	(0.721)	(0.773)	(0.777)	(0.787)	
R^2	0.260	0.386	0.379	0.357	n.a.
Overidentification test (p value)	n.a.	n.a.	0.499	0.608	n.a.
F tests on excluded instruments	n.a.	n.a.	14.25	26.05	n.a.
Observations	469	469	469	469	

n.a. Not applicable.

*Statistically significant at 10 percent level.
**Statistically significant at 5 percent level.
***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses. 2SLSFE = two-stage least squares with community fixed effects.

a. Instrumental variables are irrigated annual cropland, unirrigated annual cropland, perennial cropland, and water surface; income from social funds, social subsidies, dowries, inheritances, and lottery winnings; and the existence of relatives in other Asian countries and in non-Asian countries.

b. The estimates add per capita household income to the instrumental variables in note a.

Source: Authors' calculations using the 1993 VLSS.

Table 10.6. Determinants of Child Malnutrition in Rural Areas, 1998

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Means*
Constant	−12.715***	n.a.	n.s.	n.a.	1.00
	(1.862)				
Age (months)	−0.205***	−0.202***	−0.202***	−0.203***	32.3
	(0.022)	(0.022)	(0.023)	(0.022)	
Age squared (months)	0.006***	0.006***	0.006***	0.006***	n.a.
	(0.001)	(0.001)	(0.001)	(0.001)	
Age cubed (months)	−0.00005***	−0.00005***	−0.00005***	−0.00005***	n.a.
	(0.00001)	(0.00001)	(0.00001)	(0.00001)	
Mother's height (centimeters)	0.037***	0.039***	0.041***	0.083***	151.9
	(0.008)	(0.007)	(0.008)	(0.007)	
Mother's height missing	0.242	0.130	0.104	0.135	0.02
	(0.189)	(0.173)	(0.165)	(0.174)	
Father's height (centimeters)	0.035***	0.027***	0.029***	0.027***	161.8
	(0.009)	(0.009)	(0.009)	(0.010)	
Father's height missing	0.123	0.126	0.111	0.128	0.10
	(0.103)	(0.103)	(0.106)	(0.107)	
Female child	0.018	−0.003	−0.014	−0.001	0.49
	(0.068)	(0.067)	(0.071)	(0.070)	
Log mother's years schooling	−0.116	−0.104	−0.063	−0.122	1.61
	(0.073)	(0.073)	(0.093)	(0.071)	
Log father's years schooling	0.035	−0.006	0.042	−0.016	1.78
	(0.082)	(0.082)	(0.115)	(0.105)	
Log per capita expenditures	0.298***	0.134	−0.220	0.203	7.42
	(0.068)	(0.095)	(0.539)	(0.335)	

(table continues on following page)

Table 10.6. (*continued*)

Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*[a]	*2SLSFE*[b]	*Means*
Buddhist	0.080	0.175	0.186*	0.173	0.15
	(0.093)	(0.108)	(0.111)	(0.108)	
Catholic	−0.170*	−0.223*	−0.196	−0.228*	0.12
	(0.098)	(0.129)	(0.131)	(0.124)	
Protestant	−0.269	−0.206	−0.184	−0.210	0.03
	(0.257)	(0.277)	(0.280)	(0.279)	
Other religion	−0.148	0.041	0.033	0.043	0.03
	(0.242)	(0.235)	(0.242)	(0.234)	
Chinese	−0.170	−0.096	0.055	−0.126	0.002
	(0.339)	(0.598)	(0.663)	(0.595)	
Ethnic minority	−0.086	−0.078	−0.149	−0.064	0.22
	(0.127)	(0.158)	(0.193)	(0.179)	
R^2	0.215	0.326	0.320	0.326	n.a.
Overidentification test (p value)	n.a.	n.a.	0.561	0.506	n.a.
F tests on excluded instruments	n.a.	n.a.	13.54	14.54	n.a.
Observations	1,672	1,672	1,672	1,672	

n.a. Not applicable.

*Statistically significant at 10 percent level.

***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses. 2SLSFE = two-stage least squares with community fixed effects.

a. Instrumental variables are irrigated annual cropland, unirrigated annual cropland, perennial cropland, and water surface; income from social funds, social subsidies, dowries, inheritances, and lottery winnings; and the existence of relatives in other Asian countries and in non-Asian countries.

b. The estimates add per capita household income to the instrumental variables in note a.

Source: Authors' calculations using the 1993 VLSS data.

similar. The one change is that the Chinese variable now has a positive effect that is statistically significant at the 5 percent level, but this is of little interest for the purposes of this chapter.

The OLS estimate of the impact of household expenditures in urban areas is lower in 1998 than in 1993 (0.341 and 0.493, respectively), and the same holds when fixed effects are introduced (0.146 in 1998 compared with 0.388 in 1993). The first set of 2SLSFE estimates shows an effect very similar to that of 1993 (0.401 compared with 0.441), but neither is statistically significant from zero. If the assumption is made that household expenditures are exogenous, although measured with error, then household income is a valid instrumental variable, and a much more precise and statistically significant estimate of 0.674 (standard error of 0.226) is obtained. Both 2SLSFE estimates for 1998 easily pass the overidentification test.

In rural areas in 1998 (table 10.6), again the results for most variables are similar to those for rural areas in 1993. Turning to the variable of primary interest, household expenditures, the OLS and fixed effects estimates are quite similar across the two years. However, the first set of 2SLSFE estimates is very different: In 1993 the estimated impact was 0.724, and in 1998 it was −0.220. Yet both of these estimates have very large standard errors (0.473 in 1993 and 0.593 in 1998), and it is clear that the difference between them is not statistically significant (*t* statistic of 1.36). The second set of 2SLSFE estimates, which adds household income as an instrumental variable, is closer to the estimates for 1993, with point estimates of 0.500 in 1993 and 0.203 in 1998. Again, neither of these is very precisely estimated (with standard errors of 0.305 and 0.335, respectively), so they are not significantly different from each other.

Panel Data Estimates

In principle, there are two ways to use panel data to estimate the impact of household expenditures on children's nutritional status in Vietnam. First, one could examine data on the same children over time and estimate the impact of changes in income on changes in their height-for-age *z* scores. However, this is rather problematic because, as seen in figures 10.1 and 10.2, stunting develops in the first two years of life, after which there is little change. Thus, any child who was covered in the 1993 VLSS was already at least five years old in the 1998 VLSS, and the impact of the household's expenditure levels in the latter survey should have almost no effect on the stunting of those children because their stunting developed three or more years before that survey.

The other possibility is pursued in this chapter, which is to compare children five years or younger in the first survey to children *from the same household* who were five years or younger in the second survey. This can be done using data for those households in the panel that had children of that age in both 1993 and 1998, a situation that occurs for 1,663 of the 4,300 households in the panel dataset. For households that had two or more children in this age range in either year (or both years), all variables used are averages over those children.

Before examining the estimates, a discussion of their usefulness is in order. Recall that parental preferences for child health (η) and the child's genetic health endowment (ε) are unobserved variables that could be correlated with household expenditure (which represents household income). One way to try to get around this problem is to use instrumental variables for expenditure that are not correlated with these variables. The approach with panel data is somewhat different. Instead, one assumes that the impact of these variables on child health takes an additive form and that these additive components do not change over time. If so, *changes* in household expenditure will be uncorrelated with these household fixed effects, so regressing changes in height-for-age z scores on changes in household expenditures (and other variables that may change over time) should eliminate bias due to these two types of unobserved household characteristics.

Although this seems to be a promising approach, there are at least two problems with it. First, children's health endowments vary at the child level, not at the household level, so that although a household's *average* child health endowment differences out, the variation across different children within the household does not, and this could (at least in principle) lead to biased estimates for the same reason that it would do so in OLS estimation of cross-sectional data. Second, regressing differences in variables on each other greatly exacerbates bias due to measurement error, as stressed in Deaton (1997). Thus, it is preferable to find instrumental variables that can predict changes in household expenditure over time. This excludes many of the instrumental variables used above. Here, one instrumental variable is used: changes in household income over time.

Table 10.7 presents panel data estimates for urban and rural areas. The only variables that change over time are the (average) age and gender of the children and (log) per capita expenditures. The female child (gender) dummy variable has no significant impact in any of the regressions. The age variable is again specified in a flexible way, with linear, quadratic, and cubic terms. The coefficients on these age terms are quite similar to those seen in tables 10.3–10.6.

The three urban regressions (OLS, fixed effects, and 2SLSFE) yield a rather odd finding: negative point estimates for the impact of household expenditures on child health. However, note that the standard errors on these coefficients are very large (0.168, 0.185, and 0.920, respectively), which reflects the small sample size. Thus, the positive estimates in tables 10.3 and 10.5 are not necessarily inconsistent with these results. Unfortunately, the standard errors of the panel data estimates are so large that little can be inferred from them.

In rural areas, the sample sizes are much larger. In the OLS and fixed effects estimates, the estimated impacts of household expenditures are very close to zero, and the standard errors are small enough (0.077 and 0.084) to exclude the point estimates in tables 10.4 and 10.6 from the associated

Table 10.7. Determinants of Child Malnutrition: Panel Data Estimates

	Urban			*Rural*		
Variable	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*	*Ordinary least squares*	*Community fixed effects*	*2SLSFE*
Female child	0.033	0.032	−0.037	0.017	−0.003	0.004
	(0.329)	(0.345)	(0.395)	(0.157)	(0.147)	(0.147)
Age (months)	−0.059**	−0.067***	−0.054*	−0.083***	−0.086***	−0.087***
	(0.022)	(0.022)	(0.029)	(0.009)	(0.009)	(0.009)
Age squared (months)	0.0009**	0.0010**	0.0008	0.0011***	0.0011***	0.0011***
	(0.0004)	(0.0004)	(0.0005)	(0.0002)	(0.0002)	(0.0002)
Age cubed (months)	−0.000004*	−0.000004*	−0.000004	−0.000005***	−0.000005***	−0.000005***
	(0.000002)	(0.000002)	(0.000003)	(0.000001)	(0.000001)	(0.000001)
Log per capita expenditures	−0.016	−0.106	−0.939	0.004	−0.046	0.376
	(0.168)	(0.185)	(0.920)	(0.077)	(0.084)	(0.512)
R^2	0.068	0.239	0.178	0.138	0.240	0.226
Sample size	237	237	237	1,426	1,426	1,426

*Statistically significant at 10 percent level.
**Statistically significant at 5 percent level.
***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses. All variables were differenced for estimation. Sample includes all panel households that had at least one child 0 to 60 months in both surveys. 2SLSFE = two-stage least squares with community fixed effects.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

confidence intervals. However, recall that such differenced estimates may suffer from considerable attenuation bias due to increased influence of measurement errors. The final column of estimates in table 10.7 uses household income to correct for measurement error in the household expenditures variable (but recall that this assumes that expenditures can be considered exogenous). The point estimate of 0.376 is much larger and comparable with estimates in tables 10.4 and 10.6. Unfortunately, this point estimate also has a very large standard error (0.512), so even in rural areas the panel data estimates are probably too imprecise to add anything to what has been learned from the cross-sectional estimates.

Impact of Income Growth on Child Nutrition

Given the estimates in tables 10.3–10.7, what can be said about the impact of Vietnam's economic growth on child nutrition? More precisely, is the rapid increase in household incomes and expenditures the main cause of Vietnam's substantial decrease in child stunting?

This question is examined in table 10.8, which shows changes in mean height-for-age *z* scores and in the percentage of children who are stunted from 1993 to 1998. The first three lines of the table show the actual changes for rural and urban areas separately, and the rest of the table uses the estimated impacts of household expenditures from tables 10.3–10.7 to examine how much of the change was brought about by directly raising households' expenditure levels.

Table 10.8 shows that the mean height-for-age *z* score in urban areas of Vietnam increased by 0.56 standard deviations, while the mean in rural areas increased by 0.49 standard deviations. These increases are quite dramatic over a period of only five years; they correspond to a drop of about 15 percentage points in the incidence of stunting in both urban and rural areas. Given the high rate of income growth over this time, it is tempting to conclude that this large improvement in children's nutritional status is due to higher household income.

The remaining lines of table 10.8 assess whether this conclusion is valid. For each estimator, the predicted change in the mean height-for-age *z* score is given, which is simply the estimated coefficient of the impact of household expenditures multiplied by the change in (the log of) average household expenditures. For estimates based on cross-sectional data, the estimated impact used is a simple average of the 1993 and 1998 estimates. In addition, these estimated impacts are added to each child's *z* score in 1993 to see how they change the incidence of stunting. Those calculations are reported in the third and fourth columns of table 10.8.

The obvious conclusion to draw from the results in table 10.8 is that growth in household expenditures accounts for only a small proportion of the improvement of children's nutritional status in Vietnam from 1993 to 1998. In urban areas, the mean height-for-age *z* score increased by 0.56, but

Table 10.8. Role of Economic Growth in Reducing Child Malnutrition

Indicator	Mean height for age z score: Urban	Mean height for age z score: Rural	Stunted (percent): Urban	Stunted (percent): Rural
	Actual figures			
1993	−1.455	−2.009	33.2	53.2
1998	−0.895	−1.524	18.4	38.2
Change (over 5 years)	0.560	0.485	−14.8	−15.0
	Estimates of change due to economic growth, by different estimation methods			
Ordinary least squares	0.199	0.083	−5.7	−3.0
	[0.344]	[0.133]		
Fixed effects	0.128	0.042	−3.3	−1.5
	[0.300]	[0.109]		
2SLSFE[a]	0.201	0.066	−6.6	−2.4
	[1.112]	[0.421]		
2SLSFE[b]	0.281	0.092	−9.0	−3.2
	[0.639]	[0.324]		
Ordinary least squares (panel)	−0.008	0.001	0.2	−0.0
	[0.156]	[0.041]		
Fixed effects (panel)	−0.051	−0.013	2.3	0.6
	[0.130]	[0.031]		
2SLSFE (panel)	−0.449	0.098	15.0	−3.2
	[0.451]	[0.363]		

Note: 2SLSFE = two-stage least squares with community fixed effects. Cross-sectional estimates are based on the mean of the 1993 and 1998 estimates. Increase in real expenditures per capita was 29.8 percent in rural areas and 61.3 percent in urban areas (GSO 1999). This implies that the changes in log per capita expenditures were +0.261 in rural areas and +0.478 in urban areas. Numbers in brackets are upper bounds of 95 percent confidence intervals.

a. Instrumental variables are irrigated annual cropland, unirrigated annual cropland, perennial cropland, and water surface; income from social funds, social subsidies, dowries, inheritances, and lottery winnings; and the existence of relatives in other Asian countries and in non-Asian countries.

b. The estimates add per capita household income to the instrumental variables in note a.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

the highest predicted change among seven different specifications is only 0.28 (from the 2SLS specification with income as an instrumental variable), one-half of the total amount. Similarly, the incidence of stunting dropped by 14.8 percentage points, but the predictions from the econometric estimates are much smaller, the highest one showing a drop of only 9 percentage points. The same conclusion holds even more forcefully for rural areas: The mean height-for-age *z* score dropped by 0.49 standard deviations, but the largest predicted drop is only 0.09 standard deviations; the incidence of stunting dropped by 15 percentage points, but the largest predicted drop is only 3.2 percentage points.

Given the imprecision of the estimated impacts, it is useful to check the upper bound of the 95 percent confidence interval of the estimated impacts, because it is possible that even though the point estimates are low, the actual change may still lie within that confidence interval. The mean changes in height-for-age *z* scores using the upper bounds of the 95 percent confidence intervals are shown in brackets in the first two columns of table 10.8. In only 2 of 14 cases does the actual change lie within that confidence interval. Thus, one must conclude that growth in household incomes accounts for only a proportion, and probably a rather small proportion, of the improvement in children's nutritional status in Vietnam during the 1990s.

Health Programs and Child Nutrition

The results of the preceding discussion strongly suggest that something else happened in Vietnam in the 1990s that improved children's nutritional status. One possibility is that health services in Vietnam dramatically increased in their quantity, quality, or both. This section reviews changes in the quantity and quality of health services in Vietnam and uses the 1998 VLSS data to examine the impact of health services on child nutrition in rural areas.

Growth in Health Programs

The community and price questionnaires in the 1993 and 1998 VLSSs have some information that can be used to examine expansion in health services in Vietnam. In general, publicly provided services did not expand their coverage in the 1990s (World Bank 2001a). However, the economic reforms allowed private individuals to sell medicines and provide health services. Both surveys collected price data on a variety of commonly used medicines in Vietnam. The medicines that were covered differed in the two surveys: Only ampicillin and penicillin prices were collected in both surveys. No price data were recorded if communities did not have a given medicine available, which in principle allows use of the price data to see whether allowing private individuals to sell medicines increased their availability.

In urban areas in 1993, all 30 communes in the sample had price data for all medicines, but in rural areas, only 3 of 120 communes reported no data for ampicillin prices and only 10 of 120 reported no data for penicillin prices. This completeness of the 1993 price data implies that it is not possible to use the price data to check for increased availability of these medicines from private providers. Although one may think that this demonstrates that medicine availability did not improve, because these medicines were already available almost everywhere, this is not necessarily the case because the distance traveled to obtain the medicine may have decreased. Thus, the only conclusion is that the price data from the two surveys are not very informative about changes in the availability of medicines.

The other way to check the survey data to see if the availability of medicines and medical services from private providers increased in the 1990s is to examine the community questionnaires in both surveys, which asked about distances from the communities to various medical facilities, including the distance to the nearest private pharmacy. Distance information is available for both years from 111 of the 120 rural communes covered in the 1993 VLSS. In 67 communes (60 percent), the distance to the nearest private pharmacy did not change during the two surveys. For 18 communes (16 percent), the distance increased; for 27 communes (24 percent), the distance decreased. There may be some noise in these data, but overall they suggest that the distance to the nearest private pharmacy was more likely to decrease than to increase. In fact, among the 18 communes where the distance increased, the median distance of the increase was 3 kilometers; in the 27 that experienced a decrease, the median distance dropped by 7 kilometers.

Econometric Estimates

The 1998 VLSS price questionnaire collected detailed data on the prices of nine medicines in both urban and rural areas. In rural areas, the community questionnaire also collected data on the distance from the sampled communes to 14 different kinds of health facilities or health service providers. That questionnaire also collected information from community respondents on specific illnesses that were common to the community and on reported problems with the commune health center.

Commune health centers are the first line of defense in the Vietnamese health care system. Almost every rural commune has a commune health center; of the 156 communes in the 1998 VLSS for which community data were collected, only 2 did not have their own commune health center (and in both cases, there was a commune health center within 5 kilometers). The 1998 VLSS administered a commune health center questionnaire in 155 of the 156 communes in the rural areas covered by that survey. That questionnaire collected information on (a) the number of medical staff (doctors, physician assistants, nurses, and nurse's aides); (b) hours of operation; (c) the number of beds; (d) the availability of 11 kinds of medical services; (e) the availability of electricity, clean water, and a sanitary toilet; (f) 13 different types of medical equipment, ranging from thermometers to laboratories; (g) the availability and prices of 9 kinds of medicines (the same ones surveyed in the price questionnaire); and (h) fees for 5 kinds of services, and some information on whether those fees are waived for certain types of clients.

Here, community-level variables that are relevant for child health have been added to the regression analysis to see whether they have any explanatory power as determinants of child health. Because there are so many variables, and they vary only at the level of the community (and there are only 156 communities in the rural sample), they are not added all at once; rather, the most basic are added first, and then other sets of variables (sometimes in the form of an index) are added to see what explanatory power they have.

The first data to be used are medicine prices. Of the nine types of medicines available, the one most relevant for child nutrition is oral rehydration salts. Other potentially relevant medicines are the antibiotics ampicillin and

Table 10.9. Descriptive Statistics of Selected Community Variables in Rural Areas, 1998

Variable	*Communities with observations*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
Price of oral rehydration salts (thousand dong)	146	1.3	0.4	0.4	2.5
Price of ampicillin (thousand dong)	152	4.1	1.1	0.7	8.0
Price of penicillin (thousand dong)	151	2.6	0.9	1.0	8.0
Price of iron tablets (thousand dong)	119	3.4	5.5	0	37.3
Price of vitamin A (thousand dong)	126	0.7	0.9	0	4.8
Price of acetaminophen (thousand dong)	151	1.1	1.1	0	9.0
Distance to provincial hospital (kilometers)	154	38.6	33.4	0	180
Distance to state pharmacy (kilometers)	144	6.1	12.1	0	100
Distance to private pharmacy (kilometers)	146	3.1	7.8	0	50
Diarrhea is local health problem?	156	0.46	n.a.	0	1
Characteristics of community health center					
Lacks electricity	155	0.13	n.a.	0	1
Lacks clean water	155	0.26	n.a.	0	1
Lacks sanitary toilet	155	0.34	n.a.	0	1
Total equipment index	152	9.29	1.11	7	14
Price of ampicillin (thousand dong)	135	4.07	5.40	0	50
Injection price (thousand dong)	153	0.28	0.56	0	5
Price of oral rehydration salts (thousand dong)	150	1.41	1.12	1	5

n.a. Not applicable.

Source: Authors' calculations using the 1998 VLSS.

penicillin, acetaminophen (to reduce fevers—also known as paracetemol), iron tablets, and vitamin A tablets. Unfortunately, these price data are very noisy, as seen in the first six rows of table 10.9. Although prices were supposed to be collected for a given number of doses for a particular brand, it is likely that some observations are for a different number of doses or perhaps for a different brand. The variation in the price of iron tablets is particularly egregious: The standard deviation is nearly twice as large as the mean, and the maximum value is 20 times larger than the median value. To see whether these data had any explanatory power, the OLS regression in table 10.6 (for rural areas in 1998) was reestimated five times, each time adding one of the price variables for each of these five types of medicines (iron tablet prices were deemed too noisy to be used). In all cases, the point estimates were very close to zero and far from any statistical significance. As an example, consider the medicine most likely to have an effect, namely, oral rehydration salts (which also displayed the least amount of noise in the data). The price of oral rehydration salts had the expected negative sign, but it had a t statistic of only 0.83 and thus was not statistically different from zero.

Another "price" of medical care is the distance to nearby health facilities. Although the distance to commune health centers is trivial, those centers are not equipped to handle the most serious medical problems; seriously ill individuals must go to a hospital in a district or provincial capital or perhaps to some other kind of health facility (including private health facilities). Of the 13 other types of health facilities or health service providers considered in the commune questionnaire, 4 had missing data for nearly one-third or one-fourth of the observations (private nurse, medicine peddler, midwife, and practitioner of Eastern medicine) and thus were not considered. For the remaining 9, the same procedure used with the medicine price data was used for the distance data. For 6 types of facilities (family planning center, polyclinic, district hospital, other hospital, private doctor, and private physician assistant), no significant relationship was found. However, for 3 types of health facilities (provincial hospital, state pharmacy, and private pharmacy), a negative effect—significant at the 5 percent level—was found.

The first column of table 10.10 presents the results when all three distance variables are added simultaneously. The distance to the nearest provincial hospital is statistically significant at the 10 percent level, with a coefficient of −0.0023. The distance to the nearest state pharmacy is not statistically significant; it has a coefficient of −0.0022 and a standard error of 0.0019. Finally, the distance to the nearest private pharmacy is statistically significant at the 1 percent level, with a coefficient of −0.0158. Despite the statistical significance of two of the distance variables, the policy significance of the estimated impacts is not particularly large. Reducing by one-half the current mean value of the distance to the nearest provincial hospital implies an improvement in children's height-for-age z scores of about 0.044, and halving the distance to the nearest private pharmacy implies an improvement of only 0.025.

The next variables to consider are those from the community questionnaire concerning local health problems and problems with the commune health center. Five illnesses cited seem relevant for small children: malaria, respiratory illnesses (other than tuberculosis), childhood illnesses (diphtheria, whooping cough, measles, polio, tetanus, and encephalitis), diarrhea, and

Table 10.10. Impact of Community Health Services on Child Malnutrition in Rural Areas, 1998

Variable	*Base model*	*Adding electricity and toilet*	*Adding equipment index*	*Adding oral rehydration salts*
Age (months)	−0.211***	−0.209***	−0.208***	−0.207***
	(0.024)	(0.024)	(0.025)	(0.025)
Age squared (months)	0.006***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Age cubed (months)	−0.00005***	−0.00005***	−0.00005***	−0.00005
	(0.00001)	(0.00001)	(0.00001)	(0.00001)
Mother's height (cm)	0.035***	0.035***	0.035***	0.0036***
	(0.008)	(0.008)	(0.008)	(0.008)
Mother's height missing	0.150	0.127	0.110	0.160
	(0.219)	(0.219)	(0.108)	(0.208)
Father's height (cm)	0.032***	0.032***	0.031***	0.031***
	(0.010)	(0.010)	(0.010)	(0.010)
Father's height missing	0.094	0.099	0.110	0.092
	(0.107)	(0.107)	(0.108)	(0.109)
Female child	−0.030	−0.031	−0.023	−0.033
	(0.068)	(0.068)	(0.069)	(0.071)
Log mother's years schooling	−0.202***	−0.185***	−0.178**	−0.181**
	(0.069)	(0.070)	(0.0070)	(0.075)
Log father's years schooling	−0.002	0.000	−0.001	−0.002
	(0.085)	(0.084)	(0.083)	(0.088)
Log per capita expenditures	0.0259***	0.240***	0.232***	0.219***
	(0.074)	(0.078)	(0.080)	(0.083)
Buddhist	0.047	0.029	0.028	0.053
	(0.098)	(0.097)	(0.097)	(0.103)
Catholic	−0.233*	−0.213*	−0.269**	−0.288***
	(0.124)	(0.116)	(0.108)	(0.109)
Protestant	− 0.357*	−0.278	−0.343	−0.346
	(0.195)	(0.204)	(0.221)	(0.217)
Other religion	−0.330	−0.364	−0.387	−0.178
	(0.227)	(0.231)	(0.247)	(0.184)
Chinese	−0.946***	−0.971***	−0.894***	−0.959***
	(0.112)	(0.110)	(0.106)	(0.113)
Ethnic minority	−0.066	−0.036	−0.007	−0.016
	(0.134)	(0.135)	(0.132)	(0.136)
Distance to provincial hospital (in kilometers)	−0.0023*	−0.0016	−0.0022	−0.0018
	(0.0012)	(0.0015)	(0.0016)	(0.0017)
Distance to state pharmacy (in kilometers)	−0.0022	−0.0020	−0.0018	−0.0024
	(0.0019)	(0.0020)	(0.0021)	(0.0021)

Table 10.10. (*continued*)

Variable	*Base model*	*Adding electricity and toilet*	*Adding equipment index*	*Adding oral rehydration salts*
Distance to private pharmacy (in kilometers)	– 0.0158***	– 0.0136**	– 0.0138**	– 0.0133**
	(0.0053)	(0.0062)	(0.0062)	(0.0063)
Commune health center variables				
Lacks electricity	n.a.	– 0.104	– 0.028	– 0.052
		(0.165)	(0.173)	(0.166)
Unsanitary toilets	n.a.	– 0.151*	– 0.142	– 0.192**
		(0.087)	(0.089)	(0.091)
Equipment index	n.a.	n.a.	0.051	0.052
			(0.041)	(0.038)
Availability of oral rehydration salts	n.a.	n.a.	n.a.	0.110**
				(0.048)
Sample size	1,446	1,443	1,411	1,342
R^2	0.247	0.250	0.252	0.261

n.a. Not applicable.

*Statistically significant at 10 percent level.

**Statistically significant at 5 percent level.

***Statistically significant at 1 percent level.

Note: Standard errors (adjusted for sample design) in parentheses.

Source: Authors' calculations using the 1998 VLSS.

child malnutrition. Using the same procedure described above, only respiratory illnesses approached statistical significance, with a point estimate of −0.130 and a *t* statistic of −1.34. Even less statistical significance was seen in the variables citing problems with local health facilities (lack of equipment and supplies, lack of medicines, inadequate staff, inability of staff to provide services, inadequate training opportunities, and lack of sanitation). None of these variables had a *t* statistic greater than 1.3 when added to the regression.

Finally, turn to the data from the commune health center questionnaire. The numbers of different kinds of staff in the center, divided by the population of the commune, never had any explanatory power, either separately or as a group. The same is true of weekly hours of operation and number of beds (divided by the commune population). Of the 11 kinds of services offered, 1 was offered by all centers in the sample (immunizations), 1 was offered by all but two (prenatal care), and 2 appear to be irrelevant for child nutrition (eye exams and dental exams). Of the remaining 7, 3 are closely tied to child health (obstetrics, child health exams, and education on nutrition), 2 concern birth control (intrauterine device [IUD] insertion and abortion), and 2 are very general (Eastern medicine and simple operations). The last 4 had no explanatory power when entered individually. Neither did the 3 that are most closely tied to child health. In addition, combining all these variables into a general health services index also had no explanatory power.

Next consider the three general variables concerning amenities at the facility: electricity, clean water, and sanitary toilet. Of these, lack of a sanitary toilet and lack of electricity both had significantly negative effects on child health when added separately, but the clean water variable had no effect. A regression adding the two significant variables is shown in the second column of table 10.10. The electricity variable loses statistical significance, and the toilet variable is still significantly negative. The policy significance of lacking a sanitary toilet is much larger than that of the distance variables; taking the coefficient at face value implies that remedying this deficiency will increase the typical child's height-for-age z score by 0.15 point.

The next variables examined are the 13 equipment variables. There are so many types of equipment that the best thing to do is to develop an index. First, 4 variables with almost no variation were dropped: blood pressure monitor and stethoscope (only one commune did not have these) and thermometer and laboratory (only three communes did not have thermometers and only three had laboratories). Two variables were also dropped that have no clear relevance for child malnutrition: eye charts and family planning equipment (for abortions). This leaves 7 variables for the general index: refrigerator, sterilizing equipment, delivery bed, microscope, examining bed, child growth chart, and child scale.[2] The results, after adding the equipment index, are shown in the third column of table 10.10. The index has the expected positive sign but is not statistically significant (t statistic of 1.24).

The last type of information in the commune health center questionnaire is data on the availability of drugs, the prices of those drugs (if available), and the prices of common health services. The drug availability index ranges from 1 (not available) to 5 (always available). This variable was statistically significant for only one drug, oral rehydration salts, which had the expected positive impact with a t statistic of 1.74. Turning to drug prices, missing data were a serious problem because prices were not recorded for commune health centers that rarely or never had the medicine. Of the four for which price data were available at almost all commune health centers, three had statistically significant effects: ampicillin, penicillin, and oral rehydration salts (the fourth was acetaminophen, which is used to treat fevers). The prices of ampicillin and penicillin were highly correlated, and only ampicillin was retained because it had fewer missing values. An odd finding for both ampicillin and penicillin is that the sign was positive: Higher prices improved child health. Finally, prices of three kinds of medical services were examined: general examination, birth, and injection. Only the injection price had a statistically significant impact, which was unexpectedly positive.

When all four of the statistically significant variables (price of ampicillin, price of injection, and availability and price of oral rehydration salts) are added to the regression (not shown in table 10.10), only one retains statistical significance: The availability of oral rehydration salts has the expected negative sign. Because the sample size drops considerably as a result of missing data in all of these variables, only the oral rehydration salts variable is added in the regression shown in the last column of table 10.10 (even then, the sample size drops from 1,411 to 1,342). The impact of the index is statistically significant at the 5 percent level, with a parameter estimate of 0.110. Because the index ranged from 1 to 5, this estimate implies that a change from never being available to always being available raises child height-for-age *z* scores by 0.44 point, which is almost as large as the increase in rural areas from 1993 to 1998 reported in table 10.8. Note, however, that 84 percent of the commune health centers report that they already have this medicine available all the time, so the benefits of oral rehydration salts are already reaching most Vietnamese children.

Summary and Conclusion

This chapter has investigated the impact of household income growth, as measured by household expenditures, on child nutritional status in Vietnam. Vietnam was doubly fortunate in the 1990s: Household incomes rose dramatically and children's nutritional status improved rapidly. Although one might conclude that the former caused the latter, the estimates presented here do not support such a conclusion. Using many different estimation methods, this chapter has shown that the impact of household expenditures on children's nutritional status (as measured by height-for-age *z* scores) is not necessarily significantly different from zero. More specifically, the impact may well be positive, but it is not very large. In particular, none of the estimates is large enough to account for even one-half of the measured improvement in children's nutritional status from 1993 to 1998.

Some observers may argue that this finding casts doubt on the benefits of economic growth for children's health status, but such a conclusion would be misleading. Economic growth may lead to other changes in society, such as improved health care services. That is, economic growth typically increases government budgets through higher tax revenues, some of which can then be used to provide better health care services. The question then becomes: What kinds of health services are most effective at raising child (and adult) health? A first attempt at answering this question was made in the "Health Programs and Child Nutrition" section. The community-level data on health services suggest that the distance to private pharmacies has a statistically significant, though not very large, negative effect on child nutrition. It also suggests that providing commune health centers with sanitary toilets and ample supplies of oral rehydration salts could have substantial positive impacts on child health in Vietnam.

These findings regarding community-level health services are tentative; much more research is needed in Vietnam on the impact of different kinds of health care services and programs on children's nutritional status. A better understanding is important for policy, given current trends in the provision and use of government health care services; in particular, government support for commune health centers is stagnant (World Bank 2001a), which may explain the decline in their use documented in chapter 11 of this volume. A particularly crucial factor may be parents' health knowledge, especially mothers' health knowledge. A recent study of Morocco found that mothers' health knowledge was the main pathway by which their education affects child health (Glewwe 1999). In Vietnam, several new community programs supported by donor agencies focus on raising parents' health knowledge (see World Bank [2001a]). Such programs could lead to substantial improvements in children's nutritional status, but rigorous analysis is needed to test this hypothesis.

Notes

1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted one year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. As an exploratory exercise, each piece of equipment was added separately. The three that approached statistical significance were delivery beds, examining beds, and child scales, with the expected positive sign and t statistics ranging from 1.9 to 2.6. Because there are many other kinds of equipment that are not observed but may be correlated with specific observed equipment, it seemed best to combine all types of equipment into a single index.

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11

Patterns of Health Care Use in Vietnam: Analysis of 1998 Vietnam Living Standards Survey Data

Pravin K. Trivedi

The changes to the Vietnamese health sector initiated by *Doi Moi* ("renovation") have been described and analyzed in previous World Bank empirical studies based on the 1992–93 Vietnam Living Standards Survey (VLSS). These studies noted, in particular, the decline of the traditional public sector provider of health care to the poor, the commune health center, and the incipient rise in the early 1990s of private sector health providers. The deregulation of the pharmaceutical industry was followed by a dramatic growth of private pharmacies as the single most important source of drugs for self-medication. Contacts with pharmacies, both public and private, became the most important type of contact between the provider and patient while the role of the commune health center declined. Deregulation permitted the emergence of private care facilities provided by doctors and nurses, some of whom are simultaneously employed in government hospitals and other public facilities. Another major new feature of the health care sector, largely absent in 1993, is the Vietnam Health Insurance (VHI) program, with mandatory coverage for some sections of the community and voluntary coverage for others. This is an important new development that has significant implications about the rate at which the relative importance of different providers in the health sector has changed and is likely to change in the future. These emergent trends, also highlighted and explored in the *Vietnam Health Sector Review* (VHSR; World Bank 1999), have raised important analytical and policy questions about the access to and use of health services by different socioeconomic groups.

This chapter provides a further analysis of the direction and scope of changes in the health sector. Here, the emphasis is on econometric modeling of demand for different types of health care in Vietnam rather than supply aspects. In contrast, the VHSR (World Bank 1999) surveys all aspects of the health sector. In modeling the demand for health care, both individual- and household-level data from the 1997–98 VLSS are used.[1] The focus is on four major features of health care use:

- Determinants of the largely self-prescribed use of pharmaceutical drugs
- Use of government hospitals
- Low level of use of commune health centers
- Increasing use of private health care facilities.

In each case, the major interest is the role of price and income variables. Given the high rate of economic growth, accompanied by major structural changes in health care delivery, it is useful to consider how these changes have affected the pattern of health care use and what further changes we can expect if these trends persist. The major analytical tool is multivariate regression analysis using models that respect the discrete nature of many of the outcome variables that are reported in the VLSSs.

The analysis in this chapter complements that provided in the comprehensive VHSR (World Bank 1999), which provides much descriptive statistical information on the structure and organization of health care delivery and on the broad pattern of health care use in Vietnam. The VHSR also provides many points of comparisons between the 1993 and 1998 VLSSs. Although the tabular summary information provided in the VHSR is both rich and informative, and also highly suggestive of factors that influence health care use, no formal modeling of the data is undertaken. Relationships between variables are studied or interpreted on a bivariate basis—for example, the relation between health care usage and household income. Because this method cannot control for the presence of other relevant factors, and can at most only establish informal associations, there is a danger of misleading interpretations as a result of the neglected confounding variables. This chapter addresses the task of measuring and testing various hypotheses about health care use within a multivariate econometric framework.

In the second section of the chapter, there is a preliminary look at data and an outline of the substantive issues, as well as a summary of the changes and trends affecting the health sector since the 1993 VLSS. The next section surveys the main empirical issues and is followed by a section that considers the modeling framework and related statistical issues. This is followed by a section that analyzes the determinants of enrollment in the VHI program. Next, the use of the major components of health care is modeled, ignoring the remaining providers who collectively account for only a small share of the health care budget. Econometric methods used in this section are those appropriate for binary-valued and count variables. These are used to model the probability of or number of visits, or both, to commune health centers, pharmacies, government hospitals, private providers, and public hospitals. The next section discusses results for individual and household health care expenditures, which is followed by a section that discusses the policy implications of the results. The last section summarizes and concludes.

The 1998 VLSS

The health component of the 1998 VLSS is the main source of the data used here. Usage data are collected for seven types of providers: government hospital (GOVHOSP), commune health center (CHC), regional polyclinic, other government health facility, private health facility (PHF), traditional Eastern medical practitioner, and pharmacy visits or self-medication (PHARVIS). For each type of provider, the questionnaire seeks information on the number of contacts, total expenditure, the amount spent on medicines, and transportation and other costs associated with the visits. For the self-medication part, the questionnaire also sought information on whether the visit to the drug vendor was self-initiated or requested by another provider.

The survey also provides information on government hospital admissions (HOSPADM) in the 12-month period preceding the survey and the number of nights spent in hospitals (HOSPNITE).

The responses to questions about expenditure on health care refer to a period of 12 months. The data make it possible to calculate this figure for the household both inclusively and exclusively of health insurance expenditure.

Finally, the questionnaire collected information on whether the respondent had health insurance (HLTHINS) and the amount spent on it in the previous 12 months.

The survey includes information on the current health status, such as occurrence of illness (ILL) or injury (INJ) in the preceding four weeks, the number of days of illness (ILLDAYS), and the number of days of restricted activity (ACTDAYS).[2]

However, there are some gaps in the information available that affect econometric modeling of health care use. For example, there is still no information on long-term health status, such as the presence of limiting and nonlimiting chronic conditions. The general health status of an individual is an important conditioning variable in most analyses of demand for health care. Further, the direct information on HLTHINS lacks some necessary detail as to which of the several levels of coverage of insurance applied to a survey respondent (this issue is elaborated further in the section on health insurance).[3]

The survey also provides information on various sociodemographic variables such as gender (SEX), years of schooling (EDUC), age (AGE), and marital status (MARRIED), as well as total household expenditure (INC). Table 11.1 provides the data definitions and descriptive summary statistics.

These data can support empirical investigations at both the individual and household levels. The available frequency-of-use data can be used in regression modeling of the probability of contact between provider and patient and also in modeling the frequency of such contact. Models of probability of contact attempt to explain the factors that distinguish those who

Table 11.1. Definitions and Descriptive Statistics

Variable	*Definition*	*Mean*	*Standard deviation*
PHARVIS	Number of pharmacy visits	0.51	1.31
PHARDUM	0/1 dummy for pharmacy visit	0.26	0.44
GOVHOSP	Number of hospital outpatient visits	.049	0.41
PHF	Number of visits to private health facility	0.11	0.80
CHC	Number of visits to commune health centers	0.04	0.34
HOSPADM	0/1 dummy for hospital admissions	.051	0.22
HOSPNITE	Number of hospital nights	13.53	21.82
MEDEXP	Total medical expenditure, 1998 Dong	1,520	5,139
(4W+12m)	(4 weeks plus 12 months)		
HHEXP	Total nominal household expenditure, 1998 Dong	15,273	13,020
log(INC)	log(HHEXP)	2.60	0.62
lnmedexp (>0)	lnmedexp (>) for positive expenditures	2.14	1.08
lnmedexp (insured)	lnmedexp for the insured	2.32	1.11
lnmedexp (uninsured)	lnmedexp for the uninsured	2.12	1.08
HLTHINS	0/1 dummy for health insurance status	0.16	0.37
AGE	Age in years	29.7	9.67
SEX	0/1 dummy for gender	0.51	0.49
MARRIED	0/1 dummy for marital status	0.40	0.49
EDUC	Completed years of education	3.38	1.94
ILL	0/1 dummy for illness in 4 weeks before survey	0.41	0.49
INJ	0/1 dummy for injury in 4 weeks before survey	0.009	0.098
ILLDAYS	Number of days of illness/injury in 4 weeks before survey	2.80	5.45
ACTDAYS	Number of days of limited activity in 4 weeks before survey	0.06	1.11
URBAN	0/1 dummy for urban household	0.29	0.45
HHSIZE	Household size	4.73	1.96

Source: Author's calculations.

received some care from those who did not receive any care. Such models distinguish only between zero and positive levels of use. Count data models distinguish between different levels of usage, but do not distinguish between high-quality contacts that may have cost more and those of lower quality. Models of expenditure, however, allow us to take into account expenditure variations that may be due to variation in the quality of care, but they do so indirectly. Count models are analogous to models that explain quantities, but expenditure models attempt to explain the product of quantity and price of service. Aggregated health care expenditure data can be used to develop total household expenditure models. The two modeling approaches are largely complementary and mutually reinforcing.

Survey of Main Issues

The VHSR (World Bank 1999, pp. 49–50) considers five factors in health care use: income, price, quality of care, access (especially by income levels), and the role of education. In this section, the main issues concerning the role of these factors are qualitatively outlined. Regression models are considered in another section. First, the main features of health care use data provided in the 1998 VLSS are summarized.

Table 11.2 summarizes the contact rates for the main types of providers in 1993 and 1998. The data show that other government health facilities and traditional providers are a small part of the total number of visits. Pharmacies and drug vendors, GOVHOSP, PHF, and CHC account for the bulk of the total usage. All types of use have grown since 1993, but the use of drug vendors has shown the fastest rate of growth: It has more than tripled. This attests to the overwhelming importance of self-medication. Pharmacies are both private and public. Private pharmacies are more prevalent in urban areas and public ones are more prevalent in rural areas. The VHSR (World Bank 1999, p. 56) points out that the increase in the average number of pharmacy visits is accompanied by a decline in out-of-pocket expenditure on drugs. Also notable is the growth of use of private health facilities, which has increased more than 2.5 times.

Table 11.2. Annualized Health Service Contact Rates, by Provider

Year	*GOVHOSP*	*CHC*	*OTHER*	*Public providers*
1993	0.32	0.19	0.03	0.54
1998	0.60	0.57	0.25	1.43
Year	*PHARVIS*	*PHF*	*TRAD*	*All providers*
1993	2.14	0.66	0.03	3.37
1998	6.78	1.76	0.36	10.33

Note: Definition of variables: CHC = commune health center. GOVHOSP = government hospital. OTHER = other government facilities. PHARVIS = visits to pharmacy or drug vendor. PHF = private health facility. TRAD = traditional (Eastern) practitioner.

Source: World Bank 1999, pp. 37–38.

Previous analyses of the 1993 VLSS data have attributed the impressive rise in pharmacy visits to a combination of factors. The first is the improvement in the supply and availability of pharmaceutical drugs between 1993 and 1998 after the deregulation of the retail markets and liberalization of the pharmaceutical industry in 1989. Evidence suggests that the real price of drugs may have declined over the 1993–98 period by as much as 30 percent or more. The second factor is the persistence of self-medication, which is induced in part by the ease of access to medicines relative to the alternatives. In rural areas, especially, distance from government health facilities and poor quality of health services at commune health centers have been cited as possible reasons for the continued growth of self-medication.

The growth of private health providers is another important facet of health care use. There are two main types of private health providers: full-time providers who own private facilities and part-time providers employed by the public health facilities who also engage in private practice during off-hours (World Bank 1999, p. 101). Both licensed and unlicensed practices are included in this category; hence, the quality of care in this sector may be variable. Nearly 70 percent of PHFs are estimated to be in urban areas.

Access and Costs

The annualized health service contact rate by provider type is a rough measure of access (table 11.3). This measure can be misleading if it is not supplemented with other information. In any sample survey, one is likely to observe zero contact frequency for some respondents, in part because the respondent was healthy in the survey period and did not need health care. Table 11.4 compares the overall contact rates with the subset consisting of those classified as sick or injured and extends the same comparison across different income levels.

The figures show that commune health care is sought at a three to four times higher rate by the sick in the lowest income quartile, compared with the sick in the highest income quartile. The situation is reversed in the case of government hospitals. The contact rate in that case is three to four times higher for the better-off sick than for the sick poor. This differential usage is further in evidence for private health care providers, but the difference multiple is closer to two than three or four. The differential usage is the smallest for pharmaceutical providers. This appears to indicate that access to private drug vendors is roughly equal for the sick, whether they have low or high income. However, this needs a caveat, because government hospitals that are accessible to the VHI enrollees and favored by the high-income groups also dispense pharmaceutical drugs and act as a substitute for pharmacies.

Table 11.4 shows that at all income levels, the pharmacy is the most frequently contacted care provider for the sick. Private health care providers and government hospitals, respectively, are the next most frequently contacted by those in the top income quartile. For the sick in the lowest income quartile, private providers are relatively more frequently contacted than are

Table 11.3. Mean Number of Visits to Different Health Care Providers
(percent)

Category	*N*	*CHC*	*GOVHOSP*	*PHF*	*PHARVIS*	*TRAD*	*HOMEVIS*
Full sample	27,331	0.040	0.049	0.113	0.512	0.022	0.038
Sick sample	11,322	0.096	0.113	0.274	1.214	0.054	0.091
Insured sample	4,496	0.041	0.105	0.084	0.406	0.014	0.037
Sick/insured sample	1,818	0.100	0.248	0.198	0.971	0.033	0.086
Health expenditures	8,081	0.96	3.22	2.61	92.17	0.33	0.41

Note: Definition of variables: CHC = commune health center. GOVHOSP = government hospital. HOMEVIS = home visits. PHARVIS = visits to pharmacy or drug vendor. PHF = private health facility. TRAD = traditional (Eastern) practitioner.

Source: Author's calculations.

Table 11.4. Average Contact Rates with Providers, by Health Status

	CHC		*GOVHOSP*		*PHF*		*PHARVIS*		*OTHER*	
Income class	*All*	*Sick*	*All*	*Sick*	*All*	*Sick*	*All*	*Sick*	*All*	*Sick*
Lowest 10%	0.0659	0.1271	0.0299	0.0532	0.1002	0.1967	0.5660	1.0688	0.0279	0.0586
Lowest 25%	0.0596	0.1219	0.0336	0.0672	0.0995	0.2089	0.5595	1.1368	0.0256	0.0537
Highest 25%	0.0119	0.0326	0.0762	0.2005	0.1406	0.3878	0.4526	1.2323	0.0221	0.0086
Highest 10%	0.0075	0.0211	0.1081	0.2920	0.1398	0.3989	0.3985	1.1407	0.0096	—

— Not available.

Note: Sample size for full sample: lowest 10%, 2,773; lowest 25%, 6,922; highest 25%, 6,939; highest 10%, 2,775. Sample size for sick sample: lowest 10%, 1,408; lowest 25%, 3,273; highest 25%, 2,483; highest 10%, 945. Definition of variables: CHC = commune health center. GOVHOSP = government hospital. OTHER = other government facilities. PHARVIS = visits to pharmacy or drug vendor. PHF = private health facility.

Source: Author's calculations.

commune health centers. The contact rates for the latter are very low for high-income individuals.

Thus, commune health centers appear to primarily serve the low-income groups, and government hospitals primarily serve the high-income group. However, those who are covered by the VHI program are served by government hospitals. Also, insurance coverage under VHI is more extensive for the relatively better-off groups; hence, the observed higher usage for these groups may be due to a combined income and price effect, as will become clear in this chapter's econometric analysis. Finally, as others have also previously noted (Gertler and Litvack 1998), self-medication through drugs purchased at pharmacies appears to be the first line of defense against sickness, irrespective of income class.

For each type of service contact, the questionnaire collected responses on the total cost of transportation, room and board, and other related costs. Of course, these data were collected only for those who actually had nonzero usage. The data are censored for those who had zero usage. For those who had a positive usage level, the data can be used to estimate average extraneous cost of health service. Although this is useful information, it is insufficient for modeling individual choice of the type of service. Standard economic theory suggests that in choosing between two types of providers (for example, commune health center and government hospital), the *relative* extraneous cost of the services of the two providers is relevant. The survey data pertain only to the average extraneous cost of the service actually chosen by the patient. By itself, average extraneous cost cannot be used to construct the relative price for each user that is needed for modeling purposes. Even a simple measure, such as distance from different types of providers, may be used to construct a more appropriate measure of the extraneous costs under the assumption that such costs are closely related to the distance. However, the average extraneous cost of access, for those who used a provider, may still be useful as a rough benchmark comparison. Average household medical expenditures in 1998 dong for different types of households are shown in table 11.5. The medical expenditure for the average

Table 11.5. Medical Expenditure by Household Type
(1998 dong)

Household type	*N*	*Expenditure 2*	*Expenditure 1*
Average	5,999	768	1,520
Average $\|y > 0$	5,006	788	1,822
Urban	1,730	997	2,000
Rural	4,269	674	1,325
Farm	2,561	942	1,772
Nonfarm	3,438	637	1,331

Note: Expenditure 1 = medical expenditure. Expenditure 2 = medical expenditure excluding insurance.

Source: Author's calculations.

urban household is nearly 50 percent higher than the average rural household. Greater insight is provided by budget share of health expenditure at different income levels. The VHSR (World Bank 1999) indicates that, overall, 11 percent of total consumption expenditure and 24 percent of nonfood expenditure were devoted to medical care in 1998. Medical care constitutes a much larger share of nonfood expenditure for the poor than the rich; the richest quintile devoted 15 percent of the nonfood expenditure to health care, compared with 30 percent for the poorest quintile.

Health Insurance

A major new development in the health sector since the 1993 VLSS is the emergence of a national health insurance program, VHI; initiated in late 1992, the program began effective operation in 1993.

Three health insurance programs in Vietnam are provided under government sponsorship, a compulsory national health insurance program and two voluntary programs. During its first phase, insurance coverage was provided to current and retired civil servants and salaried employees of state-owned enterprises and large, private enterprises. Benefits include the full cost of pharmaceuticals and ambulatory and inpatient care at governmental facilities to which enrollees are referred. A district or provincial hospital acts as the primary care provider. The mandatory VHI coverage does not extend to dependents of employees.

A voluntary VHI plan provides for group coverage to dependents of those enrolled in VHI and some other groups, such as communes. That is, groups rather than individuals must enroll in the program. The benefit level varies. A third tier of national health insurance is the voluntary plan called Comprehensive Student Insurance (CSI). The benefits of the compulsory VHI are less variable than those of the voluntary component. The CSI plans and premiums are locally designed and administered, and they show substantial variation in premiums and benefits among localities.

One estimate of the number of total (compulsory and voluntary) enrollees in the VHI program comes from the VHSR (World Bank 1999), which estimates this at 9.8 million in 1998, including about 38 percent voluntary enrollees. This covers roughly 12 percent of the population. The coverage of the target population for the compulsory component is around 77 percent, but it is much lower for the voluntary component and largely consists of students.

Having health insurance is positively related to income class. In the lowest income quartile, the insurance coverage rate is 9.2 percent. A high proportion of this group may be those enrolled in the voluntary scheme. In the top income quartile, 24.5 percent have health insurance (see table 11.6).

Tabular analysis of the impact of insurance is provided in table 65 of the VHSR (World Bank 1999). Controlling for income (by quintiles), the insured have significantly higher rates of service use of public providers, especially for inpatient services in government hospitals.

Table 11.6. Health Insurance and Income Status

Income class	*Lowest 10%*	*Lowest 25%*	*Highest 25%*	*Highest 10%*
Percentage insured	8.7	9.2	24.5	27.0

Source: Author's calculations.

Because the VHI premium for the compulsorily insured is a fixed percentage of the employee's base salary, the cost of insurance varies and income serves as a partial proxy for the cost of insurance.

One of the objectives of the empirical investigations in this chapter is to estimate the impact of health insurance on health care use, an issue that was not relevant in analyzing 1993 VLSS data. The foregoing account raises an important econometric issue concerning the treatment of health insurance. For those who are compulsorily enrolled in the program—that is the majority—insurance status can be treated as exogenous, but for those who are voluntarily enrolled, there may be an element of individual choice, which is an argument for treating the variable as endogenous. However, as noted, enrollment is on a group, and not individual, basis. This factor diminishes the role of individual preferences in the choice of health insurance. There is also a related data problem. The health component of the questionnaire asked only two questions about insurance: whether the respondent had health insurance and the cost of health insurance in the previous 12 months. Without additional data, one cannot distinguish between those who were enrolled in the compulsory insurance program and those who were not. Therefore, insurance status is treated as exogenous in the health care use equation—that is, it is postulated that causality runs from health insurance to health care use. In theoretical models with unrestricted choice of insurance, the choice of insurance and health care use will be interdependent or jointly (rather than recursively) determined.

It is of some interest to compare usage patterns among insured and uninsured individuals, conditional on positive expenditure over the previous 12 months. Total expenditure of the insured sample is about 20 percent higher, and this difference is statistically significant. The average difference in government hospital use between the insured and the uninsured is also statistically significant: that for the insured population is higher by a factor of about 2.5. The average difference in the use of a private health facility and drug vendors is significantly higher for the *uninsured* sample than for the insured. This general pattern is also consistent with the results of regression analysis in which many sociodemographic variables are controlled for.

Statistical Issues in Analysis of Individual Data

In this section, econometric models are developed for health insurance and for four categories of health care services that jointly account for about

99 percent of the total health care expenditure. The largest component (92.7 percent) is due to visits to drug vendors and pharmacy; government hospitals and private health facilities account for another 5.5–6.0 percent, with the former being slightly larger. The commune health centers account for close to 1 percent. Traditional (Eastern) medicine providers and other smaller components are not analyzed in this chapter.

The Problem of Zeros

Individual use data are available for 27,731 cases. However, this includes a high proportion of cases of zero use, in part because the survey period is truncated at four weeks (see table 11.7). For PHARVIS, the zero proportion is about 76 percent, but for the other three major provider categories it is between 96 and 98 percent each. Typically, the observed frequency distribution shows positive probability mass at only a few other integer values—such as 1, 2, and 3—and very small mass at higher integer values. For example, for PHARVIS, the frequency of one visit is about 10 percent and of two visits, less than 5 percent. In the case of GOVHOSP, PHF, and CHC, the corresponding percentages are even smaller.

The handling of the zero problem depends on whether one's objective is to model health care expenditures or frequency of contact with the provider. In modeling expenditures, the zeros pose a problem because they introduce a discontinuity in the distribution of expenditures. But in modeling a discrete random variable, such as contact frequency, this is not an issue.

Table 11.7. Frequency Distribution of Health Service Contacts

Number of contacts	*PHARVIS*	*GOVHOSP*	*PHF*	*CHC*	*OTHER*	*HOSPNITE*
0	20,639	26,796	26,481	27,041	27,158	42
1	3,827	736	540	486	254	71
2	1,716	133	316	111	124	100
3	776	30	180	52	66	122
4	359	17	99	23	36	74
5	174	8	36	6	24	92
6	64	4	12	3	12	54
7	43	1	18	4	16	274
8	16	3	4	1	9	32
9	4	2	3	3	2	20
10+						

Note: Sample size, 27,731. Sample size for HOSPNITE, 1,463. Outpatient contacts only for GOVHOSP. Definition of variables: CHC = commune health center. GOVHOSP = government hospital. HOSPNITE = nights in government hospitals. OTHER = other government facilities. PHARVIS = pharmacy visits. PHF = private health facility.

Source: Author's calculations.

For the 1993 data, Gertler and Litvack (1998) chose the two-part model (TPM), in which the first part models the split between zero and nonzero expenditures through a binary outcome model. That is, the focus is on modeling the probability of contact with the provider, using the logit, the probit, or the linear probability model. The second part of the model is a linear regression in which the outcome variable is health care expenditure, or the logarithm of it, for those who had at least one contact with a provider. If y denotes the measure of health care use—for example, expenditure—and X denotes the explanatory variables, then according to the two-part model:

$$E[y|X] = \textit{probability}\ [y > 0|X] \times E[y|y > 0, X].$$

The TPM framework is attractive because it provides a solution to the awkward statistical issues arising from the presence of significant probability mass at $y = 0$.[4] Note also that the zeros have two possible interpretations. The first is that they correspond to "corner solutions" in the consumer choice problem. That is, they indicate nonconsumption, given current income, price, and health status. A second interpretation is that zeros indicate that the good under consideration is not in the consumer's choice set for a variety of possible reasons (see Cameron and Trivedi [1998, chapter 6]). The first part of the TPM may be interpreted as a model of the probability of an interior solution to the choice problem, and the second part models the level of consumption, conditional on an interior solution being realized. Therefore, both parts yield estimates of economically interesting parameters.

A disadvantage of this framework is that the number of observations available for the second part of the model can be proportionately quite small, leading to a loss of precision in estimation. In these cases, it is attractive to use a count data model, which can naturally accommodate a significant probability mass at zero, making it unnecessary to separate the zero and nonzero observations as in the case of TPM.[5] Further, count data models work well in those cases where the outcomes are concentrated on a relatively few values of the outcome variable, which is the case for three of the four usage measures that need to be modeled. An important exception is the number of nights spent in a GOVHOSP. In all count models, the following specification is used to model the number of visits:

$$\textit{log}(E[\textit{\#visits to provider}\,|X|]) = \sum X_j \beta_j.$$

This chapter uses Gertler and Litvack's 1998 binary outcome framework in those instances where the frequency distribution of contacts is strongly concentrated on just two (0 and 1) or three values (0, 1, and 2). For other cases, most notably PHARVIS, a count data model is used in which the modeling focus is on the average number of contacts as a function of observed characteristics of individuals.

Aggregate health care expenditures are modeled at both the individual and household levels, but expenditure is not modeled on individual components of use.

The Problem of Clustering

Another significant factor is the clustering of responses by the primary sampling unit, the commune, used in the complex (stratified) sample survey methodology. In the case of VLSS data, clustering is by commune, which is the sampling unit. The sample covers fewer than 200 communes, with a variable number of observations per commune.

Clustering implies lack of independence of observations. It affects both the discrete and continuous outcome variables studied in this chapter. If there is significant within-commune homogeneity, perhaps due to common unobserved fixed or random components that affect all individual behavior within a commune, then assuming independence of observations will produce estimates with a spuriously higher degree of precision than is warranted. The correct sampling variances are larger than estimated under the independence assumption.

Two statistical approaches to deal with the effects of clustering are used. The first is based on adjusting all standard errors for clustering by using the "cluster-robust" variance estimator. This adjustment typically inflates the estimated variance of the coefficients. This approach is analogous to the use of the Eicker-White robust variance estimator. All estimates of standard errors reported in this chapter are "cluster robust" unless stated otherwise.[6]

A second approach to clustered observations uses a different statistical model. In this case, it is assumed that each commune has its own intercept, denoted α_j, where j is the commune subscript. Correlation between responses for a given commune reflect the presence of a common intercept, which is treated as a cluster (fixed) effect. In this formulation of the cluster effect, both the point estimates of parameters and their standard errors are affected, whereas the cluster-robust approach adjusts only standard errors. An example of a linear fixed effects model is shown in Deaton (1997, pp. 288–92). In this chapter, it is necessary to allow for commune fixed effects, but the main interest is not in estimating the fixed effects but in eliminating their impact on economically interesting parameters such as income elasticity. Neglect of the fixed (cluster) effects can bias the coefficients of interest if the relevant regressors are correlated with fixed effects. In fixed effect models, parameters of interest may be obtained after "sweeping out" commune effects. However, unlike linear regression models (where the sweep step is always possible), for the nonlinear regression models used in this chapter, this approach is feasible only for a class of models, such as the logit (but not the probit) and Poisson regression models (Cameron and Trivedi 1998, chapter 9.3; Hsiao 1986).

An interesting feature of the use of the fixed effects count model is that it indirectly reduces the impact of the excess zeros problem. This comes about because the fixed effects model will drop all observations from a commune if the responses within it are identical. In general, therefore, fixed effect models are based on fewer observations because (as is the case in the sample here) all observations from a commune are thrown out if every survey respondent records the same response (such as zero). For example, if in any particular commune the sample shows no usage of the CHC, then all observations for that commune are dropped. This reduces the sample size and also reduces the impact of the excess zeros problem. The number of "lost" observations will vary with the type of provider being considered.

The two approaches for handling clustered data involve nonoverlapping statistical assumptions; hence, there is no guarantee that the results from the fixed effects model will coincide with those from the standard models. Nor is there a simple way of choosing between the two models if they yield different results.

Econometric Models

The preferred model for counted data in this chapter is some variant of the count regression model that can handle the statistical problems of clustering, excess zeros, or both. In those cases where the excess zeros problem is very severe, the binary outcome model is used to model the probability of nonzero outcome. The justification here is that the ability to distinguish between factors that lead to, say, $n + 1$ units of use rather than n is seriously reduced when the cell counts for those outcomes are small. Thus, to gain precision, an attempt to distinguish between zero usage and positive usage is made, ignoring the extent of positivity.

In all cases, the fixed effects version of an estimator is used to check the robustness of the estimates. Fixed effects estimators are usually adopted in the analysis of longitudinal data to deal with individual-specific heterogeneity under the assumption that this component is fixed for any individual and can be "swept out" by an appropriate data transformation that is feasible given repeated observations on the same individual. In the case of VLSS data, it is assumed instead that the fixed effect is commune specific and can be handled in an analogous fashion, given more than one observation per commune. That is, the longitudinal (panel) models can be adapted to handle the present case. The underlying general method for handling clustered data is the conditional maximum likelihood approach, which can be applied to binary, counted, or continuous data. Fixed effects variants of the Poisson, the logit, and the linear regression available in the literature for panel data can be adapted to handle clustered observations.

Counted data are sometimes modeled using the ordered probit or the Tobit regression. These rely on the normality assumption. Violation of normality due to the excess zeros and clustering is so pervasive in the VLSS sample that these estimators are inappropriate.

To summarize, the following alternative models specifications were estimated. For data on individuals:

- Probability of having health insurance
- Probability of visit to CHC, PHF, GOVHOSP, or PHARVIS
- Number of visits to CHC, GOVHOSP, PHF, or PHARVIS
- Probability of HOSPADM

- Number of nights spent in government hospital (HOSPNITE)
- Aggregate expenditure on health care provided by all providers in the four weeks preceding the survey and in government hospitals in the previous 12 months (MEDEXP).

For household data, model specifications were estimated on aggregate expenditure on health care provided by all providers in the four weeks preceding the survey and in government hospitals in the previous 12 months.

Results

The main focus of the discussion of results is on the role of income and health insurance, after conditioning on a set of relevant covariates. This conditioning applies to all models unless stated otherwise. As is customary, the income variable is proxied by logarithm of total household expenditure, denoted log(INC). The only price variable is HLTHINS. The conditioning covariates are AGE, SEX, MARRIED, EDUC, ILL, INJ, ILLDAYS, and ACTDAYS. These variables are defined in table 11.1.

Determinants of Health Insurance Status

Initially, there is no differentiation between voluntary and mandatory enrollees into the VHI program. A logit model for HLTHINS status, using the full sample, shows that AGE, EDUC, and income (INC) are all strongly positively related to having insurance. (See the first two columns of table 11.8 for detailed regression results.) The coefficient on log of total household expenditure, the proxy for income (INC), is precisely determined with a *t* ratio exceeding 5 in most specifications. High income and high education both increase the probability of compulsory coverage; hence, the observed result is quite plausible. Surprisingly, being married is negatively related to having health insurance. One possible interpretation of this result is that it reflects the higher rate of health insurance among students through the CSI program, but it could also reflect relatively higher enrollment into the VHI by unmarried males.

Controlling for these factors, there is a negative association between having insurance and being female. In the third and fourth columns, the results are for a specification with a more flexible functional form for the income variable to allow for different response coefficients in the four income quartiles, denoted INC1, INC2, INC3, and INC4. Essentially, log(INC) is split into four ranges to consider whether the income coefficient varies and whether this spline functional form improves the fit of the model. This specification fits the data better. However, the fixed effects logit version of the same specification, which allows for commune fixed effects, fits even better. Overall, this regression gives a similar picture to that from the simple logit, but it shows that the insurance decision is insensitive to income in the lowest quartile and most sensitive in the two middle quartiles.

Table 11.8. Determinants of Probability of Health Insurance Enrollment

	Robust logit		*Robust logit*		*Fixed effects logit*		*Fixed effects logit*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	–4.53	0.2985	–3.9217	0.6039	n.a.	n.a.	n.a.	n.a.
log(INC)	0.3645	0.0611	n.a.	n.a.	n.a.	n.a.	0.5868	0.0452
AGE	0.3786	0.0412	n.a.	n.a.	0.0105	0.0011	0.0211	0.0018
SEX	–0.2940	0.0368	–0.2966	0.0366	–0.3509	0.0365	–0.2456	0.0388
MARRIED	–0.5099	0.0726	–0.5008	0.0733	–0.4266	0.0464	–0.8005	0.0616
EDUC	0.2952	0.0226	0.2963	0.0227	0.2045	0.0105	0.2144	0.0110
INC1	n.a.	n.a.	–0.0169	0.2330	0.1171	0.1509	n.a.	n.a.
INC2	n.a.	n.a.	1.3532	0.2871	1.0391	0.2234	n.a.	n.a.
INC3	n.a.	n.a.	0.3967	0.2343	0.6203	0.1684	n.a.	n.a.
INC4	n.a.	n.a.	0.0837	0.1177	0.3004	0.0762	n.a.	n.a.
-log-lik	11,268		11,242		9,422		8,220	
Sample	Full		Full		Full		22<age<60	

n.a. Not applicable.

Note: Fixed effects are assumed to be commune specific. Fixed effects logit adapts the corresponding model for longitudinal data to the case of cross-section data clustered by communes. Communes that show no response variation across individuals are dropped from the sample. For robust logit, standard errors are calculated using Eicker-White-type formula adapted for clustering. Definition of variables: AGE = age in years. EDUC = completed years of education. INC = household income proxied by total nominal household expenditure. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. SEX = 0/1 dummy for gender. -log-lik denotes log of likelihood.

Source: Author's calculations.

Several variants of the fixed effects logit model were estimated by three age categories: younger than 22 years, between ages 22 and 60, and older than 60. The motivation for this disaggregation comes from the differences in types of health insurance. It is expected that the student enrollees are predominantly concentrated in the youngest group and the retired individuals in the oldest group, leaving the middle group containing the largest number of those mandatorily enrolled. It is interesting that the average rate of enrollment in the three age groups varies only between 16 percent and 19 percent. The regressions for the middle group are shown in the last two columns of table 11.8, and the main features of this regression conform to those mentioned before in this section. The results for the youngest group show the highest income coefficient (0.72), and those of the oldest group show statistically zero income sensitivity. (To save space, the separate results for the young and old groups are not reported in table 11.8.) Although this disaggregation is rough, and a more careful modeling of the insurance decision is desirable, the results do not suggest that there is serious distortion due to the absence of distinction between types of health insurance. It is, however, possible that the main impact of different types of insurance will be on use. This issue will be explored in later sections.

An important issue is whether there is adverse selection into the insurance program. To infer that there is, one would need to show that controlling for other factors, the insurance program enrolls a disproportionately larger number of bad risks. Identifying enrollees at high risk is not easy because of the lack of information about the long-term health status of individuals in the health survey. The inference has to be more indirect. The survey provides information on injury or illness in the four weeks preceding the survey, as well as information on the number of illness days (ILLDAYS) and days of limited activity (ACTDAYS). Information is also available on the smoking or nonsmoking status of the respondent. This latter variable can serve as a proxy for future health problems. The logit regression results suggest that there is no significant association between insurance status and the number of ILLDAYS, ACTDAYS, or both, or on smoking habit. There is, however, a statistically significant, but weak, positive association between occurrence of illness (ILL) and injury (INJ) and having health insurance. This is consistent with those who are insured having a greater proclivity to report illness or injury.

Employment plays an important role in insurance status because insurance is mandatory in some government and private sectors. If, as seems reasonable, membership in this sector is independent of the level of health care use, then exogeneity of the insurance variable is justified. In such cases, it seems valid to argue that causality runs from insurance to health care use. To put this argument on a sound footing, it is desirable to enter sector of occupation as an additional factor in the insurance equation and confirm its role as an important factor after conditioning on income and educational attainment. Implementing this step requires additional data that were not available when this study was done. Regression analysis of health care use, treating the insurance variable as exogenous, is needed.

Table 11.9. Models for Number and Probability of Commune Health Center Visits

	Fixed effects Poisson		*Fixed effects Poisson*		*Fixed effects logit*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
log(INC)	n.a.	n.a.	−0.2214	0.0775	−0.3574	0.1116
INC1	0.0117	0.1807	n.a.	n.a.	n.a.	n.a.
INC2	−0.0704	0.3240	n.a.	n.a.	n.a.	n.a.
INC3	−0.3847	0.3592	n.a.	n.a.	n.a.	n.a.
INC4	−0.9222	0.3285	n.a.	n.a.	n.a.	n.a.
HLTHINS	0.1855	0.0941	0.1885	0.0996	0.3820	0.1310
SEX	0.0699	0.0616	0.0608	0.0616	0.0637	0.0877
AGE	−0.0078	0.0018	−0.0082	0.0018	−0.0082	0.0026
MARRIED	0.3015	0.0764	0.3124	0.0760	0.2958	0.1108
ILLDAYS	0.0392	0.0041	0.0394	0.0041	0.0180	0.0065
ACTDAYS	−0.0221	0.0122	−0.0213	0.0121	−0.0194	0.0301
INJ	1.1758	0.1788	1.1447	0.1788	1.6969	0.3422
ILL	3.7315	0.1992	3.7248	0.1991	3.8622	4.1359
EDUC	−0.0496	0.0235	−0.0510	0.0234	0.0065	0.0316
-log-lik	2,695		2,700		1,640	
N	15,132		15,132		15,132	

n.a. Not applicable.

Notes: Fixed effects are assumed to be commune specific. Fixed effects logit and Poisson adapt the corresponding models for longitudinal data to the case of cross-section data clustered by communes. Communes that show no response variation across individuals are dropped from the sample. Definition of variables: ACTDAYS = number of days of limited activity in 4 weeks before survey. AGE = age in years. EDUC = completed years of education. HLTHINS = 0/1 dummy for health insurance status. ILL = 0/1 dummy for illness in 4 weeks before survey. ILLDAYS = number of days of illness/injury in 4 weeks before survey. INC = household income proxied by total nominal household expenditure. INJ = 0/1 dummy for injury in 4 weeks before survey. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. SEX = 0/1 dummy for gender. -log-lik denotes log of likelihood.

Source: Author's calculations.

Commune Health Centers

Detailed regression results are given in table 11.9. In the case of the CHC, the relative infrequency of use—the excess zeros problem—has already been noted. This makes the results from direct application of the Poisson regression unreliable. Thus, the reported results use either the fixed effects (conditional maximum likelihood) variant of the Poisson regression or simply the fixed effects logit model for the probability of CHC use.

The three regressions in table 11.9 suggest that the CHC is treated by users as an inferior good. The marginal impact of rising household income on both the probability and level of usage is negative and significant (see the last four columns of table 11.9). The impact of rising educational level is also negative but only marginally significant. That is, CHCs are typically not used by the higher-income and better-educated groups. The VHSR (World Bank 1999, p. 51) notes that "the quality of commune health centers is regarded by most users to be very low." It is to be expected that with rising incomes, users may substitute toward other, relatively higher-quality providers. However, to the extent that CHCs act as suppliers of pharmaceuticals, and as the supply of these has improved both in the CHCs and generally, the absolute level of their use (especially by the low-income groups) could rise. In their analysis of the 1993 VLSS, Gertler and Litvack (1998) have also noted the low quality of CHC services (also see World Bank [1999]). The evidence here is consistent with their observation. However, it would have been more satisfactory to have introduced additional variables in the regression to reflect various observed CHC features to pin down precisely why CHC usage continues to be low. For example, it would be useful to know whether there are differences in their ability to supply drugs or provide higher levels of service. However, this requires more data than are currently available.

To throw more light on the relation between income [log(INC)] and the level of use of CHCs, an additional regression is reported in the first two columns of table 11.9, which uses the spline functional form to allow for different response coefficients in the four income quartiles, denoted INC1, INC2, INC3, and INC4. The fit of the model for probability of using a CHC improves only slightly. These results indicate that the income coefficient is not significantly different from zero for the three lowest income quartiles, and it is significantly negative for the highest income quartile. Qualitatively, the pattern of coefficients is that which would be expected for an inferior good.

The coefficient of HLTHINS is positive. This is an unexpected result. When additional regressions were estimated for the three age groups, the results indicated a positive coefficient in each case but with a low degree of precision. One possible explanation is that the result reflects the role of the CHCs as drug providers to eligible insured individuals.

The results also indicate that AGE and CHC use are negatively related—that is, older individuals avoid using CHCs.

The strongest positive relation of CHC use is with short-term health status. Those who are ill or injured and have suffered limitation in physical activity do use CHCs. For young and sick or injured individuals from low-income households, CHCs may serve as a first step in seeking health care.

Government Hospitals

This subsection first discusses the results from models of probability of outpatient visits. This is followed by discussion of results for inpatient hospital admissions and number of nights spent in the hospital.

PROBABILITY OF OUTPATIENT USE. A variety of estimation methods have been used to model the probability of use of public hospital outpatient services. Detailed regression results are given in table 11.10. The results from the regular logit and fixed effects logit are qualitatively similar and precise.

Table 11.10. Government Hospital Inpatient and Outpatient Use

	Robust logit GOVHOSP		*Fixed effects logit GOVHOSP*		*Fixed effects logit HOSPADM*		*Fixed effects Poisson HOSPNITE*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	−5.6949	0.1915	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
log(INC)	0.4474	0.0571	0.4183	0.0839	0.1045	0.0643	0.4283	0.0175
HLTHINS	1.1155	0.0834	0.9449	0.0928	0.2070	0.0768	0.1583	0.0214
SEX	0.1723	0.0742	0.1709	0.0746	0.0115	0.0553	−0.0452	0.0160
AGE	−0.1783	0.0518	−0.1933	0.0485	−0.0349	0.0370	0.0068	0.0004
MARRIED	0.4947	0.1006	0.5085	0.0966	0.1035	0.0718	−0.1812	0.0194
ILLDAYS	0.0906	0.0041	0.0964	0.0046	0.0169	0.0054	0.0111	0.0013
ACTDAYS	0.0392	0.0300	0.0451	0.0199	0.0555	0.0259	−0.0046	0.0070
INJ	1.7518	0.2653	1.9980	0.2440	−0.7760	0.4478	0.4671	0.0900
ILL	0.5322	0.0318	0.6057	0.0384	0.1851	0.0712	0.0388	0.0207
EDUC	0.0003	0.0192	−0.0289	0.0222	−0.0441	0.0173	−0.0063	0.0047
-log-lik	3,297		2,568		4,981		10,479	
N	Full		25,227		27,380		1,412	

n.a. Not applicable.

Note: Fixed effects are assumed to be commune specific. Fixed effects logit and Poisson adapt the corresponding models for longitudinal data to the case of cross-section data clustered by communes. Communes that show no response variation across individuals are dropped from the sample. For robust logit, standard errors are calculated using Eicker-White-type formula adapted for clustering. Definition of variables: ACTDAYS = number of days of limited activity in 4 weeks before survey. AGE = age in years. EDUC = completed years of education. HLTHINS = 0/1 dummy for health insurance status. ILL = 0/1 dummy for illness in 4 weeks before survey. ILLDAYS = number of days of illness/injury in 4 weeks before survey. INC = household income proxied by total nominal household expenditure. INJ = 0/1 dummy for injury in 4 weeks before survey. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. SEX = 0/1 dummy for gender. -log-lik denotes log of likelihood.

Source: Author's calculations.

The probability of hospital use is strongly and positively related to household income. The elasticity of probable use with respect to income is estimated around 0.4. There is also a strong positive relationship with having health insurance (HLTHINS), which confirms the strong connection between the use of public hospital outpatient services and having health insurance. These two results confirm that income and price effects in the use of public hospital outpatient services are strong. Additional robustness checks do not show that the fit of the model can be improved by using a spline specification for the income variable.

The use of public hospitals is also strongly related to being ill or injured and to the length of illness. Usage is also higher for married persons and for females. Somewhat unexpectedly, AGE is negatively related to use.

However, inpatient use is strongly and positively related to age, as discussed in the next section.

HOSPITAL ADMISSIONS AND NIGHTS IN THE HOSPITAL. About 5 percent of the sample reported admission into hospital in the 12 months before the survey. About 26 percent of those admitted are insured. Of these, the overwhelming majority, more than 97 percent, spent at least one night in the hospital. The average number of nights spent in the hospital, conditional on admission, is between 13 and 14, but the median figure is about 7, indicating a skewed, fat-tailed distribution. The probability of hospital admission is higher for the insured than for the uninsured, and the average length of hospital stay is also longer for the insured, about 18 days versus 12 for the uninsured. The distribution of hospital expenditure is also correspondingly skewed and fat-tailed, with very high nonnormal kurtosis. That is, a relatively small number of individuals account for a high proportion of the total hospital expenditure.

Detailed regression results for hospital admission and hospital nights are given in table 11.11. The results indicate a strong positive relation between being insured and the probability of admission into the hospital. There is also a statistically significant positive relation between income and hospital admission, but this link is weaker than that with insurance. Other factors that indicate bad health status also increase the probability of hospital admission. When HOSPADM regressions are run separately for the insured and uninsured subsamples, hardly a single explanatory variable has a statistically significant coefficient for the insured subsample, but for the uninsured, both health status and income levels are important factors. When the HOSPNITE regressions are run separately for the insured and uninsured subsamples, most of the coefficients in the uninsured equation are absolutely larger, indicating their greater sensitivity to other factors. That is, having health insurance reduces the role of other factors but does not eliminate it.

Developing a robust regression model for the number of nights in the hospital is difficult because of the awkward frequency distribution of the data. Several linear and nonlinear (count data) models were tried. None fit the data really well because the data are intrinsically rather noisy. Overall, these results indicate that AGE, INC, and HLTHINS are the most important explanators of hospital usage. When different specifications of equations are considered, INC is not a robust explanatory variable, but HLTHINS and AGE remain consistently significant.

Private Health Facilities

The contact rate for private health facilities is significantly higher among the uninsured than the insured population. It is also slightly higher among the younger age group. Because the excess zero problem is very evident (95.5 percent of the sample report no use), the estimated regressions model

Table 11.11. Models for Probability of Use of Private Health Care

	Fixed effects logit		*Robust logit*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	0.0	n.a.	−6.93	0.6177
log(INC)	0.0414	0.0723	n.a.	n.a.
INC1	n.a.	n.a.	0.5434	0.3033
INC2	n.a.	n.a.	−0.3038	0.5098
INC3	n.a.	n.a.	1.5588	0.3783
INC4	n.a.	n.a.	0.1425	0.1572
HLTHINS	−0.2388	0.1064	−0.4003	0.1135
SEX	0.1512	0.0653	0.1396	0.0544
AGE	−0.3908	0.0364	−0.3628	0.0373
MARRIED	0.3187	0.0849	0.3034	0.0815
ILLDAYS	0.0390	0.0046	0.0336	0.0045
ACTDAYS	−0.0376	0.0242	−0.0325	0.0237
INJ	1.3521	0.2512	1.3208	0.2760
ILL	4.3357	0.2160	4.2822	0.2211
EDUC	0.0242	0.0207	−0.0451	0.0244
-log-lik	3,097		3,086	
N	27,733		27,783	

n.a. Not applicable.

Note: Fixed effects are assumed to be commune specific. Fixed effects logit adapts the same model for longitudinal data to the case of data clustered by communes. Communes that show no response variation across individuals are dropped from the sample. For robust logit, standard errors are calculated using Eicker-White-type formula adapted for clustering. Definition of variables: ACTDAYS = number of days of limited activity in 4 weeks before survey. AGE = age in years. EDUC = completed years of education. HLTHINS = 0/1 dummy for health insurance status. ILL = 0/1 dummy for illness in 4 weeks before survey. ILLDAYS = number of days of illness/injury in 4 weeks before survey. INC = household income proxied by total nominal household expenditure. INJ = 0/1 dummy for injury in 4 weeks before survey. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. SEX = 0/1 dummy for gender. -log-lik denotes log of likelihood.

Source: Author's calculations.

the probability of contact. Detailed regression results are given in table 11.11. In the full-sample regressions, HLTHINS has a negative coefficient, which reflects the higher contact rate among the uninsured. Because insured individuals are eligible for outpatient care in GOVHOSP, the private facilities are relatively more frequented by the uninsured. Health insurance, therefore, diverts usage away from the private facilities.

Once insurance status is controlled for, there is no clear evidence that income and private health care are positively related. The size of the income coefficient is found to be sensitive to changes in specification. In the fixed effects logit model, the income coefficient is small and relatively imprecise. The use of the spline specification also does not completely resolve the ambiguity, but there is slight evidence that in the higher-income quartiles, there may be a significant positive relation between income and the use of private health facilities (PHF).

In an attempt to examine the role of aggregation bias in estimating the income effect, the fixed effects Poisson model was reestimated by age groups, using both the regular and the spline specification of the income variable. For the middle-income group (ages 22–60 years), the insurance impact is significantly negative, and the income coefficient is small (.064; *t* ratio, 1.06). In the spline version, the insurance impact is again negative and significant, and two of the four income coefficients are also negative, with *t* ratios greater than 2, and one positive with a *t* ratio also greater than 2. That is, PHFs appear to be an inferior good at the higher range of income but possibly a normal good at a lower level. However, the link between income and use is not robust. The ambiguity in the results persists also for the younger (ages younger than 22 years) and older (ages older than 60 years) groups. These results suggest that as yet there is only weak evidence of income-induced demand shift toward PHFs and quite clear evidence of the negative impact of the VHI plan on PHFs.

In other respects, the pattern of use is qualitatively similar to that of public hospitals. As in that case, usage is positively related to being ill or injured, being female (SEX) or married, and with the length of illness, and negatively related to age. The last result may simply indicate a greater willingness on the part of the young to try out the emergent private health facilities.

Pharmacy Visits

Detailed regression results for the number of visits and the probability of visit are given in table 11.12. Because of the overwhelming importance of expenditure on purchased medicines, the results for the frequency of pharmacy visits are of special interest.

Although many variants of the Poisson regression and the logit model were used, the reported results are based on the commune fixed effects formulation.[7]

The most interesting results shown in the first two columns of table 11.12 are that the overall income effect is significantly negative and the health insurance effect is also negative. As in the case of GOVHOSP, using the fixed effects model lowers the absolute size of the income coefficient. This result is plausible and consistent with lower-income households relying overwhelmingly on self-medication in the event of illness, injury, and activity limitation. Evidence has already been cited that indicates an increasing reliance on self-medication as the supply of drugs has improved and the retailing of drugs has been deregulated. Drugs can also be dispensed at public hospitals, but the evidence presented above suggests that this particular channel is available to, and more likely to be used by, the high-income insured individuals.

To more closely investigate the connection between income and pharmacy visits, separate regression models were fitted for probability and number of pharmacy visits, using a flexible spline specification for the income

Table 11.12. Models for Pharmacy Visits

	Fixed effects Poisson		*Fixed effects Poisson*		*Fixed effects logit*	
	PHARVIS		*PHARVIS*		*PHARDUM*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
log(INC)	–0.1025	0.0190	n.a.	n.a.	n.a.	n.a.
INC1	n.a.	n.a.	0.0623	0.0544	–0.0336	0.1257
INC2	n.a.	n.a.	–0.0939	0.0939	0.2239	0.2234
INC3	n.a.	n.a.	–0.0346	0.0823	–0.6112	0.1972
INC4	n.a.	n.a.	–0.3042	0.0461	–0.4301	0.1028
HLTHINS	–0.1614	0.0273	–0.1589	0.0273	–0.2613	0.0592
SEX	0.0255	0.0171	0.0024	0.0171	0.1267	0.0399
AGE	0.0564	0.0004	0.0283	0.0004	0.0059	0.0011
MARRIED	0.1071	0.0201	0.1010	0.0201	0.1158	0.0491
ILLDAYS	0.0229	0.0012	0.0230	0.0012	–0.0401	0.0032
ACTDAYS	0.0203	0.0056	0.0207	0.0056	0.0438	0.0190
INJ	0.3019	0.0788	0.2965	0.0789	0.2533	0.2195
ILL	3.5072	0.0486	3.5062	0.0486	4.9302	0.0706
EDUC	–0.0167	0.0055	–0.0169	0.0056	0.0162	0.0126
-log-lik	18,564		18,547		7,617	
N	27,671		27,671		27,671	

n.a. Not applicable.

Note: Fixed effects are assumed to be commune specific. Fixed effects Poisson adapts the same model for longitudinal data to the case of data clustered by communes. Communes that show no response variation are dropped from the sample. Definition of variables: ACTDAYS = number of days of limited activity in 4 weeks before survey. AGE = age in years. EDUC = completed years of education. HLTHINS = 0/1 dummy for health insurance status. ILL = 0/1 dummy for illness in 4 weeks before survey. ILLDAYS = number of days of illness/injury in 4 weeks before survey. INC = household income proxied by total nominal household expenditure. INJ = 0/1 dummy for injury in 4 weeks before survey. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. PHARDUM = 0/1 dummy for pharmacy visit. SEX = 0/1 dummy for gender. -log-lik denotes log of likelihood.

Source: Author's calculations.

variable. These results suggest that pharmacy use is a normal good, with a positive (but imprecisely determined) income elasticity, in the lower-income quartile. But with high probability, it is an inferior good, with a negative income elasticity, in the two highest quartiles. Unfortunately, the relatively large standard errors on the coefficients preclude a stronger statement. That is, pharmacy visits appear to be an inferior good for the rich, but a normal good for the poor. This result is different from that in some previous analyses based on the 1993 VLSS data (Gertler, Litvack, and Prescott 1996), which suggests that pharmacy visits are a normal good at all income levels.

The impact of HLTHINS on self-medication is found to be negative, statistically significant, and sign-wise robust across a range of alternative specifications. The size of the impact is larger in models that do not control for clustering, and they are not reported in table 11.12. The fixed effects Poisson model yields the lowest estimate, but even this is unambiguously negative and significant. The interpretation that self-medication is a risky form of health care is consistent with the results, and it is avoided as income rises and as alternative, higher-quality health care becomes available through health insurance. In Vietnam, the higher-quality care is provided in public hospitals. Note that the more highly educated individuals, and hence presumably those better aware of the risks of self-medication, also avoid pharmacy visits.

The role of other factors—such as being female, being married, having illness or injury, and the length of illness—is similar to that found for other types of health care; that is, they all increase the frequency of pharmacy visits. One difference is that AGE does have a positive effect.

This picture is broadly consistent with the predictions of a theoretical model that treats self-medication as a risky alternative to professional care (Chang and Trivedi 2003). The reported results are robust and do not qualitatively change if the econometric analysis is carried out by insurance status or by using disaggregated age categories, or using other econometric estimators based on more flexible assumptions.

Analysis of Health Care Expenditure

Individual Data

This section is devoted to a regression analysis of medical expenditure. The dependent variable is log(MEDEXP)) for each member of the household, conditional on a positive level of expenditure for that individual. All types of health care expenditure in the four-week period preceding the survey are included. The sample size is 8,081.

The main focus in this analysis is again on the role of household income and HLTHINS. As before, AGE, SEX, MARRIED, EDUC, and health status (ILL, INJ, ILLDAYS, ACTDAYS) are controlled for. The detailed regression results are shown in table 11.13.

The results indicate that whereas household income continues to show a strong explanatory power, the insurance variable is much less significant. The point estimate of the elasticity of *individual* health expenditure with respect to income is of the order of 0.3–0.4. The estimates of income elasticity from the fixed effects model are slightly smaller than those without fixed effects.

The response to HLTHINS, however, is positive but with a relatively large standard error. This can be interpreted as follows: HLTHINS acts to divert demand from lower-quality care, such as that provided by commune health centers, to higher-quality care, such as that provided in public hospitals. The aggregate response of expenditure to insurance would then be small or zero if most of the impact takes the form of such substitution. However, substitution in terms of number of visits need not have zero impact on

Table 11.13. Models for Positive Medical Expenditure for Individuals

			Fixed effects	
	Ordinary least squares, robust		*Ordinary least squares*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	0.6096	0.0797	n.a.	n.a.
log(INC)	0.3623	0.0195	0.2963	0.0248
HLTHINS	0.0922	0.0327	0.0254	0.0332
SEX	0.0021	0.0228	0.0033	0.0212
AGE	0.1071	0.0136	0.0961	0.0126
MARRIED	0.0321	0.0284	0.0468	0.0267
ILLDAYS	0.0427	0.0022	0.0422	0.0022
ACTDAYS	0.0455	0.0127	0.0380	0.0119
INJ	0.1488	0.1275	0.2395	0.1170
ILL	−0.0659	0.0587	−0.0363	0.0578
EDUC	0.0085	0.0063	0.0047	0.0071
R^2			0.1208	
N	8,081		8,081	

n.a. Not applicable.

Note: Robust standard errors are calculated using Eicker-White-type formula adapted for clustering. Definition of variables: ACTDAYS = number of days of limited activity in 4 weeks before survey. AGE = age in years. EDUC = completed years of education. HLTHINS = 0/1 dummy for health insurance status. ILL = 0/1 dummy for illness in 4 weeks before survey. ILLDAYS = number of days of illness/injury in 4 weeks before survey. INJ = 0/1 dummy for injury in 4 weeks before survey. INC = household income proxied by total nominal household expenditure. log(INC) = log(total nominal household expenditure). MARRIED = 0/1 dummy for marital status. SEX = 0/1 dummy for gender.

Source: Author's calculations.

total expenditure. If the substitution is toward higher-quality care, then total medical expenditure may increase. Such a situation seems consistent with the estimates obtained. The insurance effect on health care expenditure reflects substitution toward higher-quality care.

The reported estimates are robust. Point estimates of income elasticity similar to those from the fixed effects model are obtained from several other variants (including separate models for insured and uninsured samples, a random effects version of the estimated model, and a model in which income coefficient is allowed to differ by income quartile). To save space, the details of these results are not included in table 11.13.

Household Data

Analysis of medical expenses aggregated across all household members serves as a useful check on the results from individual data. It also yields estimates of Engel curves for medical expenditure. The main limitation of this approach is that one cannot control for health status of individual members of the household, and to do so is important. However, one can control for some of the other relevant variables, such as location (urban or rural) and size of the household, SEX, AGE, and educational attainment of the head of the household.

Descriptive sample statistics show that, on average, households with an insured head spend about 20 percent more on health care than those without. Average household health care expenditure is higher for urban than rural households, although rural households are typically slightly larger.

Detailed regression results are shown in table 11.14. The most interesting result is that point estimates of the income elasticity are around 0.6–0.7, varying somewhat with the exact definition of total expenditure used. Health care in total is thus found to be a normal good, but not a luxury good. If total health care expenditure is a small part of the household budget, endogeneity of the total expenditure may be ignored. However, this assumption is easy to relax. Instrumental variable estimates are given in the last two columns of table 11.14. The income elasticity still remains around 0.6.

Additional robustness checks do not indicate that this estimate varies significantly by urban or rural location or by level of income. This point estimate of income elasticity is larger than the corresponding estimate for individual expenditures. One possible explanation is that the estimate from aggregate household data may be upward biased because of the failure to take into account the effect of HLTHINS, which, as was seen earlier, is positively correlated with the household income level. That is, the role of

Table 11.14. Models for Positive Medical Expenditure for Households

	Ordinary least squares, robust		*Random effects Ordinary least squares*		*Fixed effects Ordinary least squares*		*Robust Instrumental variable*	
Variable	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*	*Coeff.*	*Std. err.*
Constant	−0.8852	0.3806	−0.3008	0.4163	0.1103	0.4568	0.0281	0.5573
log(INC)	0.7340	0.0436	0.6542	0.0479	0.6000	0.0519	0.6210	0.0692
SEX	0.1189	0.0531	0.1172	0.0513	0.1091	0.0519	0.0760	0.0517
AGE	0.0100	0.0017	0.0115	0.0016	0.0116	0.0016	0.0105	0.0016
EDUC	−0.0296	0.0127	−0.0628	0.0129	−0.0519	0.0135	−0.0922	0.0140
URBAN	−0.3024	0.0595	−0.2648	0.0917	n.a.	n.a.	n.a.	n.a.
HHSIZE	0.0163	0.0135	0.0111	0.0136	0.0112	0.0141	0.0360	0.0160
R^2	0.094							
N	5,006		5,006		5,006		5,006	

n.a. Not applicable.

Note: The variable log(INC) has been "instrumented" using the urban, farm, age group, educational attainment, and province instruments. Definition of variables: AGE = age in years. EDUC = completed years of education. HHSIZE = household size. INC = household income proxied by total nominal household expenditure. log(INC) = log(total nominal household expenditure). SEX = 0/1 dummy for gender. URBAN = 0/1 dummy for urban household.

Source: Author's calculations.

insurance has been absorbed into the income elasticity, causing it to become somewhat inflated. A second possibility is simply that demand for health care at the level of the household is indeed more elastic than it is for an individual.

Age and sex of the head of the household are also significant factors. On average, households with female heads spend more on health care, and households with older heads also spend more. Educational level of the head of the household is not found to be a significant explanator.

Discussion of Policy Issues

Three health care policy issues are discussed in this section: the implications of the pervasive phenomenon of self-medication, the future of the CHCs, and the expected future changes in the pattern of health care use.

This chapter has documented the pervasiveness of self-medication and the factors that promote it. The phenomenon is a common one in most developing countries. The World Health Organization explicitly recognizes that self-medication has an important role to play in most health care systems and has observed that with the continued improvement in people's education, general knowledge, and socioeconomic status, self-medication has been successfully integrated into many health care systems around the world. In a developing economy like Vietnam, where both public and private health care infrastructures are relatively basic, self-medication is an important form of health care. Freer availability of drugs contributes to household welfare. Worldwide, the purchase of prescription-only drugs without a prescription is far more common than the sale of over-the-counter drugs.[8] Opportunities for self-medication are enhanced and aided by the Internet and deregulation of over-the-counter sales of pharmaceutical products. These tendencies have harmful consequences, of which the growing ineffectiveness of antibiotic drugs is the most alarming and most visible. When small doses are used to treat bacterial infections, presumably because the user cannot afford the cost of the prescribed full course, the practice promotes the growth of antibiotic-resistant strains of bacteria instead of clearing the infection. This reduces the future potency of antibiotics for all users. Previous World Bank reports reflect the concern expressed by the medical profession and public health organizations. Inadequately supervised and administered drugs, often in incorrect dosages, are a major contributing cause of the growth of antibiotic-resistant bacteria. The problem is a serious concern because it involves a negative intertemporal externality—current actions of an individual have a negative future impact on the society as a whole. The public health issue is how to combat this problem.

This chapter has found econometric evidence that the practice of self-medication is negatively associated with educational attainment, income levels, and the relative price and accessibility of alternative providers. There is also strong a priori reason to believe that supply-side deregulation has lowered the price of, and improved access to, drugs and thereby encouraged self-medication. On the demand side, we can expect that economic growth will reduce the seriousness of the problem. But this view needs to be qualified: Although it appears that in the highest income quartile, self-medication is an inferior good, any reduction from this source due to income growth will make only a small contribution to net reduction. The larger positive contribution from lower-income groups may outweigh the negative tendencies. Moreover, economic growth has been more rapid in urban than in rural areas, so the reduction in harmful types of self-medication in rural areas is likely to be even slower. Moreover, if affordable alternatives to self-medication exist, then its use is more likely to decline as awareness of its dangers increases. Again, such alternatives are less accessible in rural areas. These arguments suggest that in the absence of regulatory constraints, the practice of self-medication is likely to persist. A discussion of the appropriate form of regulation is outside the scope of this chapter.

Previous World Bank analyses, in expressing concern about the extent and continued growth of (harmful) self-medication in Vietnam (Gertler and Litvack 1998; World Bank 1999), have suggested that this growth is in part a consequence of the low quality of care available to the lower-income groups. Various policy prescriptions have been put forward. Gertler and Litvack (1998, pp. 246–47) suggest that improving the quality of service at the CHCs—for example, by improving the supply of low-priced generic drugs—would reduce self-medication. The VHSR (World Bank 1999, pp. 120–21) also mentions the proliferation of counterfeit and substandard drugs available on the market. It goes on to describe the recently initiated Vietnam national drug policy also aimed at rational and safe use of drugs. The results in this chapter suggest that an expansion of the voluntary health insurance program would also have a qualitatively similar effect. It appears that enrollment in the voluntary health insurance program has stalled, although the reasons for such stagnation are unclear. However, results here indicate that enrollment in the insurance program is responsive to income growth. Again, this suggests that continued growth will reduce the problem. However, the poorer rural sections of the population will benefit from this development more slowly and to a lesser extent.

This chapter finds evidence that strongly suggests that CHCs provide an inferior service whose consumption declines with income and education. The analysis here is not sufficiently detailed to pinpoint the CHC characteristics that are responsible for their decline, but it is plausible that the readily available alternative of self-medication is partly responsible. Note that it has been suggested that CHCs fail to carry adequate stocks of cheap generic drugs and are generally poorly staffed and equipped. Given the continuation of the present trends, the CHCs may become even less important in the future. A factor that may counter this trend concerns the eligibility of CHCs to provide treatment to those with health insurance. The data in this chapter pertain to the period in which the insured were required to obtain treatment at government hospitals. If, however, this were to change, then the use of the CHCs, especially in rural areas, may increase.

The growth of PHFs is a relatively recent phenomenon. Results in this chapter do not suggest that income growth has a strong impact on the growth of this sector. It seems likely that this sector provides services to those who desire a higher quality of care than that available outside public hospitals, but who are also either ineligible or unable to get treated at public hospitals. Evidence indicates that higher-income individuals with insurance get treatment and drugs at public hospitals. Currently, public hospitals seem to be the main and perhaps the only source of quality care. Increased demand for health care of higher quality will come with economic growth, especially in urban areas. As long as the catchment area of the private health facilities is restricted directly or indirectly, future economic growth will put greater pressure on public hospitals unless other alternatives superior to those currently available can be found. If, however, the insured individuals can be treated at private health facilities, there will be an alternative to public hospital care. This will reduce pressure on public hospitals that is bound to arise if income growth continues to be robust. Whether this will raise the average quality of care, or reduce rampant self-medication, would seem to depend upon the regulatory constraints that apply to the private health facilities.

Summary and Conclusions

A stylized pattern of health care use in Vietnam has emerged from previous analyses of 1993 VLSS data. Broadly, according to this stylized view, the better-off sections of the population get their health care at public hospitals, the poorer at the commune health centers, and all groups use self-medication heavily, causing self-medication to dominate as the principal source of health care. In this picture, other providers such as private health facilities, traditional medicine practitioners, home providers, and so forth play a relatively minor role. The stylized description has little to say about the impact of health insurance on the observed health care use pattern.

This chapter provides some confirmations, as well as modifications, of that stylized description:

- Evidence supports the view that those who are either ill or injured have ready access to some form of health care. At all levels of income, the most common response to the need for health care is some form of self-medication.
- The private providers collectively are more important as a fraction of total health care spending than the commune health centers.
- The results suggest that both self-medication and commune health centers are inferior goods by the usual definition, because their demand declines with rising household incomes. Self-medication appears to be an inferior good, especially for high-income households, but a normal good at low-income levels. In the aggregate, however, the net effect of income on pharmacy visits is estimated to be close to

zero. These results are consistent with the view that both self-medication and commune health centers are low-quality and risky forms of health care in Vietnam.

- Within the existing income distribution, estimates show a negative relation between the use probability of commune health centers and income. This negative relation is less robust in the lowest income quartile.
- Health care provided by private health facilities is weakly related to income overall but may be positively related for the lower-income groups.
- There is a strong positive relation between income and the use of both inpatient and outpatient care provided at public hospitals.
- The net impact of health insurance on self-medication and the use of private health facilities is negative. That is, under the current organization of health care delivery, having health insurance diverts patients from private health care and self-medication mainly toward public hospitals and, to a lesser extent, toward commune health centers. The growth of services in the private health facilities is therefore affected in opposite directions by rising income and the rising proportion of the insured population.
- Income, insurance status, and age are the three major determinants of inpatient care (hospital nights) in public hospitals.
- There appears to be no evidence that health insurance has had a significant impact on the total household out-of-pocket health care expenditures (excluding inpatient care at public hospitals) in either direction. That is, much of the impact seems to be in the form of redistribution of care between types of providers.
- Previous analyses have expressed serious concern about the dominant role of unsupervised and unregulated self-medication in Vietnam. It has been suggested that this is made possible by easy availability of a very wide range of pharmaceutical drugs. Both rising incomes and growth of health insurance reduce the extent of self-medication, but it is not clear whether these deterrents are strong enough.
- Aggregate household income elasticity for health care is higher than indicated by previous studies.

There are some qualifications. This chapter has treated, with some justification, both health insurance and household incomes as weakly exogenous variables. No allowance has been made for measurement error in income. Standard statistical arguments suggest that this may cause underestimation of the impact of income on the demand for health care. Second, the chapter distinguished between different types of health insurance only indirectly, and this may have caused some aggregation bias of an indeterminate nature. Although a statistical model of the probability of enrollment in the health insurance program was provided, because of lack of data, no estimates of price sensitivity of insurance demand could be provided. This is an important qualification to the finding that enrollment in the insurance program is strongly associated with income.

Finally, it is useful to review the main policy implications of the findings. First, the results suggest several avenues for reducing the heavy (and often inappropriate) reliance of the Vietnamese on over-the-counter antibiotics. Increases in household income and education levels should reduce this reliance over the long term. In addition, expansion of the new voluntary health insurance program would reduce reliance on self-medication with antibiotics and other drugs. Second, there is clear evidence of dissatisfaction with health services provided by commune health centers. People switch to other sources of medical care as their income rises. Further research is needed on the source of this dissatisfaction. Among the possible sources are inadequate stocks of medicine and inadequate staff. If no changes are made, commune health centers will become an even less important source of health care for the Vietnamese population. Finally, the role of private health care providers in Vietnam needs further development. In the long run, they can provide high-quality hospital care unless restrictions prevent them from doing so. This would serve as an additional source of such care for individuals in Vietnam's voluntary health insurance program, and as that program expands, the capacity to meet the demand for such health care must be expanded as well.

Notes

1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. There is a suspicion, based on information collected in the field, that the responses to the question about recent illness or injury may be biased. The bias is thought to arise from the greater propensity to report illness or injury of those in higher socioeconomic categories.

3. By combining datasets, it may be feasible in the future to impute the type of insurance of each individual and thereby make it possible to study the differential impact of each on use measures.

4. Continuous probability distributions cannot allow for nontrivial probability mass at zero frequency.

5. A qualification is that the proportion of zeros may be excessive relative to the count model specified, thereby requiring use of as flexible a count data model as feasible (see Cameron and Trivedi [1998]).

6. For example, this is possible in the computer program Stata 6.0 for a variety of estimators.

7. See Cameron and Trivedi (1998, chapters 3 and 9) for a detailed discussion of the count data models used here.

8. *WHO Drug Information* (World Health Organization 2000). This article cites a consumer interview study carried out in six Latin American countries that found that only 34 percent of the dispensed medicines were classified as over-the-counter drugs.

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12

Trends in the Education Sector

Nga Nguyet Nguyen

In the 1990s, Vietnam achieved remarkably high economic growth. At the same time, it experienced steady improvement in many social indicators, which were already high despite the country's low per capita income. As explained in chapter 1 of this volume, during the past decade the country has seen a huge reduction in poverty incidence, which occurred for all income groups and in all regions. Over the period from 1993 to 1998, school enrollment rates increased substantially, but the increases were not spread equally across different income groups, regions, and ethnic groups. The government of Vietnam is embarking on a very challenging agenda to provide higher-quality basic education for all. Much more remains to be done to ensure that this ambitious, but not impossible, goal will be achieved.

The purpose of this chapter is to document and analyze changes in enrollment and financing for education in Vietnam over the period from 1993 to 1998, using the Vietnam Living Standards Survey (VLSS) data collected in 1992–93 and 1997–98.[1] The first issue discussed in the chapter is recent change in school enrollment, focusing on primary and lower secondary education because universal enrollment at these levels is an explicit goal of the Vietnamese government. Enrollment rates have increased significantly in the past five years at all levels of education. To see whether these enrollment rate increases have been evenly spread across the population, as opposed to being concentrated in certain groups or regions, the chapter compares changes in enrollments for all expenditure groups, all regions, all ethnic groups, and boys and girls.

Second, the chapter examines education finance, including the relative role of the public and private sectors in financing education in Vietnam. Private spending on education is compared by expenditure groups, regions, ethnic groups, and gender to assess any changes in the financial burden of sending children to school, especially among the poor. This chapter investigates possible links between household spending on education, enrollment, and the quality of education, and it checks whether poor households benefit as much as better-off households from public spending on education. Does government spending reduce inequalities? Can any unequal patterns be corrected by reallocating the government's education budget?

The final issue considered is whether there have been changes in rates of returns to education, including whether any changes have varied across different groups. This is done by estimating Mincerian earning functions that link wage income to the underlying determinants of earnings, such as schooling, work experience, age, economic sector, region, and gender.

The structure of the chapter follows the three issues just mentioned. The section that follows this brief background documents and analyzes changes in enrollment. This is followed by a discussion of the pattern of financing for education and the relative role of the public and private sectors in financing education in Vietnam. The section titled "Returns to Education" looks at the recent changes in rate of returns to education with limited focus on wage earners in the private sector. Finally, the chapter concludes with some policy suggestions.

Enrollment

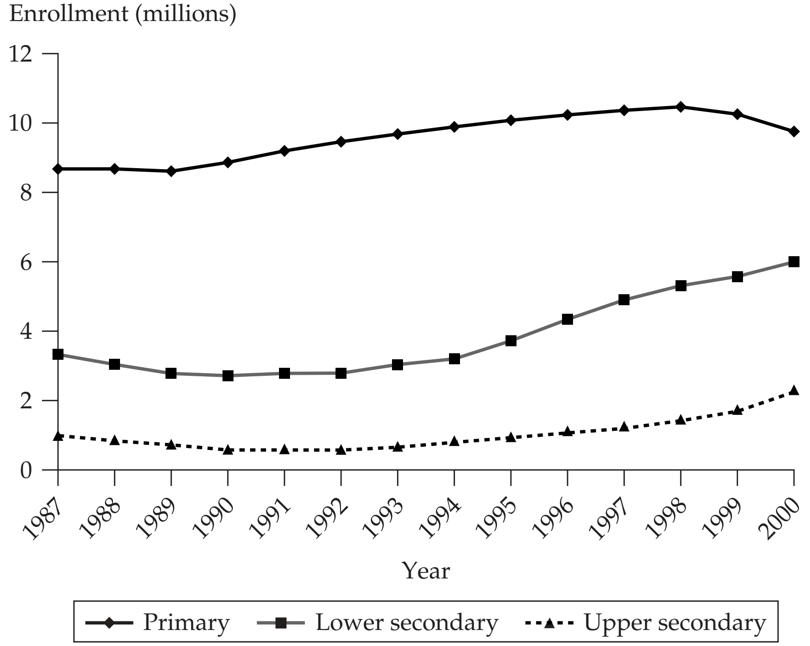
This section documents and analyzes changes in enrollment in Vietnam using the 1993 and 1998 VLSS data. It discusses recent changes in school enrollment, focusing on primary and lower secondary education because universal enrollment at these levels is an explicit goal of the Vietnamese government. Enrollment rates have increased significantly in the past five years at all levels of education. To see whether these enrollment rate increases have been evenly spread across the population, as opposed to being concentrated in certain groups or regions, the section compares changes in enrollments for all expenditure groups, all regions, all ethnic groups, and boys and girls.

General Trends

Vietnam made impressive progress in expanding enrollment in basic education in the 1990s. Figure 12.1 shows total student enrollment at the primary and secondary levels for every year from 1987 to 2000, based on official government education statistics. Vietnam has achieved high rates of literacy and school enrollment despite its low per capita income, while maintaining good social indicators (infant and under-five mortality rates, life expectancy, fertility rate, child nutrition, and access to basic services) compared with other countries with similarly low per capita income.

The enrollment statistics shown in figure 12.1 were collected by Vietnam's Ministry of Education and Training through its statistical reporting system. Absolute numbers of students attending primary school increased dramatically between the early 1990s and 1998, rising by 7 percent from 9.7 million in 1993 to 10.4 million in 1998. From 1998, a downward trend due to

Figure 12.1. Trends in School Enrollment, 1987–2000



Source: Ministry of Education and Training (2001).

demographic change was observed. The downward trend in enrollments in the years before 1990 was reversed by the mid-1990s at the secondary levels. At the lower secondary level, enrollment increased even faster, by almost 43 percent, from 3.0 million to 5.3 million in 1998. Upper secondary school enrollment has risen even more dramatically compared with 1993, from 0.6 million to 1.4 million, and has far surpassed the peak in 1987.

Trends by Expenditure Group

Education progress for different expenditure groups can be assessed by looking at the number of children actually in school and whether children are in school at the appropriate age.[2] From 1993 to 1998, net enrollments increased significantly at all levels, especially at higher general education levels. Net enrollments rates (NERs) for primary schools increased from 87 percent in 1993 to 91 percent in 1998. At the lower secondary level, NERs more than doubled in five years, from 30 percent in 1993 to 62 percent in 1998. Increases in NERs at higher levels were even more impressive; they more than quadrupled at the upper secondary level and tripled at the post-secondary level (table 12.1).

Table 12.1. Net and Gross School Enrollment Rates, by Quintile and Education Level
(percent)

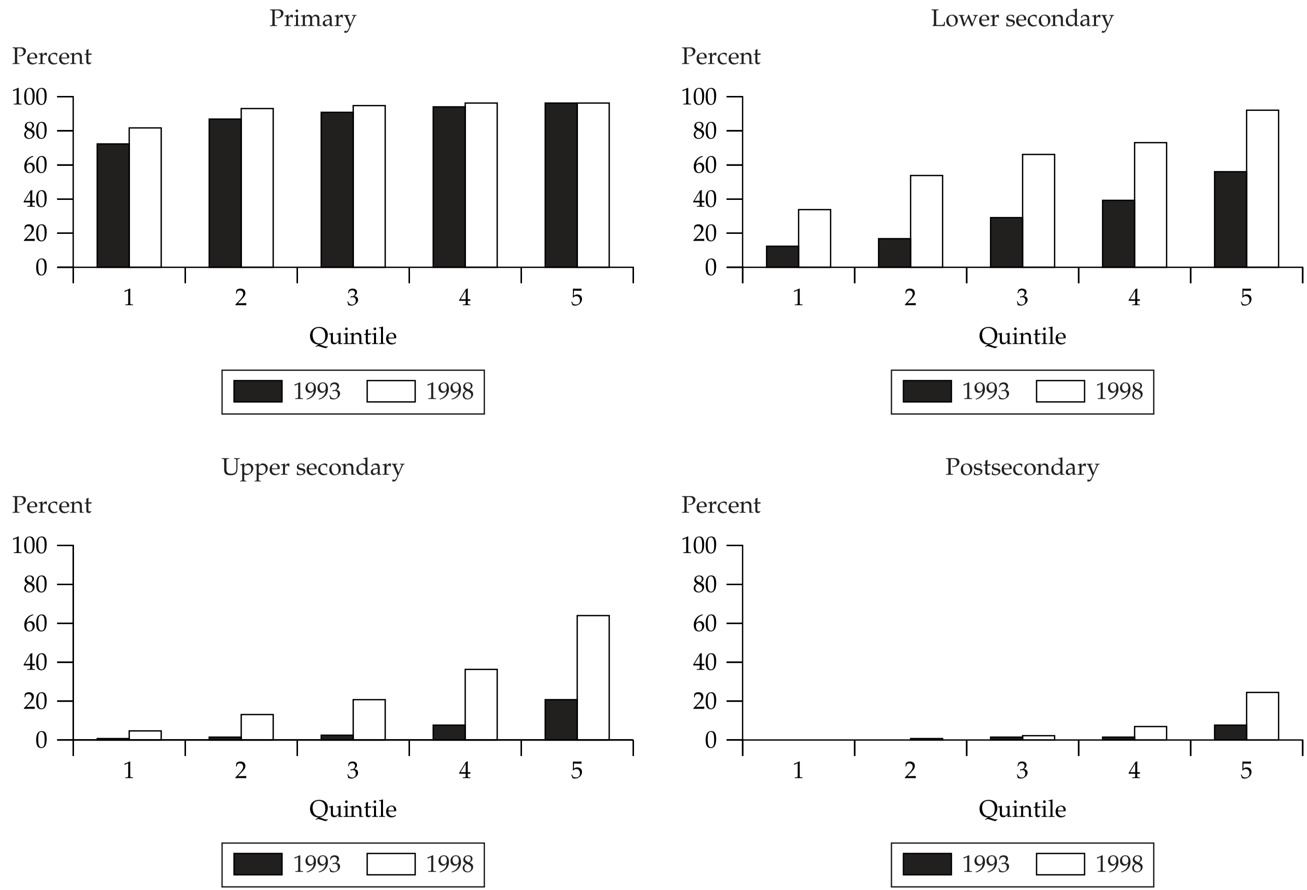
Enrollment rate/indicator	*Primary*		*Lower secondary*		*Upper secondary*		*Postsecondary*	
	1993	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Net								
Vietnam	87	91	30	62	7	29	3	9
Poorest quintile	72	82	12	34	1	5	0	0.4
Most well-off quintile	96	96	55	91	21	64	9	29
Gross								
Vietnam	120	115	42	78	9	36	4	12
Poorest quintile	100	112	15	47	1	8	0	0.4
Most well-off quintile	130	104	77	105	24	75	13	37

Source: Author's estimates based on the 1993 and 1998 VLSSs.

Table 12.1 shows that, for the poorest quintile, enrollments expanded at all education levels during the period from 1993 to 1998. Net enrollment of poor children increased in primary schools from 72 percent in 1993 to 82 percent in 1998, and it increased in lower secondary schools from 12 percent in 1993 to 34 percent in 1998. At higher levels, although enrollment increased, very few children from the poorest households went to upper secondary and postsecondary schools (figure 12.2).

Enrollment in primary education became more equitable in the 1990s, but inequities still exist. In 1998, 82 percent of poor children of ages 6 to 10 years were in primary school, compared with 96 percent for the most well-off children. Moreover, gaps in enrollment in secondary and postsecondary education between the better-off and the poor are still large in Vietnam, with the NER for the poorest quintile only about one-third of that for the most well-off quintile at lower secondary schools. In 1998, 91 percent of children of ages 11 to 14 years from the most well-off quintile attended lower secondary schools, compared with only 34 percent of children from the poorest quintile. Although more children from the poorest quintile went to upper secondary and postsecondary schools in 1998, enrollment rates for this group at these higher education levels were extremely low compared with those from the highest expenditure groups. Sixty-four percent of the most well-off children of ages 15 to 17 years attended upper secondary schools, in contrast with only 5 percent of children from the poorest quintile. The gap in enrollment in postsecondary schools is even larger: The NER was 29 percent for the most well-off children, compared with 0.4 percent for the poorest children (figure 12.2 and table 12.1).

Figure 12.2. School Net Enrollment Rates, by Quintile and Level, 1993 and 1998



Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 12.2. Repetition Rate by Level of Education, 1998
(number of students who repeated classes as percent of total students, for each level)

Level	*Poorest quintile*	*Most well-off quintile*	*Vietnam*
Primary schools	24.6	8.0	19.2
Lower secondary	28.6	14.0	21.8
Upper secondary	26.0	12.4	16.0

Source: Author's estimates based on the 1998 VLSS.

In Vietnam and other developing countries, many children start the first grade of primary school at a later age than normal, and many children repeat grades. This can cause the number of children enrolled at a certain level to be higher than the number of children in the age range associated with that level. At the primary school level, over the 1993–98 period, NERs increased while gross enrollment rates (GERs) declined for all expenditure groups except the poorest group (table 12.1). This shows that Vietnam is moving from the first to the second phase of education development: Children are increasingly starting school at the right age, and fewer children are repeating grades.

However, the high GERs for the poorest quintile in 1998 imply that either their repetition rates were still significant and much higher than those for other expenditure groups, or that many children were starting primary school at a late age (or perhaps were leaving school for a few years and then returning). In 1998, about 25 percent of the poorest primary school children repeated at least one grade, compared with only 8 percent of the most well-off children (table 12.2). Furthermore, table 12.1 also implies that the poorest quintile had the lowest rate of continuation over the 1993–98 period. Fewer than 50 percent of children from the poorest quintile continued into lower secondary school in 1998, but about 94 percent of primary school children from the most well-off quintile in 1993 moved to lower secondary schools in 1998.

As can be seen in table 12.3, despite high rates of repeating and delayed enrollment in the first grade, over 1993–98 there was a significant improvement in age-grade matching. In 1993, about 23 percent of students enrolled in primary schools were older than 10 years, and almost 28 percent of students enrolled in lower secondary schools were older than 14 years. The proportions for 1998 were 19 and 20 percent, respectively.

All these trends have important implications for Vietnam. Although enrollment in basic education (defined as primary and lower secondary education) has been improved for poor children, inequalities persist at the primary level, and the gaps are widening at higher levels. This suggests that poor children face disadvantaged conditions more often than do better-off children, such as poorer quality of education, lack of sufficient time spent

Table 12.3. Age and Grade Matching, 1993 and 1998
(percentage of total enrolled in level)

	Age group						
Date/level	*< 6*	*6–10*	*11–14*	*15–17*	*18–24*	*>24*	*Total*
1993							
Primary	4.8	72.0	22.1	1.0	0.1	0	100
Lower secondary	0	1.0	71.3	25.9	1.8	0	100
Upper secondary	0	0	1.4	83.7	13.5	1.4	100
Postsecondary	0	0	0	17.1	67.5	15.4	100
1998							
Primary	1.2	79.7	17.9	1.0	0.2	0	100
Lower secondary	0	1.2	79.2	18.7	0.8	0	100
Upper secondary	0	0	0.7	79.1	19.9	0.3	100
Postsecondary	0	0	0.2	4.2	79.7	16.0	100

Note: Rows may not add to 100 due to errors introduced by rounding.
Source: Author's estimates based on the 1993 and 1998 VLSSs.

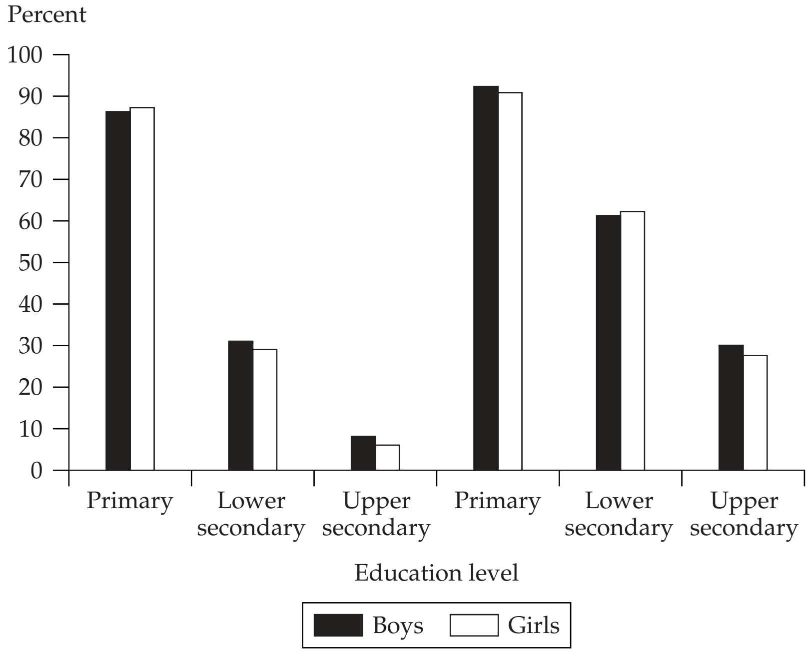
studying because of housework or income-earning activities, and poor health.

Gender Differences

Vietnam has almost achieved gender equality of enrollment in general education (including primary and lower and upper secondary schools). Testing the hypothesis that girls and boys had the same NERs showed that this equality is statistically significant. In 1998, 91 percent of school-age girls were enrolled in primary school, compared with 92 percent of boys. Gender inequality is not found at the lower secondary level (NERs in 1998 were 33.5 percent for boys and 33.7 percent for girls), although a gap between girls' and boys' net enrollment at the upper secondary level is larger and increased slightly from 2 percentage points in 1993 to 3 percentage points in 1998 (figure 12.3).

Table 12.4 shows both GERs and NERs, for 1993 and 1998. By 1998, using NERs showed that Vietnam had achieved a quite equal enrollment in basic education for both girls and boys, although the gender gap was slightly larger at the upper secondary level. It is interesting that if the GER is used instead of the NER, the whole picture changes significantly. GERs for girls were lower than those for boys at all levels—and much lower at the upper secondary level. For example, at the primary level, the girls' NER was 99 percent of that of boys, but the girls' GER was only 93 percent of the boys' GER. The difference is clearer at the upper secondary level. This implies that school-age boys and girls had equal opportunity to attend basic education. Boys repeated classes more often than girls, which is one of the reasons for a lower percentage of GER for girls compared with that for boys. However, it

Figure 12.3. School Net Enrollment Rate, by Gender and Education Level, 1993 and 1998



Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 12.4. Girls' Enrollment Rates as a Percentage of Boys' Enrollment Rates, by Education Level, 1993 and 1998

Enrollment rate/level	*1993*	*1998*
Net		
Primary education	101	99
Lower secondary education	93	101
Upper secondary education	73	91
Gross		
Primary education	96	93
Lower secondary education	80	96
Upper secondary education	62	82

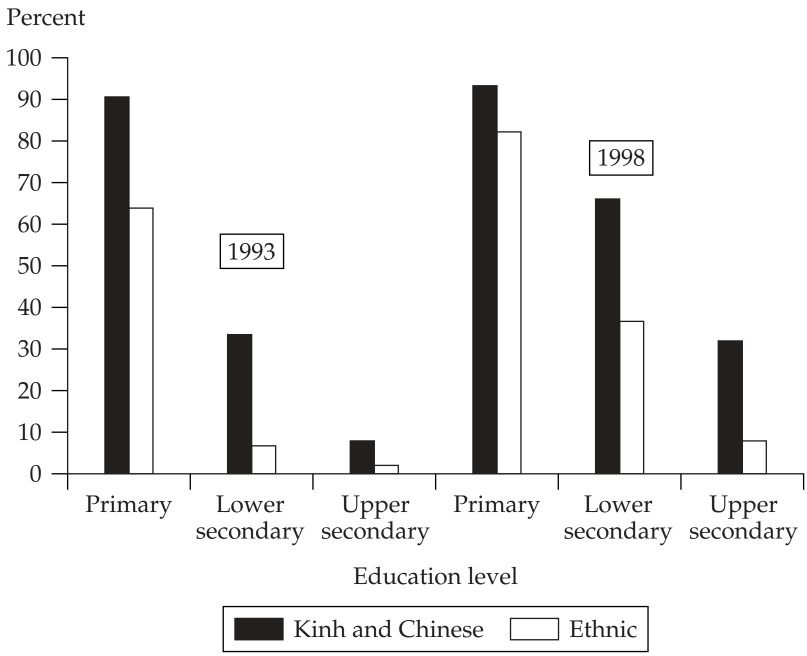
Source: Author's estimates based on the 1993 and 1998 VLSSs.

may also imply that overaged girls were less likely to stay or go back to school than overaged boys. This is somewhat consistent with findings from participatory poverty assessments done in Vietnam—that girls contend with a complex mix of barriers to their right to formal education. For example, when a household's decision to send children to school is weighted against labor contributions, girls are often the last to be sent to school and the first to be withdrawn. Similarly, some parents still consider that an investment in a daughter's education, especially at higher levels, will be lost when she marries into another family. Gender equality can be achieved and maintained only by the conscious integration of gender issues within all policies, strategies, and practices focused on addressing educational disadvantage, especially at higher levels of education.

Ethnic Groups' Differences

Despite recent improvements, ethnic minorities experience a much lower level of net enrollment at all levels of education compared with the majority ethnic Vietnamese (Kinh) and Chinese (figure 12.4). In 1998, only 82 percent of primary school-age children from ethnic minorities were enrolled in primary school, compared with 93 percent of majority children. At the lower secondary level, the disparity is much more pronounced: In the same year, the lower secondary NER was only 37 percent for minority children, compared with 66 percent for the majority. Low participation rates mean that

Figure 12.4. School Net Enrollment Rate, by Ethnicity and Level of Education, 1993 and 1998



Source: Author's calculations from the 1993 and 1998 VLSSs.

approximately 0.4 million of the 2.8 million minority children ages 6 to 14 years were not enrolled in school. Of these, 0.3 million were ethnic girls. Many ethnic minority girls are disadvantaged by a combination of late enrollment in first grade (if they enroll at all) and a tradition of early marriage. Minority people's concentration in the Northern Uplands, the Central Highlands, and the Mekong Delta means that they also experience the disadvantages found more generally in these locations.

Fortunately, compared with the Kinh and Chinese children, ethnic minority children experienced a much larger improvement in enrollments in primary and lower secondary schools from 1993 to 1998, given their low starting points in 1993. The higher the level of education, the larger the gap in school enrollment among different socioeconomic groups. Over this period, the enrollment rates of ethnic minorities increased by 18 percentage points at the primary level and 29 percentage points at the lower secondary level, compared with increases of 2 percentage points at the primary level and 22 percentage points at the lower secondary level for the Kinh and Chinese. The Kinh and the Chinese enjoyed larger improvement in enrollment at the upper secondary and postsecondary levels, however. Over the same period, the increase in enrollment was 24 percentage points at the upper secondary level and 7 percentage points at the postsecondary level for the majority, compared with 6 percentage points at the upper secondary level and 0.6 percentage point at the postsecondary level for the ethnic minorities (figure 12.4).

Regional Differences

Despite overall improvement, enrollment gaps between urban and rural areas in Vietnam are still considerable, and the higher the level of education, the larger the enrollment gap between urban and rural areas. Enrollment gaps between urban and rural areas in 1998 were smaller than those in 1993 at the primary and lower secondary levels. For rural children, enrollment in primary education was improved significantly, from 85 percent in 1993 to 91 percent in 1998 (table 12.5). Improvement in NERs at higher levels was even more impressive: NERs more than doubled at the lower secondary level and improved fourfold at the upper secondary level, compared with slightly less than double at the lower secondary level and threefold at the upper secondary level for urban children. However, the increase in enrollment rates at the upper secondary level over the same period was higher in urban areas than in rural areas, increasing the gap at this level. Specifically, the urban-rural enrollment gap at the upper secondary level increased from 12 percentage points in 1993 to 32 percentage points in 1998 (table 12.5).

Table 12.5 shows clear regional disparities at all levels of education, with the Mekong Delta and the Central Highlands below the average national NER in 1998. Surprisingly, the Northern Uplands had a very high enrollment level at primary school, behind only the Red River Delta, despite the relatively low living standards in the Northern Uplands. This achievement

Table 12.5. Net Enrollment Rates by Location, 1993 and 1998
(percent)

	Primary		*Lower secondary*		*Upper secondary*	
Location	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Vietnam	86.7	91.4	30.1	61.7	7.2	28.6
Urban-rural						
Urban	96.6	95.5	48.5	80.3	17.3	54.5
Rural	84.8	90.6	26.3	57.9	4.7	22.6
Region						
Northern Uplands	85.7	94.1	22.2	56.4	5.6	22.2
Red River Delta	95.1	95.6	46.5	83.2	10.3	45.2
North Central Coast	88.1	92.5	30.6	62.3	5.8	29.6
Central Coast	84.4	88.1	38.1	64.2	11.6	31.8
Central Highlands	67.8	80.2	15.0	43.9	2.0	10.5
Southeast	93.5	93.4	35.2	71.7	9.7	36.3
Mekong Delta	79.0	86.9	19.4	45.0	3.6	17.4

Source: Author's estimates based on the 1993 and 1998 VLSSs.

may be a result of the sizable educational assistance that this region has received in recent years from both the government and external aid to promote universal primary education. However, at the secondary education level, this region was still among the worst-performing regions. The Red River Delta and the Southeast had the highest NERs at all three levels of education.

Despite the enrollment improvement for the whole country at all levels, enrollment improvement was not evenly spread across all regions (table 12.5). The enrollment gap between the best- and the worst-performing regions over 1993–98 was smaller at the primary level, with the gap reduced from 27 percentage points in 1993 to 15 percentage points in 1998. However, the gaps were wider at secondary levels, with enrollment disparity increasing from 32 percentage points in 1993 to 39 percentage points in 1998 at the lower secondary level. It is worrisome that there was a huge increase in the enrollment gap at the upper secondary level, from only 8 percentage points in 1993 to 35 percentage points in 1998. This widening gap at the upper secondary level was due to considerable increased enrollment for the Red River Delta and relatively slight increased enrollment for the Central Highlands; it was also due to a low starting point for the Central Highlands (only 2 percent).

Financing for Education

This section examines education finance, including the relative role of the public and private sectors in financing education in Vietnam. Private spending on education is compared by expenditure groups, regions, ethnic groups, and gender to assess any changes in the financial burden of sending children to school, especially among the poor. This section investigates possible links between household spending on education, enrollment, and the quality of education, and checks whether poor households benefit as much as better-off households from public spending on education. Does government spending reduce inequalities? Can any unequal patterns be corrected by reallocating the government's education budget?

Public and Private Role in Providing and Financing Education

The public sector in Vietnam still dominates the provision of education. Even though the share of the private sector in providing school places in 1998 increased at the lower and upper secondary levels compared with 1993, provision of education is still dominated by the public sector. Table 12.6 shows that the private sector provided more school places, and its share at the upper secondary level increased from 2 percent in 1993 to 5 percent in 1998. Surprisingly, at the primary level, the private share in provision of service fell from about 1 percent to 0.3 percent, and the semipublic school (joint between public and private) share fell from 2 percent to 0.4 percent. One possible explanation is that public schools expanded quickly as a result of government efforts to achieve universal primary education. Moreover, there seems to be no space limit in public primary school because no admission examination is required, so the demand for private primary school is not as high as that for secondary levels.

Table 12.6. Public and Private Shares of School Enrollment, by Education Level, 1993 and 1998
(percent)

	Share of total enrollments	
Type of school	*1993*	*1998*
Public		
Primary	97.3	99.3
Lower secondary	97.6	96.6
Upper secondary	95.7	83.0
Private		
Primary	0.9	0.3
Lower secondary	1.7	0.5
Upper secondary	2.1	4.9
Semipublic		
Primary	1.9	0.4
Lower secondary	0.7	2.9
Upper secondary	2.1	12.6

Source: Author's estimates based on the 1993 and 1998 VLSSs and public expenditure data from the Ministry of Finance (1998).

In secondary schools, the most obvious explanation for the increased role of the private sector is the limited capacity of the public sector to provide education at that level. Demand for private and semipublic education at the secondary level has increased, because many more children who want to attend secondary schools cannot gain admission to public schools because the space available is limited. Admission to lower and upper secondary school used to be governed by admission examination, though this practice was recently abolished by the government. Instead of an admission examination, performance in the previous level of education is used. But criteria vary considerably between geographic locations and schools. However, semipublic lower secondary schools developed faster than private lower secondary schools, perhaps because they are a better investment than their purely private counterparts.

Because the public sector cannot meet the increasing demand for recurrent spending on schools in Vietnam, many schools were made semipublic; they continue using public infrastructure (classrooms and facilities), but self-finance for most of their increased recurrent expenditure (such as salaries for new-hire teachers and increasing salaries for experienced teachers). As a result, at the lower secondary level, the private provision of education fell from 1.7 percent to 0.5 percent, and the semipublic provision increased from 0.7 percent to 2.9 percent. Private schools at the upper secondary level experienced a considerable increase, from 2 percent in 1993 to 5 percent in 1998, compared with a huge increase for semipublic schools, from 2 percent in 1993 to 13 percent in 1998 (table 12.6).

The overall state budget expenditure for education and training (including funding from both central and local government levels) increased from about 10 percent of current expenditures in 1993 to 17 percent in 1998 (see table 12.7). This implies that spending on education by the government increased from 1.8 percent of gross domestic product (GDP) in 1992 to 3.5 percent in 1998. Compared with 1993, budgetary spending on primary and secondary education and training has increased from 61 percent of total public spending in 1993 to 76 percent in 1998, at the expense of spending on higher education and training. In 1998, the largest share of the state budget for the education and training sector, 36 percent, was allocated to primary education, an increase from 33 percent in 1993. The share of the budget expenditure on education for lower secondary schools in 1998 was the same as that in 1993—18 percent, and the budget share for upper secondary education increased slightly from 7 percent in 1993 to a little more than 8 percent in 1998. Government spending on higher education and training dropped from 39 percent in 1993 to 24 percent in 1998. Most of the reduction in the budget for higher education and training came from reduction in the state budget for technical and vocational training, not from reductions in spending on universities.

Despite an overall increase in public spending on education, there is a large variation in the amount of financial resources available at the local level. Provincial governments have a considerable responsibility in generating

Table 12.7. Trends in Government Expenditure on Education, 1992–98

Indicator	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*
Per capita expenditure (thousand dong at 1994 prices)	39.2	58.1	71.3	82.8	80.4	100.0	115.0
Percentage of discretionary budget	9.3	10.0	11.7	13.4	12.3	14.1	17.4
Percentage of gross domestic product	1.8	2.6	2.9	3.0	2.7	3.2	3.5
Share of total public education expenditure (percent)							
On education	63.9	60.7	60.4	72.3	71.9	72.6	75.7
Primary school	40.0	32.6	29.6	29.1	33.2	34.3	36.4
Lower secondary school	14.8	17.6	17.7	19.9	19.2	19.2	17.6
Upper secondary school	6.0	6.9	8.6	7.4	9.0	8.6	8.3
On higher education and training	36.1	39.3	39.6	27.7	28.1	27.4	24.3

Source: Author's estimates based on public expenditure data from the Ministry of Finance (1998).

resources for preuniversity education and enjoy discretion in spending allocation both between sectors and within sectors. As a result, richer provinces have been able to collect more revenues and also to spend substantially more on education. However, many provinces still find that their resources are insufficient to provide a national standard of education. Provinces normally adjudge national norms according to their financial capacity to fund their education systems. At the district level, further adjustment in norms has been carried out on spending allocation between salary and nonsalary items. Schools also have certain autonomy in collecting additional contributions from parents. As a result, schools in wealthier areas are able to collect and spend more than those in poorer areas, and the gaps in school spending become even wider.

The allocation by level of public spending on education determines the availability of resources for primary education. Public funding for primary education is critical for providing basic education skills and opportunities for poor children to be able to continue on to higher education. The previous bias against primary education in the allocation of resources within the sector as a whole in Vietnam is demonstrated by estimating how many primary students could be financed by the cost of one student in either secondary or tertiary education. In 1993, compared with a primary-level student, a lower secondary school student was 1.7 times as expensive, an upper secondary student was 4.3 times as expensive, and a postsecondary student was 26.5 times as expensive. By 1998, the situation had been significantly improved, but bias against lower levels of education still existed. A lower secondary student in Vietnam was only 0.9 times as expensive as a primary-level student, an upper secondary student in Vietnam was 1.5 times as expensive, and a postsecondary student was 6 times as expensive (table 12.8).

Table 12.8. Share of Public Spending on Education and of Enrollments, by Education Level, 1993 and 1998

	Primary		*Lower secondary*		*Upper secondary*		*Postsecondary*		*Total of four levels*	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Public education spending										
Dong, billion	1,152	4,104	477	2,096	179	968	953	2,381	2,761	9,549
Percentage of total	42	43	17	22	6	10	35	25	100	100
Enrollments (gross)										
Million	11.3	10.6	2.8	6.3	0.4	2.1	0.4	1.0	14.9	20
Percent	76	53	19	32	3	11	3	5	100	100
Per student public spending (thousand dong)	105	388	173	346	448	568	2,779	2,287		
Primary student equivalent of per student public spending (times)	1.0	1.0	1.7	0.9	4.3	1.5	26.5	5.9		

Source: Author's estimates based on the 1993 and 1998 VLSSs.

Table 12.9. Public and Private Shares of Financing, by Education Level, 1993 and 1998
(percentage of total expenditure at each education level)

	Public financing		*Private financing*	
Level	*1993*	*1998*	*1993*	*1998*
Primary education	45	61	55	39
Lower secondary education	34	41	66	59
Upper secondary education	40	33	60	67
Postsecondary education	71	46	29	54

Source: Estimates based on government budget data (Ministry of Finance 1998) and the 1993 and 1998 VLSSs.

Despite its dominant role in providing school places, the public sector accounts for only slightly more than 50 percent of total expenditure on education. Expenditures by the private sector (that is, by households) have emerged as an important complement to budget outlays at all levels of education. Estimates based on the 1993 and 1998 VLSSs suggest that total private spending on education has increased dramatically—from about 1.7 percent of GDP in 1993 to 3.4 percent in 1998. Of this aggregate total increase, 14 percent is due to the increase in total number of children enrolled in schools and 84 percent is due to increased private spending per student. Almost all of this—nearly 97 percent—was spent for students enrolled in public schools.

Putting these public and private expenditures together (table 12.9) suggests that the state budget financed only 52 percent of overall education expenses in 1993 and 50 percent in 1998. More important, as a result of the major reallocation of public spending within the education sector, public spending plays an increasing role in financing public primary education; its share in total education expenditure for this level increased from 45 percent in 1993 to 61 percent in 1998. Private spending in public primary schools fell from 55 percent in 1993 to 39 percent in 1998, though the absolute level of private spending almost doubled in real terms. Similarly, the share of public spending in total spending on lower secondary education increased from 34 percent in 1993 to 41 percent in 1998. In contrast, the private sector played an increasingly important role in financing upper secondary and postsecondary education. The share of private spending in these schools in total education expenditure increased from 60 percent and 29 percent, respectively, in 1993 to 67 percent and 54 percent, respectively, in 1998 (table 12.9). This trend means that more money from public funds for education will be available for basic education levels.

Private Financing of Education

Table 12.9 highlights the diminished role that the public sector now plays in financing upper secondary and postsecondary education, as distinct from the provision of education. On the one hand, this means that the education

Table 12.10. Per Student Household Expenditure on Schooling, 1993 and 1998
(percentage of total household nonfood expenditure)

Date/level	*Poorest quintile*	*Most well-off quintile*	*Vietnam*
1993			
Primary	4.4	3.0	3.1
Lower secondary	11.4	5.1	7.9
Upper secondary	20.9	7.6	15.8
1998			
Primary	4.9	3.8	3.4
Lower secondary	8.9	5.2	6.4
Upper secondary	21.1	7.9	13.8

Source: Author's estimates based on the 1993 and 1998 VLSSs.

sector has been successful in mobilizing a considerable volume of private sources to finance schooling. On the other hand, it means that private costs already play an important role in rationing enrollment in public schooling—the costs of official fees, private fees, unofficial contributions, books, uniforms, transport, and so forth. This factor is especially likely to influence access by students from poor families and may limit the scope for further cost recovery to finance expanded access and a better quality of education. In Vietnam, households still consider that the private sector offers lower-quality education than that offered by the public sector.

Although fees are no longer compulsory at the primary level, households must pay many other school-related costs, such as parent contributions for the parent-teacher association (PTA), books, uniforms, private tutoring fees, transportation, and lunches at school. Though none of these are compulsory by any regulation, they are at best quasi-voluntary; and many children have been punished and humiliated when their families do not pay for these extras. These costs are a considerable financial burden on the poor. Total private expenses per primary school child amounted to 4.4 percent of a typical poor household's nonfood expenditure (table 12.10). Private costs at public lower and upper secondary levels accounted for 9 percent and 21 percent, respectively, of total household nonfood expenditure in 1998, compared with 11.4 percent and 21 percent, respectively, in 1993.

As a result, if a typical poor household (from the poorest quintile) had two children in school—one at a primary and the other at a lower secondary school—it would cost 14 percent of this household's total nonfood expenditure in 1998 compared with 16 percent in 1993. It should be noted that 75 percent of the poorest households were "food poor" (table 12.11). This means these poor households do not have enough money to spend on food to get the minimum standard of necessary calories, so 3 percent of household spending on education is considerable and much more difficult for them, compared with better-off households, which are not food poor.

Table 12.11. Composition of Consumption, 1993 and 1998
(percent)

	Poorest quintile		Most well-off quintile		Vietnam	
Indicator	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Food poor	100	75	0	0	25	15
Total consumption expenditure						
On food	70	68	44	38	55	48
On nonfood	30	32	56	62	45	52
On education	2	4	4	8	3	6

Source: Author's estimates based on the 1993 and 1998 VLSSs.

Table 12.12. Composition of Private Spending on Primary Education, by the Poorest and Most Well-Off Quintiles, 1993 and 1998
(percent)

Date/expense	*Poorest quintile*	*Most well-off quintile*	*Vietnam*
1993			
Fees	5.1	6.7	5.6
PTA and school contribution	19.4	8.0	11.5
Uniforms	9.9	12.9	12.7
Textbooks and school supplies	44.9	14.5	25.0
Transportation, lodging, and food	14.5	45.4	35.1
Other	6.3	12.5	10.1
1998			
Fees	0.9	11.9	5.6
Private tutoring	4.9	24.3	14.9
PTA and school contribution	22.1	10.5	15.4
Uniforms	12.0	10.7	13.6
Textbooks and school supplies	45.8	16.3	23.8
Transportation, lodging, and food	11.3	27.8	30.1
Other	7.2	5.3	6.3

Note: PTA = Parent-teacher association.
Source: Author's estimates based on the 1993 and 1998 VLSSs.

Composition of Private Spending on Primary Education

Table 12.12 shows the composition of private spending on primary education by the poorest and most well-off quintiles in 1993 and 1998. In 1993, PTA and other school contributions (19.4 percent) and textbooks and school supplies (50 percent) were the largest items in total private spending by the poorest quintile. In contrast, among better-off households, most private spending in primary education was on food and lodging (45 percent) and books and school supplies (15 percent); PTA and other school contributions accounted for only 8 percent. In 1998, PTA and school contributions accounted for an even larger share (22 percent) of total education spending per primary school child in poor households. Another important feature in education in the 1990s was greater self-financing of textbooks and school supplies, which emerged as the largest expenditure item (46 percent) incurred by poor households. In contrast, better-off households devoted most of their private spending to private fees for tutorials (24.3 percent); transportation, food, and lodging (28 percent) (which is very important spending for high-quality education); and health and nutrition for their children.

The finding that the most well-off households spend as much as 24 percent of their total education spending per primary student on private tutors, and the poorest households spend less than 5 percent on the same line item, implies that access to higher-quality education is biased against the poor. Moreover, because primary education is free, the 12 percent of education expenditure that the most well-off families spend for fees may reflect more payments for private tutors. This can help to explain why the better-off children repeated grades less frequently. Because the public budget for education is limited, having teachers supplement their low salaries by teaching children after school is quite a common phenomenon in urban and wealthy areas in Vietnam. Children who cannot afford these tutorials are at a disadvantage, because they may not get needed guidance on how to do homework or more detailed explanations of challenging course content. The curriculum is overloaded, and the coursework may even be incomprehensible without additional teacher assistance. It is important to note that much of the material covered in tutorial sessions should, in fact, be taught within the normal school curriculum. Teachers often hold back on teaching these materials so that they can increase their low salaries by teaching extra sessions after school hours. It should also be noted that tutorials are typically used only in urban and wealthy areas. In poorer and rural areas, where households cannot afford these extra classes, teachers must supplement their low salaries by doing other jobs, which also affects the quality of education they can offer.

The composition of private spending on education also varied widely by region (table 12.13). For the northern regions, the greatest burden for households of sending children to primary school was not the fees but textbooks and teaching aids, as well as PTA and school contributions, in both 1993 and 1998. It is interesting that in 1993, household expenses for textbooks and teaching aids were much higher in the north compared with the central and southern regions. Households in the northern regions spent about one-half of their total spending on primary education on textbooks and teaching aids, but these accounted for about one-quarter in the central regions and about 15 percent in the southern regions. In 1998, households in the north spent relatively less on these items, while households in the central and southern regions increased the share of their spending on these items.

Table 12.13. Composition of Private Spending on Primary Education, by Region
(percent)

Date/expense	*Northern Uplands*	*Red River Delta*	*North Central Coast*	*Central Coast*	*Central Highlands*	*Southeast*	*Mekong Delta*
1993							
Fees	3.1	3.8	5.1	4.0	1.3	12.6	2.7
PTA and school contribution	23.5	18.7	22.8	11.7	16.7	6.8	6.7
Uniforms	0.1	1.0	16.0	23.1	12.2	15.8	12.5
Textbooks and school supplies	55.4	42.7	46.0	24.1	26.3	14.0	16.0
Transportation, lodging, and food	13.0	11.6	3.0	16.8	39.9	43.5	57.0
Others	4.9	22.2	7.1	20.3	3.6	7.3	5.1
1998							
Fees	1.1	11.9	1.3	0.9	1.2	13.1	0.8
Private tutoring	9.0	25.6	10.8	22.7	2.8	17.6	5.3
PTA and school contribution	23.9	14.3	23.3	16.0	29.3	9.7	6.5
Uniforms	1.7	6.5	10.2	16.6	21.8	12.5	17.5
Textbooks and school supplies	51.5	33.2	41.0	29.5	31.7	18.3	19.0
Transportation, lodging, and food	5.8	7.2	4.5	16.3	12	26.8	46.9
Others	7	1.3	8.9	0.5	1.2	2	4

Note: PTA = parent-teacher association.

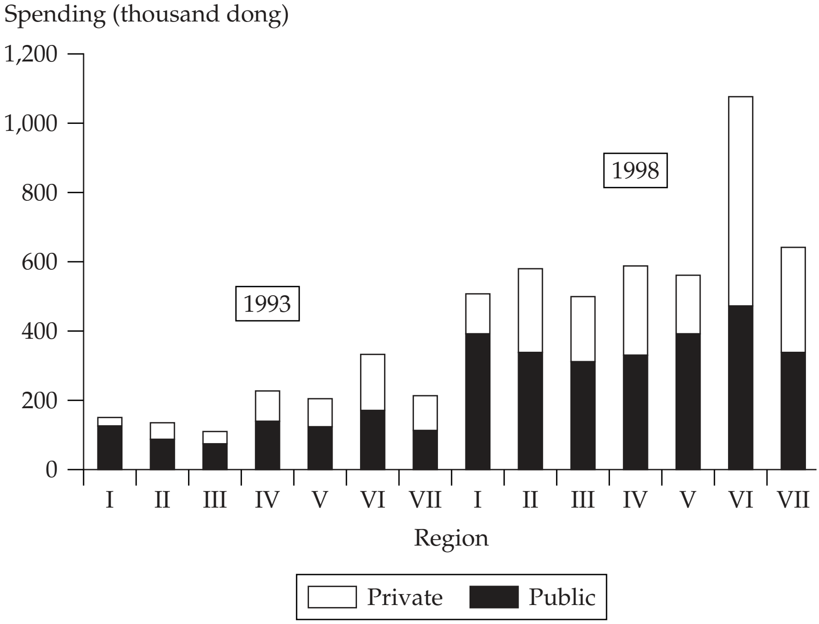
Source: Author's estimates based on the 1993 and 1998 VLSSs.

PTA and school contributions account for a large proportion (24 percent) of total household education spending in the north and central regions in both 1993 and 1998. In principle, there are no tuition fees for primary education, but in practice there are several other fees and voluntary contributions. An example of these fees is parent contributions for school construction expenses. These contributions are quasi-voluntary, because they are not officially regulated by the government but are considered to be necessary by schools and teachers. The importance of these contributions to total private spending for education varies widely among regions. The PTA and school contributions were much higher in the northern regions than in the southern and central regions, with the exception of the Central Highlands in 1998. In the Northern Uplands and Red River Delta in 1998, items such as books, PTA contributions, and school supplies accounted for 77 percent of total household spending per primary school child; these same items accounted for 87 percent of total household spending per primary school child in the North Central Coast. However, these items amounted to only 26 percent of household spending in the Mekong Delta in 1998.

In contrast, in the southern regions, especially in the Mekong Delta, uniforms, textbooks, and transportation, food, and lodging were the largest spending items. In the Mekong Delta, transportation, food, and lodging accounted for about one-half (57 percent in 1993 and 47 percent in 1998) of household education expenditure per primary school child. It is interesting to note that in southern regions, PTA and school contributions were relatively small (less than 10 percent of total expenditures). Because data did not allow for a further breakdown of expenditure on transportation, food, and lodging, it is impossible to draw conclusions about why they were so expensive in these regions compared with other regions and which item—transportation, food, or lodging—was the driving factor for such a high cost for these items in primary education. Because these items were such a large primary education expense in the Mekong Delta, further study is needed to better understand the situation in this income-poor and educationally poor region.

There is considerable variation in public spending per student across regions, however, which, when coupled with variation in enrollment rates across regions, resulted in a public spending pattern that was not pro-poor, although public spending on primary education was neutral in 1998. The low level of public budget expenditure on education makes the additional private resources essential, but they clearly have serious implications for equity, both in exacerbating existing inequalities in education finance and in the potential barriers they represent to participation by poor children. Figure 12.5 shows all public and private education spending per student and by region for both 1993 and 1998. A great variation in both public and private education spending can be seen across regions, though the variation in public education spending per student was less in 1998 than in 1993. In both years, the Southeast had the highest level of private spending—much higher than the rest of the country. Surprisingly, public spending per student

Figure 12.5. Per Student Public and Private Spending on Primary Education, by Region, 1993 and 1998



Note: I = Northern Uplands, II = Red River Delta, III = North Central Coast, IV = Central Coast, V = Central Highlands, VI = Southeast, and VII = Mekong Delta.

Source: Author's calculations from the 1993 and 1998 VLSSs.

was highest in the Southeast, the most well-off region in the country. This is partly because Ho Chi Minh City is in this region, which has more high-level education institutions than the other regions. Another explanation is the decentralization effect: The better-off cities and provinces have more resources to spend than others and thus can spend much more on education. In 1998, the Mekong Delta, the North Central Coast, and the Central Coast had the lowest levels of public spending on education. There may be some link between high performance in terms of enrollment and the level of public education spending per student. This is explored more in the next section by looking at public spending per student by level and region (see table 12.14).

Who Benefits from Public Education Spending?

The overall picture in education has been seen to have improved from 1993 to 1998 in all quintiles and all regions of Vietnam. In response to increased enrollment, there was a sizable increase in public spending for education in the 1990s and an intrasectoral reallocation toward the primary and lower secondary levels. Since policy changes have increased the availability of public funds at these levels, in absolute as well as in relative terms, public

Table 12.14. Share of Public Education Spending and School-Age Children, for Poorest and Most Well-Off Quintiles, 1993 and 1998
(percent)

	Poorest quintile		*Most well-off quintile*	
Date/level	*Share of public education spending*	*Share of school-age children*	*Share of public education spending*	*Share of school-age children*
1993				
All education	16.5	19.0	22.9	19.0
Primary	20.0	24.0	17.4	16.0
Lower secondary	7.2	20.0	33.8	19.0
Upper secondary	2.1	16.0	60.3	21.0
1998				
All education	18.1	20.0	21.4	18.0
Primary	26.0	26.0	12.5	14.0
Lower secondary	12.4	20.0	21.7	16.0
Upper secondary	4.0	18.0	41.0	20.0

Source: Author's estimates based on the 1993 and 1998 VLSSs.

primary and lower secondary spending per student has increased. Public spending on education has varied considerably across regions, however, because a large part of public education spending, especially at the primary and lower secondary levels, is locally funded as a result of the decentralization process.

Moreover, poor students still have significantly lower enrollments than better-off students, even after the recent surge in enrollment. In general, the public sector's share of total enrollment is fairly constant across quintiles; thus, public school enrollment rates are higher among the better-off than among the poor. This enrollment gap is particularly wide at higher levels of education: The small part of the population that reaches a higher level of education, among whom the better-off are overrepresented, receives a disproportionate share of the education budget. To examine the changes in benefits from public spending on education accrued to different groups of the population, and to see whether these changes are more or less pro-poor, the remainder of this section analyzes the distribution of per capita public spending across socioeconomic groups, regions, and genders for all education levels.

This section uses the benefit incidence analysis technique to measure how well public services are targeted to certain groups in the population, such as the poor, particular regions, and females.

The observed patterns of public spending across socioeconomic groups are determined by two factors. The first is government spending allocations within the sector on each level of public education and across regions, and the second is household behavior regarding use rates of public education. Thus, the incidence analysis integrates two sources of information: unit expenditure by level of education and by region (for example, the per student annual public spending for primary education by region) and information on individual use rates of education at different levels disaggregated by socioeconomic group, region, and gender. In this way, public expenditure on education is distributed across socioeconomic groups subject to their enrollment rates and the annual public expenditure per student by education level. The incidence of public expenditure is the result of both a public policy decision, the allocation of public expenditure to and within the education sector across regions, and a private decision, the behavior of households (that is, to send their children to school or not).

Assessing how well public spending on education is targeted to the poor requires a profile of who uses publicly provided education, together with measures of subsidy received by these users. This analysis uses the 1993 and 1998 VLSS data to generate the distribution of public school enrollment by per capita consumption, region, and gender, together with per student subsidies, estimating from the public finance data. If public spending were equally distributed across the population, then every expenditure quintile, region, and gender group would receive exactly the same percentage share of total public resources in the sector compared with their share in the total population. A Lorenz curve will be used to illustrate benefit incidence of public spending for education.

In this chapter, an adjusted Lorenz curve is used instead of a normal one, because the number of school-age children was not equally distributed across quintiles. The two poorest quintiles in Vietnam have a higher proportion of primary school-age children than their proportion in the population. In 1998, 26 percent of the total number of school-age children were from the poorest quintile, compared with only 14 percent of school-age children from the most well-off quintile. In contrast, the poorest quintile contained only 18 percent of all upper secondary students, compared with 23 percent from the fourth quintile and 20 percent from the most well-off quintile (table 12.14). Thus, on the Lorenz diagram, cumulated share of public spending for education accrued is drawn against the cumulated share of school-age children instead of the cumulated share of population. The diagonal line (or 45-degree line) is also known as the line of absolute equality because it goes through those points where the cumulative share of school-age children equals the cumulative share of total public spending on education.

Targeting of public education spending to the poor improved significantly between 1993 and 1998, partly as a result of the surge in enrollments by poor children at the primary and lower secondary education levels and partly because of the recent policy shift favoring primary education. The majority of school enrollment in Vietnam has traditionally consisted of primary-level students. Students at the primary level made up 78 percent of the total general education enrollments in 1993 and 58 percent in 1998.

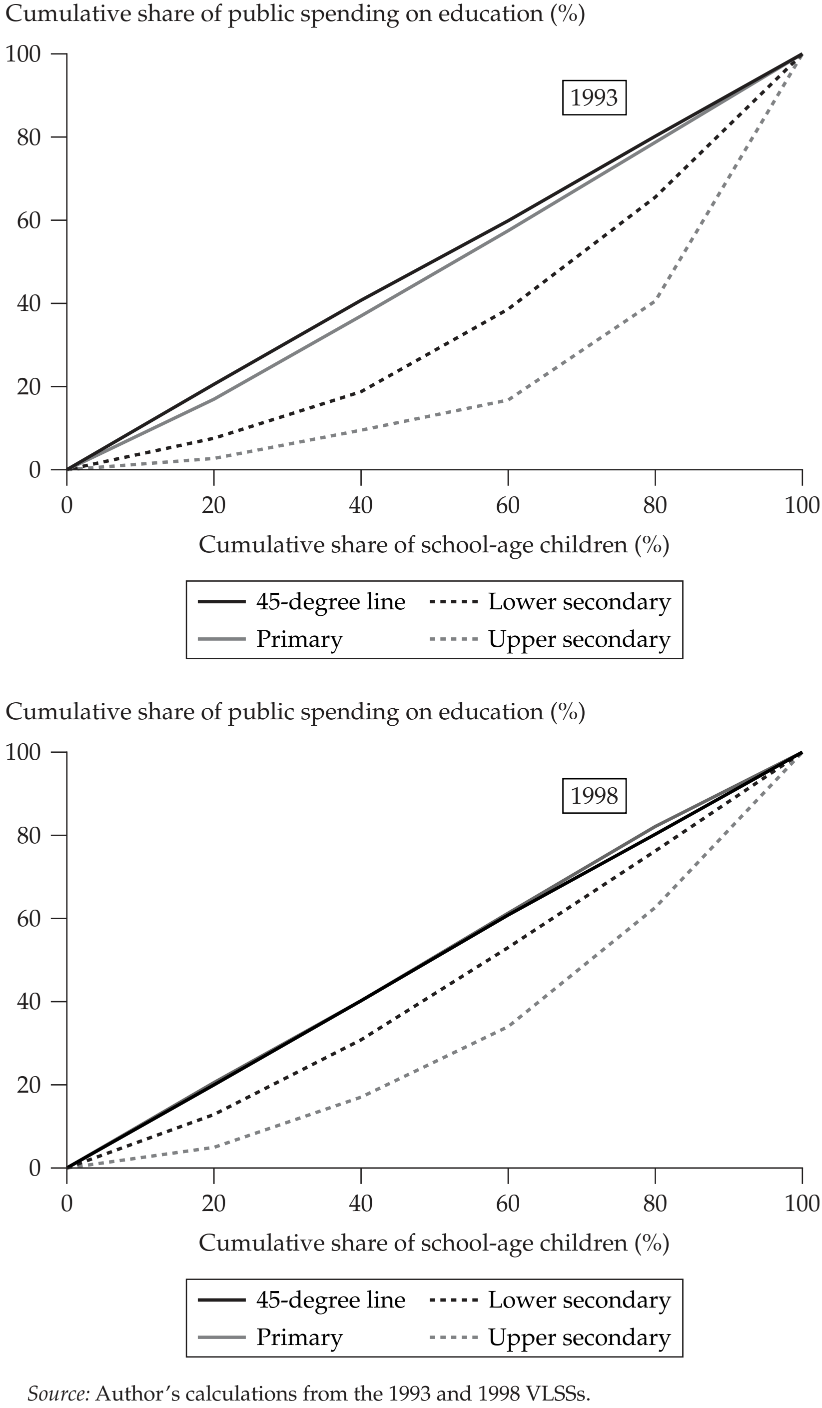
As a result, the share of public education spending received by the poor increased between 1993 and 1998. The share of all public education expenditure received by the poorest household expenditure quintile increased from 17 percent in 1993 to 18 percent in 1998, while the share of the most well-off household expenditure quintile fell from 23 percent in 1993 to 21 percent in 1998. Primary education demonstrated the most dramatic shift. In 1998, the poorest expenditure quintile received 26 percent of public primary education expenditure, up from 20 percent in 1993. The share going to the most well-off expenditure quintile fell to 13 percent in 1998 from 17 percent in 1993. When these cumulative shares of public spending in primary education are put against cumulative shares of school-age children in Lorenz diagrams for 1993 and 1998, it is shown that public spending for primary education in 1998 was quite neutral, though in 1993 it was still slightly biased against the poor. In 1993, public expenditure at the primary level was slightly biased against the poor because its distribution was below but close to the diagonal line, which means that the poor receive a slightly smaller share of total education spending than their share of primary school-age children. In contrast, in 1998 public expenditure at the primary level was pro-poor because its distribution was just above the diagonal line (figure 12.6).

Despite this recent progress in education spending and enrollments, by 1998 inequities in public education spending were still considerable at the secondary level. Public expenditure at secondary education levels was still not favoring the poor because their distributions were under the diagonal line, though the Lorenz curves moved upward between 1993 and 1998, reflecting improvement supporting the poor. The poorest quintile received a 12 percent share of lower secondary education expenditures while it consisted of 20 percent of lower secondary school-age children (see table 12.14). Similarly, in 1998 the bottom quintile received a much smaller share of public spending on upper secondary education (4 percent) than its share of school-age children (18 percent in 1998). In contrast, the most well-off quintile received 22 percent of lower secondary and 41 percent of upper secondary education expenditures, although it accounted for only 16 percent and 20 percent, respectively, of school-age children at these levels. The Lorenz distribution of public expenditure on upper secondary education was most biased against the poor, compared with that at the primary and lower secondary levels.

Regional Benefit Incidence of Public Spending on Education

Table 12.15 shows public spending per capita by level of education and across regions in Vietnam for 1993 and 1998. Per capita public spending for education increased more than threefold between 1993 and 1998, from D (dong) 40,000 to D 126,000. Improvement in public spending for education was highest in the Northern Uplands, the Central Highlands, and the North Central Coast over the five-year period. These three regions received the

Figure 12.6 Lorenz Distributions of Public Education Expenditure, by Level of Education, 1993 and 1998



Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 12.15. Per Capita Public Spending for Education, by Level and Region, 1993 and 1998
(thousands of constant January 1998 dong)

Date/level	*Northern Uplands*	*Red River Delta*	*North Central Coast*	*Central Coast*	*Central Highlands*	*Southeast*	*Mekong Delta*	*Vietnam*
1993								
Primary	17.6	16.1	17.6	15.0	18.5	16.7	16.3	16.6
Lower secondary	4.9	8.2	6.1	9.4	3.8	7.8	6.0	6.9
Upper secondary	2.0	3.2	1.9	4.5	0.6	3.5	1.6	2.6
Postsecondary	7.9	22.8	12.2	15.0	0.0	22.2	6.5	13.7
Total	32.0	50.0	38.0	44.0	23.0	50.0	30.0	40.0
1998								
Primary	62.7	44.3	58.8	45.5	63.4	37.7	48.3	50.4
Lower secondary	30.2	33.0	32.0	24.2	24.1	27.2	21.7	27.9
Upper secondary	10.0	16.7	13.1	13.5	5.5	15.1	7.9	12.2
Postsecondary	16.7	45.0	21.0	35.9	7.3	66.4	21.2	31.9
Total	120.0	139.0	125.0	119.0	100.0	146.0	99.0	122.0

Source: Author's estimates based on the 1993 and 1998 VLSSs.

highest per capita public spending in primary education compared with other regions. This may be an explanation of their good performance in terms of primary school enrollment in 1998. The Red River Delta and the Mekong Delta had the highest per capita public education spending, because they spent much more on postsecondary education.

Table 12.16 shows benefit incidence by region in 1993 and 1998. Overall, public spending for education in Vietnam was more equal in 1998 compared with 1993. In terms of benefiting from public education spending, the regions that were disadvantaged in 1993 gained more in 1998, and vice versa for the regions that received more in 1993. Although inequalities still exist, the Northern Uplands, North Central Coast, Central Highlands, and Mekong Delta benefited more from public spending on education relative to their share of population. In contrast, the Red River Delta, Central Coast, and Southeast benefited less from public spending on education compared with 1993, although the two most well-off regions—the Red River Delta and Southeast—still received much more compared with their share in total population (table 12.16). The major explanation is that, on the one hand, the change in the allocation of public education spending moved relatively toward primary and lower secondary education (as opposed to upper secondary and postsecondary education). On the other hand, the two most well-off regions had fewer children attending primary and lower secondary education.

The above standard benefit incidence analysis assumes that all regions have the same share of school-age children in the population. However, it is school-aged children who need to be in school, not all population. Therefore, the proportion of school-age children matters more in benefit incidence analysis than the proportion of the population. As can be seen from table 12.17, the Northern Uplands and the Southeast received a far greater proportion of total public spending on primary education than their proportion of school-age children in 1993, as occurred in 1998 in the Northern Uplands and the Mekong Delta. It is interesting that the Mekong Delta moved from a relatively less benefited status in public spending on primary education in 1993 to relatively more in 1998. The opposite trend happened in the Southeast.

Data from table 12.17 partially reflect a result of the recent decentralization process in Vietnam, which allows more authority at the local level to make decisions on local budget allocations and has resulted in an increased inequality in education opportunities. In fact, the provinces that may have more public funding resources or external support can thus spend more on education in terms of absolute per student costs, in terms of share of total public expenditure spent on education, or both. In contrast, other provinces have fewer funding resources or external assistance, which in turn limits their ability to spend more on education. Two central regions, the Central Coast and the Central Highlands, and the Southeast spent relatively less from public funding on primary education in 1998 than in 1993. There is a need to review and improve the system of budget planning and management, in general, and the mechanism for budget allocation, in particular, to

Table 12.16. Incidence of Public Spending for Education, by Region, 1993 and 1998
(as percent of public spending for each education level)

Date/indicator	*Northern Uplands*	*Red River Delta*	*North Central Coast*	*Central Coast*	*Central Highlands*	*Southeast*	*Mekong Delta*	*Vietnam*
1993								
Primary	16.6	20.9	13.5	10.8	3.6	12.7	21.9	100
Lower secondary	11.2	25.7	11.3	16.3	1.8	14.2	19.5	100
Upper secondary	12.1	27.0	9.2	20.6	0.7	17.0	13.5	100
All schools	13.0	27.0	12.0	13.0	2.0	16.0	17.0	100
Region percent of population	15.6	21.6	12.8	11.9	3.2	12.6	22.4	100
1998								
Primary	22.2	17.2	16.1	9.7	4.6	9.5	20.6	100
Lower secondary	19.4	23.2	15.8	9.3	3.2	12.4	16.7	100
Upper secondary	14.8	26.9	14.9	11.9	1.7	15.9	14.0	100
All schools	18.0	22.0	14.0	10.0	3.0	14.0	18.0	100
Region percent of population	17.9	19.6	13.8	10.7	3.7	12.7	21.5	100

Note: Rows may not add to 100 due to errors introduced by rounding.
Source: Author's estimates based on the 1993 and 1998 VLSSs.

Table 12.17. Incidence of Public Subsidies for Primary and Lower Secondary Education, by Region, 1993 and 1998

(as percent of public spending for education, adjusted using regional unit cost)

Date/indicator	*Northern Uplands*	*Red River Delta*	*North Central Coast*	*Central Coast*	*Central Highlands*	*Southeast*	*Mekong Delta*	*Vietnam*
1993								
Percentage of public spending								
Primary	22	19	11	11	3	17	17	100
Lower secondary	10	30	19	13	1	12	14	100
Percentage of population								
Total	16	22	13	12	3	13	22	100
Primary school age	17	23	14	11	3	12	20	100
Lower secondary school age	14	20	12	13	3	13	24	100
1998								
Percentage of public spending								
Primary	24	16	14	9	5	12	19	100
Lower secondary	24	17	13	11	4	11	20	100
Percentage of Population								
Total	18	20	14	11	4	13	21	100
Primary school age	17	17	14	12	8	15	17	100
Lower secondary school age	16	17	13	12	8	17	18	100

Note: Rows may not add to 100 due to errors introduced by rounding.

Source: Author's estimates based on the 1993 and 1998 VLSSs.

allow opportunities to redirect more public resources toward poorer provinces and toward those that need more resources for social services, such as education and health for the poor.

Returns to Education

This section looks at the recent changes in rate of returns to education, focusing on private sector wage earners. The Vietnamese labor force is relatively well educated, given its low income level, and there was a clear improvement in education level attained from 1993 to 1998 (table 12.18). The average number of years of schooling of wage earners increased from eight years in 1993 to nine years in 1998. The proportion of wage earners with upper secondary-level educations or higher increased from 23 percent in 1993 to 29 percent in 1998. Real average earnings (converted to January 1998 prices) have increased 11 percent annually over the 1993–98 period. Figure 12.7 shows that in 1993, there was no clear difference in real earnings between completed education levels. Instead, a worker who had completed upper secondary school did not earn more than those with less education. Similarly, holding a university degree did not make a significant difference in earnings. The whole picture changed in 1998: the higher the education level completed, the higher the earnings. This is especially true at the university level: University graduates earn 50 percent more than workers with no more than an upper secondary school diploma. Among those working in the private sector, university graduates can earn almost three times more than workers with only an upper secondary school diploma.

Rates of returns to investment in education are estimated here following up a work that was itself based on the 1993 VLSS (Moock, Patrinos, and Venkataraman 1998). The estimates in this study are based on wage data from the 1993 and 1998 VLSSs in an effort to capture the impact of recent economic reforms in Vietnam. Basic and extended Mincerian earning functions are used to estimate returns to schooling and levels of education. In the extended model, four levels of general education systems in Vietnam were considered. The levels were primary, lower secondary, upper secondary, and university or college. The impact of vocational training (with three categories: vocational training after primary, lower secondary, and upper secondary schools) has been estimated separately from the benefit of general education (from primary to university and college). Because the earning difference between public and private sectors was statistically significant, models were estimated separately for the private and public sectors.

The basic Mincerian earnings function links logarithm of average earnings to the approximate determinants of earnings such as years of schooling (S), years of experience (EXP), squared experience, sex, northern or southern region, urban or rural location, and seniority. The Mincerian earning function has the following semilog form:

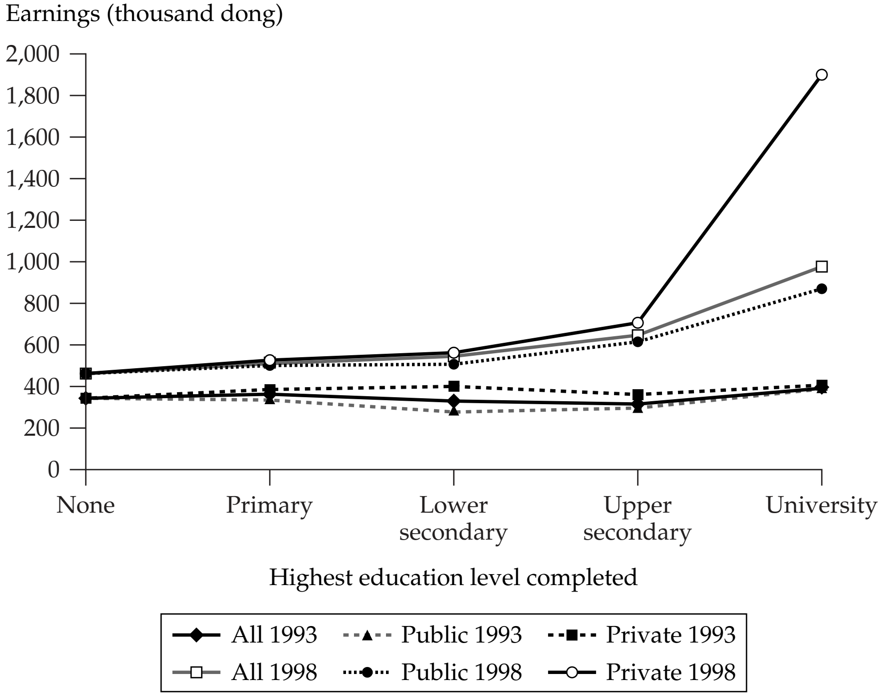
$$\ln Y_{\mathrm{i}} = \alpha + \beta_1 S_{\mathrm{i}} + \beta_2 EXP_{\mathrm{i}} + \beta_3 EXP_{\mathrm{i}}^2 + \beta_4 SEX_{\mathrm{i}} + \beta_5 NORTH_{\mathrm{i}} + \beta_6 URBAN_{\mathrm{i}} + \beta_7 SENIOR_{\mathrm{i}} + \varepsilon_{\mathrm{i}}$$

Table 12.18. Mean of Selected Variables, by Sector of Employment and by Sex, 1993 and 1998

	Total		*Public*		*Private*		*Males*		*Females*	
Variable	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Age (years)	31.3	32.9	34.0	37.0	29.0	30.0	32.0	33.0	31.0	32.0
Years of schooling	8.2	9.0	11.1	12.2	6.0	7.0	8.0	9.0	8.0	9.0
Years of experience	17.1	17.9	17.4	18.8	16.9	17.0	17.0	18.0	17.0	17.0
Real earnings per month (thousands of dong)	342	570	311	612	365	542	383	620	279	493
Public sector	0.43	0.40	1.0	1.0	0	0	0.39	0.37	0.49	0.45
Hours worked per week	46	47	44	45	48	49	47	48	45	47
Number of observations	2,251	3,199	966	1,293	1,285	1,906	1,358	1,942	893	1,257
Education level (percent)										
No education	22	21	6	5	34	33	21	21	24	23
Primary	27	26	15	14	35	34	29	27	24	24
Lower secondary	28	25	36	27	23	24	29	26	28	23
Upper secondary	16	20	28	35	7	9	14	18	19	22
University/college	7	9	15	19	0	1	7	8	6	9

Source: 1993 and 1998 VLSSs.

Figure 12.7. Monthly Earnings of Private and Public Sector Workers, 1993 and 1998



Source: Author's calculations from the 1993 and 1998 VLSSs.

where S_i stands for number of years of schooling that individual i had completed; EXP_i and EXP_i^2 are number of years of experience and its square; SEX_i represents sex of worker with value one for male and zero for female workers; $NORTH_i$ is the residence location of workers that takes value one if the workers were from the north (including the Northern Uplands, the Red River Delta, the North Central Coast, and the Central Coast) and value zero otherwise; $URBAN_i$ distinguishes workers from urban areas (value one) from workers from rural areas (value zero); $SENIOR_i$ identifies whether the worker has participated in the work force for a period of fewer than five years, which has value one if fewer than five years and zero otherwise. In this semilog earnings function specification, the coefficient on years of schooling can be interpreted as the average private rate of return to one additional year of education, regardless of the education level to which this year of schooling refers.

As can be seen from table 12.19, returns to one additional year of schooling, regardless of the level of education, increased from 3 percent in 1993 to 4 percent in 1998. Despite this change, returns to schooling in Vietnam are

Table 12.19. Basic Earning Functions Based on Years of Schooling for Private Sector Workers, 1993 and 1998

	1993			1998		
Variable	*Mean*	*Coefficient*	*t statistic*	*Mean*	*Coefficient*	*t statistic*
Years of school	6.01	0.031	5.96	6.8	0.039	8.64
Years of experience	16.92	0.032	6.30	17.4	0.019	2.95
Experience squared	444.18	−0.0006	−6.37	440.2	−0.0004	−3.20
Sex (male = 1)	0.65	0.380	11.38	0.7	0.292	10.51
North (north = 1)	0.28	−0.268	−6.99	0.3	−0.389	−9.04
Urban (urban = 1)	0.32	−0.057	−1.62	0.3	0.122	3.10
Seniority (junior = 1)	0.16	−0.004	−0.07	0.3	0.019	0.39
Constant		4.311	22.27		3.358	17.74
R^2		0.200			0.330	
Number of observations		1,285			1,897	

Source: 1993 and 1998 VLSSs.

still low by international standards and are below those of some other developing countries, such as the Philippines (6.2 percent in 1998) (Schady 2001). Worldwide, one more year of schooling can bring about a 10 percent increase in earnings. However, low returns to schooling were observed in some developing countries in the 1980s—the estimates of returns to schooling in China ranged from 1 to 5 percent in the mid- and late 1980s, 2.9 percent in Poland in 1986, and 4.3 percent in Hungary in 1987 (Psacharopoulos 1994).

Among factors other than schooling, the experience, gender, region, and urban or rural location of the worker were statistically significant in determining earnings in 1993 and 1998. An additional year of experience brings 3 percent higher earnings in 1993, an amount equivalent to the impact of one more year of schooling. However, experience was relatively less important in 1998, so that an additional year results in only a 2 percent increase in earnings (table 12.19).

Female workers are better educated than male workers. Although males and females have nearly the same level of education attainment in terms of number of years of schooling, the female work force has a slightly higher proportion with a university degree or who have completed upper secondary school than the male work force. However, males' earnings were still 37 percent and 26 percent higher than females' earning in 1993 and 1998, respectively. In both years, a male worker earned much more than an equally skilled female worker even after controlling for education, experience, and the other variables in table 12.19. In 1993, a male worker earned 46 percent more than a female worker with the same (observable) characteristics. This differential decreased slightly by 1998, but it was still 40 percent. These results mean that there is still some kind of discrimination between males and females, and something that keeps females' wages low. Further study is needed to fill the gap in this area.

A structural test was used to see if there is any difference in returns to education between male and female workers for the 1993 and 1998 surveys. It is interesting that returns to schooling of male workers in 1993 were higher than those of female workers, but the situation was reversed in 1998, when females had higher returns to schooling than males. However, the differences in 1998 were not statistically significant.

The wages of workers also varied by their locations. Urban workers in 1998 earned 12 percent more than identical workers in rural areas. Workers in the south earned more, on average, than those in the north, even though the average education level in the north is higher. The work force in the north had, on average, one more year of schooling than the work force in the south, and it had higher proportions with upper secondary- and university-level education than the south. After taking into account other factors, in 1993 a worker in the south still earned 24 percent more than an identical worker in the north. In 1998, the gap widened to 32 percent. A variable on seniority was included in the model to see if there was any impact from recent changes in the labor market. It is assumed that younger workers are more affected by the recent changes because they are entering directly into a free market wage economy, and higher levels of education can bring them a significant difference in earnings. The variable takes the value one if a worker had been in the labor market for fewer than five years and zero otherwise. It turns out that, other things being equal, there is no statistical difference in terms of earnings between young and senior workers.

An extended earning model was estimated to look at the rates of return for different levels of education. It estimates average private returns to different levels of schooling by converting continuous years of schooling (S) into a series of dummy variables. The dummy variables represent the completion of the respective level of general education or vocational training after general education. The following is the extended model:

$$\begin{aligned}\ln Y_i = {} & \alpha + \beta_1 PRIM_i + \beta_2 LSEC_i + \beta_3 USEC_i + \beta_4 UNIV_i + \beta_5 VOCP_i \\ & + \beta_6 VOCLS_i + \beta_7 VOCUS_i + \beta_8 EXP_i + \beta_9 EXP_i^2 + \beta_{10} SEX_i \\ & + \beta_{11} NORTH_i + \beta_{12} URBAN_i + \beta_{13} SENIOR_i + \varepsilon_i\end{aligned}$$

where $PRIM_i$, $LSEC_i$, $USEC_i$, and $UNIV_i$ are dummy variables indicating primary, lower secondary, upper secondary, or university education completion by individual i; $VOCP_i$, $VOCLS_i$, and $VOCUS_i$ reflect the kind of vocational training that individual i took after completing primary, lower secondary, or upper secondary school. The private rates of return to one year at different levels of schooling then can be derived by dividing the estimated rates of return to each level of education by the correspondent number of additional years required at each level. For primary education, this is assumed to be equal to one, because there will be no opportunity cost involved for a child at this level. A student in Vietnam is required to spend at least four, three, and four years at lower secondary, upper secondary, and university education, respectively.

Table 12.20 presents regressions that allow for a different impact of different levels of education. Unlike table 12.19, the coefficients in table 12.20 represent returns to different completed education *levels* (and to completed vocational training), not the returns *per year* of education at different levels. Returns per year of education at the different levels can be easily calculated and are given below. Other economic variables were kept unchanged.

Investment in education at the primary and lower secondary levels was profitable in both surveys. Returns to primary education declined slightly, from 15 percent in 1993 to 14 percent in 1998, however. Similarly, returns to lower secondary education declined from 3 percent in 1993 to 2 percent in 1998. In contrast, upper secondary and university education turned out to be statistically significant only in 1998. One more year of attending an upper secondary school did not make any statistical difference in a worker's earnings in 1993, but it could bring as much as 4 percent more to the worker's earnings for each additional year spent in an upper secondary school in 1998. Similarly, returns to one more year in a university or college could bring a 24 percent increase in earnings in 1998. It is interesting that, after taking into account differences in education attainment level, attending vocational

Table 12.20. Extended Earning Functions Based on Level of Education for Private Sector Workers, 1993 and 1998

	1993			1998		
Variable	*Mean*	*Coefficient*	*t statistic*	*Mean*	*Coefficient*	*t statistic*
Primary	0.66	0.153	3.75	0.67	0.143	3.86
Lower secondary	0.31	0.118	2.64	0.34	0.072	2.14
Upper secondary	0.08	−0.013	−0.18	0.09	0.122	1.90
University	0.00	−0.265	−1.01	0.01	0.940	4.17
Postvocational	0.00	−0.334	−0.83	0.01	−0.025	−0.13
Lower vocational	0.01	0.063	0.44	0.03	0.068	0.65
Upper vocational	0.01	−0.027	−0.19	0.05	0.057	0.68
Years of experience	16.92	0.032	6.18	17.41	0.021	3.24
Experience squared	444.18	−0.001	−6.29	440.22	0.000	−3.57
Sex (male = 1)	0.65	0.389	11.65	0.65	0.300	10.81
North (north = 1)	0.28	−0.269	−6.82	0.32	−0.369	−8.57
Seniority (junior = 1)	0.16	0.001	0.01	0.33	0.026	0.54
Urban (urban = 1)	0.32	−0.048	−1.36	0.34	0.121	2.99
Constant		4.361	22.51		3.448	18.01
R^2		0.200			0.340	
Number of observations		1,285			1,897	

Source: 1993 and 1998 VLSSs.

training did not make any statistical difference in earnings in the private sector in both years (table 12.20). As in the basic earning model, experience, gender, number of hours worked, and region seemed to have similar impacts on earnings in this extended model.

Conclusions

Over the period from 1993 to 1998, school enrollment in Vietnam increased dramatically at all levels, but especially at higher education levels. These improvements occurred for all expenditure groups and regions. Changes in the allocation of public spending on education in the 1990s increasingly favored lower levels of education. As a result, the share of public spending on education going to the poor increased from 16.5 percent in 1993 to 18.1 percent in 1998. This chapter documents major changes and conditions in the education sector in Vietnam, using data on public expenditure on education and the VLSSs. There are four main conclusions:

Enrollment

The improvement in enrollment rates was not equal across the different expenditure groups. At the primary level, there was a huge increase in enrollment for the bottom quintile, but still 18 percent of the poorest children of primary school age were not enrolled in school. The enrollment gaps between the better-off and the poor are even wider for higher levels of education.

Improvements in enrollment rates also varied considerably across regions, with wider disparities at higher levels of education. It is important to look at the reasons underlying these disparities and understand why some regions were doing much better than others. Regional variation in public spending, private contributions, or both, is an important factor that calls for government attention, especially in the context of strong decentralization in Vietnam.

On a more positive note, improvements in enrollment were considerable and equally spread for boys and girls. Gaps in improvement in enrollment between the majority and minority groups widened, however, given low enrollment rates for minority children—especially at the higher education levels. This may be an area that merits special attention from policymakers, researchers, and others. Considerable improvement in primary enrollment for ethnic minority groups shows that recent programs of the government and the international community have generated positive results. Additional efforts will be needed to provide access to higher levels of education and encourage ethnic minority children to enroll (and stay) in school.

Financing for Education

Public spending on education more than tripled in real terms from 1993 to 1998, and a larger share of public spending was allocated to primary and lower secondary education. Despite this overall increase, several issues in spending allocation and revenue collection accounted for a large variation in public spending on schools.

Although fees are no longer compulsory at the primary level, households purchased many school-related items, such as books, uniforms, private tutoring, transportation, and lunch. There were also other contributions; thus, even at the primary level, paying for education can be a considerable financial burden on the poor. This burden is even greater for poor children continuing on to higher levels of education. Findings from many participatory poverty assessments in Vietnam show that financial contribution was one of the main reasons why many poor children dropped out of school at a relatively young age (World Bank 1999). Moreover, better-off households spent more on such quality-related items as private tutoring after school hours, transportation, food, and lodging. As a result, the poor children not only receive less education compared with better-off children, but the education they receive is of lower quality. It is thus important that although reducing the financial burden on poor households is necessary, it is equally important that everyone have access to quality education. It also should be noted that getting these marginal children to school may be much harder than for the average child. Efforts in this regard must come from many sides: the government, civil society, the local community, and households.

The level and composition of private spending on education also vary greatly across regions. In the Mekong Delta and the Central Highlands, which are poor regions, private spending by households on secondary education was much higher than in the Northern Uplands and the Red River Delta. In the northern regions, the highest burdens faced by households with children in primary schools were PTA contributions, textbooks, and paper. In contrast, in the southern and central regions, especially in the Southeast and the Mekong Delta, uniforms, transportation, and lunch were the largest spending items. Given the poor performance in enrollment in the Mekong Delta and the Central Highlands, it is important that the role of, and regional variations in, private payments for the PTA, textbooks, and other school supplies are taken into consideration if these are major impediments to enrollment of poor children.

Pro-Poor Budget Planning and Management

The proportion of school-age children in the population varies greatly among regions, with poorer regions likely to have more children who are of school age. When the proportions of school-age children were taken into consideration in the benefit incidence analysis, it turned out that the Northern Uplands received a far greater proportion of total public spending on primary education than its proportion of school-age children in both 1993 and 1998. It is interesting that the Mekong Delta moved from benefiting relatively less from public spending on primary education in 1993 to benefiting relatively more in 1998. This, together with low performance profiles in some of the less-benefited regions, may have implications for policy in reallocation of public spending on education, especially between regions, to improve enrollment performance in these regions. There is a need to review and improve the system of budget planning and management in general and the mechanism for budget allocation in particular to allow opportunities to redirect more public resources toward poorer provinces and toward those that need the most.

Returns to Education

Finally, this chapter shows that the labor market in Vietnam is changing rapidly. Returns to schooling at higher levels of education increased substantially between 1993 and 1998, especially at the upper secondary and university levels. Investment in education at all levels raised wages in the private sector, but returns to primary and lower secondary education dropped slightly between 1993 and 1998. Linking these findings with those from previous sections in this chapter shows that helping the poor to complete primary education can provide them with an opportunity to improve their earnings and living standards (by entering secondary and postsecondary education). In contrast, vocational training had no statistically significant influence on earnings in the private sector. This result raises questions about the value of such education, which is thought to play an important role in generating technical skills to meet the demand of a fast-changing market economy. Further study is needed on the quality of vocational training and its capacity to provide the right skills that new businesses need most.

Notes

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1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. The gross enrollment rate is defined as the ratio of the number of children currently in school at a given education level to the total number of children of the right age for that level. For example, the right age for primary school is 6 to 10 years. The net enrollment rate is defined as the ratio of the number of children currently in school at the right age for a given education level to the total number of children of the right age for that level.

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13

An Investigation of the Determinants of School Progress and Academic Achievement in Vietnam

Paul Glewwe

Many economists have claimed that a well-educated population leads to higher economic growth (Barro 1991; Lucas 1988; Mankiw, Romer, and Weil 1992). The World Bank concurs with this view; for example, it has claimed that education played an important role in the economic success of many East Asian countries (World Bank 1993). In almost all developing countries, the majority of schools are run by the government, so government education policy has a very direct effect on education outcomes. Vietnam is no exception in this regard: 99 percent of Vietnamese primary school students and more than 90 percent of secondary school students attend public schools.

Despite its recent economic success, Vietnam is still a low-income country; its gross national income per capita in 2000 was US$390, which implies a rank of 164 among 206 countries (World Bank 2002a). Yet Vietnam's performance in education is much higher than that of other low-income countries. According to World Bank data, the average (net) primary school enrollment rate for low-income countries (those with per capita incomes below US$755) was 76 percent in 1997, yet Vietnam's rate was 100 percent. Analogous figures for (net) secondary school enrollment rates are 51 percent for low-income countries and 55 percent for Vietnam (World Bank 2001a).

Vietnam's success in education is commendable, but it is still below the educational achievements of the top-performing countries in East Asia. For example, China's (net) secondary school enrollment rate was 70 percent and the Republic of Korea's rate was 100 percent. In view of Vietnam's desire to close this gap, this chapter examines the determinants of school completion and school performance (as measured by test scores) in Vietnam, focusing on primary and lower secondary schools.

The next section of this chapter presents trends in education outcomes in Vietnam in the 1990s, followed by a description of the data and a presentation of the empirical framework for estimation. The results are presented in the subsequent section, and the last section summarizes and presents concluding comments.

Primary and Secondary School Outcomes

This section presents some basic facts about education outcomes in Vietnam in the 1990s, focusing on trends over time and variation across different socioeconomic groups.

Trends over Time

Vietnam enjoyed high rates of economic growth in the 1990s: The average annual rate of economic growth from 1990 to 2000 was 7.9 percent (World Bank 2002b). Wealthier countries typically have relatively high rates of school enrollment, so one would expect increased enrollment in primary and secondary school in Vietnam in the 1990s. This is confirmed by household survey data from Vietnam, which show that school entrance rates increased at all levels from 1992–93 to 1997–98. As seen in table 13.1, the percentage of children who eventually enter primary school (grades 1–5) increased from 95 percent to 97 percent, so that virtually all Vietnamese children begin primary school. The percentage of children who eventually enter lower secondary school (grades 6–9) increased from 66 percent to 72 percent, and the percentage who eventually enter upper secondary school (grades 10–12) increased from 23 percent to 29 percent.[1]

These recent increases in enrollment stand in sharp contrast to the changes that took place from the late 1980s to the early 1990s. Although income growth was also robust during this earlier period, school enrollment at the secondary level declined. Table 13.2 illustrates this fact, using school enrollment rates calculated from two different data sources: the official rates reported in the United Nations Educational, Scientific, and Cultural

Table 13.1. School Entrance Rates in Vietnam, 1993 and 1998
(percent)

Education level	*1993*	*1998*
Primary	94.7	97.4
Lower secondary	66.1	72.3
Upper secondary	22.7	29.4

Note: Because late enrollment and grade repetition are common in Vietnam, primary entrance is based on children ages 11–12 years. The ages for lower and upper secondary levels are 16–17 and 19–20, respectively.

Source: Author’s calculations based on the 1993 and 1998 VLSSs.

Table 13.2. School Enrollment Rates in Vietnam, 1980–98

	School enrollment						
				1998 VLSS			
	UNESCO data (gross rates)			*Primary*		*Secondary*	
Year	*Primary*	*Secondary*	*Postsecondary*	*Net*	*Gross*	*Net*	*Gross*
1980–81	109	42	2	—	—	—	—
1981–82	—	—	—	—	—	—	—
1982–83	—	—	—	—	—	—	—
1983–84	—	—	—	—	—	—	—
1984–85	104	40	—	—	—	—	—
1985–86	103	43	2	62	75	39	44
1986–87	104	—	—	66	82	37	41
1987–88	106	44	—	68	85	35	39
1988–89	104	40	2	68	85	32	35
1989–90	102	35	2	72	89	32	35
1990–91	103	32	2	74	91	32	35
1991–92	104	31	2	76	93	35	38
1992–93	109	32	2	79	96	37	41
1993–94	111	35	2	81	102	41	44
1994–95	113	41	3	85	107	44	48
1995–96	114	47	4	87	110	48	53
1996–97	115	52	7	89	113	53	58
1997–98	113	57	—	92	113	57	63

— Not available.

Note: Gross enrollment rates measure the number of children enrolled in the particular level of schooling, regardless of their ages, divided by the number of children in the age range associated with that level of schooling (ages 6–10 for primary, ages 11–14 for lower secondary, and ages 15–17 for upper secondary). Net enrollment rates are similarly defined, except that the number of children enrolled excludes children enrolled who are not in the associated age range.

Sources: UNESCO, *Statistical Yearbook*, various years; author's calculations based on the 1998 VLSS.

Organization (UNESCO) statistical yearbook and rates calculated using retrospective data from the 1997–98 Vietnam Living Standards Survey (VLSS).[2] The UNESCO figures show that from 1987–88 to 1992–93, the secondary gross enrollment rate fell from 44 percent to 32 percent, but rose steadily thereafter. The VLSS data show a similar trend, although the timing is somewhat different. Both sources of data show increases in enrollment rates starting in the early 1990s, reaching a gross secondary school enrollment rate of about 60 percent in 1997–98; they also show a modest increase in the gross primary school enrollment rate during the 1990s. These increases are consistent with substantial increases in government spending on education, especially secondary education, in the 1990s. Recent trends in education finance are described in detail in chapter 12.

Variation across Different Socioeconomic Groups

Table 13.3 shows entrance rates into lower and upper secondary schools in 1993 and 1998 for the two VLSSs (described in the section on data and methodological framework). For Vietnam as a whole, the proportion of children entering lower secondary school (grades 6–9) increased from 66 percent to 72 percent, a respectable but not spectacular increase over five years. For upper secondary school, the increase was sharper, from 23 percent to 29 percent. Yet these school entrance rates vary widely across different population groups in Vietnam.

As in most countries, urban children in Vietnam are more likely to enter lower secondary school than rural children. The rates among urban children were 83 percent in 1993 and 87 percent in 1998. Thus, in urban areas lower secondary school is approaching universal coverage. In rural areas, the rates are lower, but the increase is higher—from 62 percent in 1993 to

Table 13.3. Entrance Rates for Lower and Upper Secondary Schools, 1993 and 1998
(percent)

	Lower secondary		*Upper secondary*	
Indicator	*1993*	*1998*	*1993*	*1998*
All Vietnam	66.1	72.3	22.7	29.4
Urban	82.6	87.2	46.9	53.1
Rural	62.2	68.5	15.2	22.5
Region				
Northern Uplands	62.4	72.3	20.7	22.5
Red River Delta	83.3	91.7	35.8	45.7
North Central Coast	72.1	84.4	31.1	38.2
Central Coast	68.6	73.8	23.2	31.0
Central Highlands	45.7	57.2	0.0	8.2
Southeast	71.1	71.1	24.1	39.2
Mekong Delta	49.2	54.4	9.2	16.4
Quintile				
1 (poorest)	40.1	47.4	9.1	7.6
2	53.7	64.7	7.3	10.9
3	67.8	70.6	21.1	22.6
4	75.8	81.2	25.0	35.6
5 (most well-off)	84.2	92.8	43.3	58.8
Ethnic group				
Vietnamese (Kinh)	71.2	72.8	25.4	29.1
Chinese	80.0	82.9	31.0	53.8
Other ethnic minority	28.6	64.0	3.4	24.5

Note: Because late enrollment and grade repetition are common in Vietnam, lower and upper secondary school entrance rates are based on children ages 16–17 and 19–20, respectively.

Source: Author's calculations based on the 1993 and 1998 VLSSs.

69 percent in 1998. Although rural areas are slowly catching up to urban areas in terms of enrollment in lower secondary school, there is still a large gap at the upper secondary school level. In urban areas, 47 percent of the population entered upper secondary school in 1993, a figure that increased to 53 percent in 1998. Yet in rural areas the rate was only 15 percent in 1993, although it did increase to about 23 percent by 1998. Thus, the largest gap in schooling between urban and rural areas in Vietnam is at the upper secondary level.

There are also large regional disparities in entry into lower and upper secondary school. The best performer among Vietnam's seven regions[3] is the Red River Delta. In 1993, about 83 percent of the children in that region had entered lower secondary school, and this increased to 92 percent by 1998. Entry into upper secondary school was also the highest in the Red River Delta among the seven regions, increasing from 36 percent in 1993 to 46 percent in 1998. The next-best performer among the seven regions was the North Central Coast: By 1998, it had an enrollment in lower secondary school of 84 percent and an upper secondary enrollment of 38 percent. At the other end of the spectrum are the Central Highlands and the Mekong Delta. The percentage of children who entered lower secondary school was in the mid- to upper 40s in 1993 and the mid-50s in 1998. Entry into upper secondary school was lowest in the Central Highlands, at about 8 percent in 1998, while the Mekong Delta had the second lowest rate among the seven regions, at 16 percent.

In almost any country, including Vietnam, school progress is positively correlated with income levels. Among the poorest 20 percent of the population (as measured by consumption expenditures per capita), only about 40 percent of children had entered lower secondary school in 1993, although the rate increased to 47 percent by 1998. Among the most well-off 20 percent of the population, the respective rates are doubled: 84 percent in 1993 and 93 percent in 1998. In upper secondary education, the disparities are even wider and appear to be increasing. Only 9 percent of children in the poorest 20 percent of households had entered upper secondary school in 1993; this rate was even lower in 1998, at 8 percent. In stark contrast, among the most well-off 20 percent of the population, entry into upper secondary school increased from 43 percent in 1993 to 59 percent by 1998.

Finally, it is worthwhile to examine differences by ethnic groups. About 85 percent of the population in Vietnam is ethnically Vietnamese (Kinh). Another 2 percent is Chinese, and the remaining 13 percent is spread across a wide variety of groups that are found predominantly in remote rural areas. Entrance into lower secondary school increased slightly for both Kinh and Chinese children; in contrast, entry into lower secondary education increased dramatically for ethnic minority children, from 29 percent in 1993 to 64 percent in 1998. This suggests that policies to promote schooling among minority populations were quite successful. However, minority entrance into lower secondary schools (64 percent) still lagged behind the rates for Kinh (73 percent) and Chinese (83 percent). At the upper secondary level, enrollment among Kinh increased modestly (from 25 percent to 29 percent), while enrollment for Chinese and ethnic minorities increased dramatically (from 31 percent to 54 percent and from 3 percent to 25 percent, respectively). It is particularly surprising that by 1998, ethnic minorities appear to have almost caught up with Kinh in upper secondary enrollments.

Data and Methodological Framework

The analysis in the remainder of this chapter uses data from the 1998 VLSS. This survey collected extremely detailed information from 6,002 households in urban and rural areas in all regions of Vietnam. In rural areas, a community questionnaire was used to collect information on community characteristics, including the distance to the nearest schools. The survey is one of the World Bank's Living Standards Measurement Study household surveys, which are described in Grosh and Glewwe (1998). See the appendix to chapter 1 for more information on the VLSS. For further details on the 1998 VLSS, see World Bank (2001b).

Data

The 1998 VLSS collected a large amount of data on education. The education of all household members is recorded in detail, including years repeated and diplomas or certificates obtained. For individuals who had less than an upper secondary education, simple tests of reading comprehension and mathematics computation were administered. In all rural areas, a school questionnaire was used to collect information from primary schools and from lower and upper secondary schools. This allows for an analysis of the relationship between household and school characteristics and various educational outcomes, including test scores.

For two reasons, the analysis in the remainder of this chapter examines only rural areas. First, as seen in table 13.3, rural areas lag far behind urban areas, so concern about children leaving school early or, more generally, about children not doing well in school leads to a focus on rural areas, where 80 percent of the Vietnamese population lives. Second, data on communities and local schools in the VLSS are available only for rural areas.

To provide some context for the data analysis presented in this chapter, table 13.4 presents basic descriptive statistics on selected variables of interest, with separate figures for the primary school sample and the secondary school sample. The typical Vietnamese child has a mother with about five years of education and a father with about seven years. The nearest primary school is less than one kilometer away, but the nearest lower and upper secondary schools are about two and six kilometers away, respectively. Poor material conditions are the most common complaint about both primary and lower secondary schools, and concerns about crowding and teacher quality are far less common (data on these school problems are from the community questionnaire).

Table 13.4. Descriptive Statistics for Child, Household, and School Variables

	Primary		*Lower secondary*	
Variable	*Mean*	*Standard deviation*	*Mean*	*Standard deviation*
Mother's years in school	4.69	3.33	4.94	3.28
Father's years in school	6.56	3.55	6.91	3.41
Distance to primary school (km)	0.61	1.00	n.a.	n.a.
Distance to lower sec. school (km)	2.26	2.65	1.79	1.83
Distance to upper sec. school (km)	n.a.	n.a.	5.77	4.57
Poor material conditions	0.82	0.38	0.73	0.45
Lack school supplies	0.59	0.49	0.62	0.49
Crowded	0.09	0.29	0.06	0.25
Low teacher quality	0.19	0.39	0.13	0.33
Teachers with credentials (percent)	0.76	0.25	0.86	0.18
Teachers with 5–10 years experience (percent)	0.28	0.18	0.21	0.16
Teachers with 10+ years experience (percent)	0.44	0.25	0.57	0.24
Percent students without desks	0.02	0.06	0.02	0.08
Poor-quality classroom	0.40	0.27	0.30	0.32
Blackboard	0.76	0.24	0.84	0.25
Books per pupil	0.05	0.16	0.17	0.51
School day (minutes)	189.5	17.2	210.5	20.4
Electricity	0.62	0.40	0.86	0.32
Clean water	0.47	0.42	0.66	0.46
Sanitary toilet	0.44	0.41	0.54	0.48
Library	0.26	0.35	0.59	0.48
Multigrade classrooms	0.14	0.30	0.02	0.14
Number of shifts	1.94	0.23	1.75	0.41

n.a. Not applicable.

Source: Author's calculations based on the 1998 VLSS.

Data from the school questionnaires show that three-fourths of primary school teachers and almost 9 of 10 lower secondary school teachers have the credentials appropriate for their positions. About half of the teachers in both types of schools have more than 10 years of teaching experience. Almost all of the students have desks, and about 80 percent of classrooms have blackboards. The school days are quite short—a little more than three hours for primary school and just three and one-half hours for lower secondary school. This is not surprising, given that both types of schools typically have two shifts. About 62 percent of primary schools and 86 percent of lower secondary schools have electricity. Approximately one-half of both types of schools have clean drinking water and sanitary toilets. About one-fourth of primary schools have libraries, compared with 59 percent of lower secondary schools with libraries. Finally, multigrade classrooms (more than one grade in the same class) are relatively rare.

Methodological Framework

Although the education data in the VLSS provide one of the best opportunities to analyze education outcomes in Vietnam, there are formidable methodological problems that limit the inferences that can be drawn from any analysis of them. This chapter focuses on two basic educational outcomes: school completion and academic performance as measured by test scores. The remainder of this section will explain the regression analysis that was done and the limitations of that analysis.

First consider school progress, which can be measured in terms of years of schooling completed or level of schooling completed. The equation to be estimated, the determinants of school progress, takes the form:

$$SP = f(X_c, X_h, X_s).$$

In this equation, SP indicates school progress. It is a function (denoted by f) of X_c, a vector of child characteristics; X_h, a vector of household characteristics; and X_s, a vector of school characteristics. If all child, household, and school characteristics were observed and measured without error, standard linear or nonlinear regressions methods, such as ordinary least squares, could be used to estimate this relationship.

In reality, it is never possible to observe all components of the X vectors—although the VLSS measures more than is done in most other surveys—and those components that are observed may be measured with error. For example, it is difficult, if not impossible, to collect information on children's innate abilities or parents' wishes for their children's schooling. Even more daunting is the collection of data on school characteristics. Schools can vary in hundreds of ways, some of which are difficult to measure. Examples of difficult-to-measure school variables are the quality and motivation of the teachers, the quality (as opposed to quantity) of school supplies and equipment, and the pedagogical methods used by teachers.

The following simple example illustrates the difficulty of estimating the determinants of school progress. Suppose that the above equation is estimated and shows that children living in areas where the schools have adequate numbers of desks and other basic equipment are much more likely to be enrolled in school. Although it is probably true that better-equipped schools attract students, other factors that are not observed could also be at work. For example, communities in which the parents place an unusually high value on education are likely to take actions that improve the quality of those schools, so better school equipment is positively correlated with the values held in the community. Because these values are not in the VLSS data, and they almost certainly also have a *direct* impact on whether children attend school, there will be a tendency to overestimate the impact of school equipment; part of the estimated effect of school equipment is in fact due to the higher value placed on education in communities with ample equipment. To make matters worse, it is also possible that the impact of better-equipped schools on school progress is underestimated. This would be the case if there were government programs that provided equipment and supplies to areas where school progress is particularly low.

The problems with estimating the determinants of school progress also confound attempts to estimate the determinants of children's academic achievement. The equation to be estimated in this case can be depicted as:

$$TS = g(X_c, X_h, X_s)$$

where TS is the student's test score, a different function $g(\ )$ is to be estimated, and the three sets of X variables may be different from those in the school progress equation. An example of the difficulty here is measuring the impact of textbooks on academic achievement. In Vietnam, as in many other developing countries, schools do not provide textbooks; instead, parents are expected to purchase them for their children. Of course, parents who decide to purchase those textbooks probably place a higher value on education than parents who do not buy textbooks. Moreover, parents who place a high value on education probably do other things to help their children, many of which may not be observed in the VLSS data (such as helping children with schoolwork). When estimating the above equation for test score performance, standard estimation methods will tend to overestimate the impact of textbooks on learning because textbooks are positively correlated with parental actions that are not observed in the data.

A full treatment of the difficulties involved in estimating the determinants of school progress and academic achievement in Vietnam is beyond the scope of this chapter. See Glewwe (2002) for a thorough review of the problems encountered when estimating the determinants of academic achievement in developing countries. The point to bear in mind is that the estimates in the next section should be treated as suggestive only, not as definitive.

Results

This section presents estimates of the determinants of school progress in terms of level of schooling completed, and of academic achievement, as measured by test scores and examination results. As explained above, the results may suffer from biases and thus should be treated with caution; further analysis is needed before using these results to provide policy advice.

School Progress

As seen in table 13.1, almost all Vietnamese children (97 percent) enter primary school, so there is little point in estimating the determinants of entry into primary school. However, only about 80 percent finish primary school. Table 13.5 presents logit regressions for finishing primary school. Because

Table 13.5. Determinants of Primary School Completion
(Logit)

	Base model		*Community fixed effects*		*Adding school variables*			
Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Mean*	*Standard deviation*
Constant	−7.254	−2.88	n.a.	n.a.	6.772	−2.07	1.00	n.a.
Age	−0.185	−3.06	−0.239	−3.69	−0.211	−3.37	17.45	1.15
Female	0.001	0.01	−0.021	−0.12	−0.091	−0.47	0.51	0.50
Mother's years in school	0.183	5.88	0.119	3.57	0.149	5.06	4.69	3.33
Father's years in school	0.182	6.54	0.159	5.45	0.171	5.75	6.56	3.55
Log(expenditure per capita)	1.163	5.35	1.703	7.65	1.302	5.62	7.72	0.47
Ethnic minority	−0.355	−1.50	−0.304	−0.90	−0.015	−0.05	0.15	0.35
Buddhist	−0.121	−0.66	0.292	1.38	−0.115	−0.56	0.18	0.39
Christian	0.245	0.99	−0.017	−0.05	0.070	0.30	0.11	0.31
Height (cm)	0.009	0.68	0.015	1.11	0.001	0.10	155.4	6.7
Height missing	−0.111	−0.73	−0.067	−0.36	−0.127	−0.75	0.21	0.41
Distance to primary school (km)	n.a.	n.a.	n.a.	n.a.	0.083	1.15	0.61	1.00
Distance to lower secondary school (km)	n.a.	n.a.	n.a.	n.a.	−0.058	−1.21	2.26	2.65
Poor material conditions	n.a.	n.a.	n.a.	n.a.	−0.372	−1.70	0.82	0.38
Lack school supplies	n.a.	n.a.	n.a.	n.a.	0.203	0.94	0.59	0.49
Crowded	n.a.	n.a.	n.a.	n.a.	−0.533	−1.72	0.09	0.29

Low teacher quality	n.a.	n.a.	n.a.	n.a.	−0.106	−0.38	0.19	0.39
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	0.819	2.72	0.76	0.25
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.649	0.85	0.28	0.18
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.794	1.65	0.44	0.25
Percent students without desks	n.a.	n.a.	n.a.	n.a.	−0.025	−2.46	0.02	0.06
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	0.569	1.51	0.40	0.27
Blackboard	n.a.	n.a.	n.a.	n.a.	−0.446	−1.01	0.76	0.24
Books per pupil	n.a.	n.a.	n.a.	n.a.	−0.041	−0.06	0.05	0.16
School day (minutes)	n.a.	n.a.	n.a.	n.a.	0.002	0.26	189.5	17.2
Electricity	n.a.	n.a.	n.a.	n.a.	0.193	0.68	0.62	0.40
Clean water	n.a.	n.a.	n.a.	n.a.	−0.007	−0.03	0.47	0.42
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	−0.338	−1.25	0.44	0.41
Library	n.a.	n.a.	n.a.	n.a.	−0.334	−1.14	0.26	0.35
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	−0.203	−0.72	0.14	0.30
Number of shifts	n.a.	n.a.	n.a.	n.a.	−0.201	−0.54	1.94	0.23
Teaching in ethnic language	n.a.	n.a.	n.a.	n.a.	−0.141	−0.35	0.04	0.18
Ethnic language teaching × ethnic minority	n.a.	n.a.	n.a.	—	0.007	0.01	0.01	0.10
Sample size	1,983		1,639		1,939		n.a.	n.a.
Community fixed effects?	No		Yes		No		n.a.	n.a.

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation.

Source: Author's calculations based on the 1998 VLSS.

some children start primary school one or two years late, and grade repetition is common, it is often not clear whether a particular child will complete primary school until he or she is 16 years old. Thus, the regressions in table 13.4 are based on outcomes for children ages 16 to 19. The dependent variable is one if the child has finished primary school and zero otherwise. As explained above, these regressions are for rural areas only, because there are data on school characteristics only in those areas.

The results shown in table 13.5 are based on a sample of 2,075 children ages 16 to 19. Some of these children have already moved away from home, but any problems with sample selection are avoided because the VLSS data include information on children of household members who no longer live with their parents (including questions on their schooling).[4] Of the 2,075 children, 92 were dropped because of missing data on one or more child and household variables (the most common missing variable was father's education), so the estimates are based on a sample of 1,983 children. For about 21 percent of the children, data on their height were missing; to retain them, their heights were set at the average height, and a dummy variable was created to indicate children whose height data were missing.

The first two regressions in table 13.5 focus on child and household characteristics. The variables included are the age, sex, and height of the child; the years of schooling of each parent; household expenditures per capita; and dummy variables indicating whether the household is an ethnic minority, Buddhist, or Christian. The means and standard deviations of all variables are shown in the last two columns of the table.

In the first regression, the impacts of these variables are generally as expected. Age has a negative impact on primary school completion. This indicates that older children did not go as far in school as younger children, which is consistent with the trends in school enrollment shown in table 13.3. The "female" dummy variable has no impact at all, indicating no gender differences at the primary school level. The years of schooling of both parents are strongly and positively associated with primary school completion. This probably reflects two distinct effects: Better-educated parents are more able to help their children with their schoolwork, and they are also likely to place a higher value on education.

Another strong effect is that of household expenditure per capita; as expected, it has a strong and significantly positive impact. The magnitude of this impact can be measured in terms of its effect on the probability of attending primary school. Consider a child who is average in all of his or her characteristics. Such a child would have an average (per capita) expenditure level that would put him or her in the middle of the distribution of per capita expenditures—that is, in the middle of quintile 3 (see table 13.3). If the per capita expenditure of the child's household dropped to one standard deviation below the mean, he or she would be in quintile 1, albeit near the top of that quintile. The estimated parameter on per capita expenditures implies that the probability of finishing primary school would drop by 7.7 percentage points (recall that 80 percent of Vietnamese children finish primary school).

Similarly, for an average child whose (log) per capita expenditure increases from average to one standard deviation above average (which would put him or her near the top end of quintile 4), the probability of finishing primary school is predicted to increase by 5.3 percentage points. Another way of depicting these impacts is to consider that a child who is average in every respect, except that his or her household per capita expenditure rises from quintile 1 to quintile 4, is 13 percentage points more likely to finish primary school.

Children from ethnic minority households are somewhat less likely to complete primary school, even after controlling for parents' schooling and income (expenditures), but the statistical significance of this effect is weak (*t* value of 1.50). This suggests that minority children face barriers even after income and parental education are controlled for (this will be discussed further later in this section). The "Buddhist" dummy variable is negative but insignificant, and the "Christian" dummy variable is positive but also insignificant.

A final variable of interest is child height. In general, height is partially determined by nutritional status in early childhood. Many Vietnamese children are stunted (see chapter 10 in this volume), and child malnutrition has been linked to poor school performance in other developing countries (see Glewwe, Jacoby, and King [2001] for the Philippines). The coefficient on the height variable is positive, as expected, but not statistically significant, and the coefficient is very small; an increase of one standard deviation in height raises the probability of finishing primary school by less than 1 percentage point. The coefficient on the dummy variable indicating no data on height is also insignificant, which indicates no systematic differences between children with and without height data. (Recall that the height variable is set to the mean for children without data on height.)

The estimates in the first column of table 13.5 could be biased because they include no variables pertaining to local schools. For example, part of the impacts of expenditures per capita and parental education could be due to better-off, better-educated communities having higher-quality schools. To check for such bias, the second set of results in table 13.5 includes community fixed effects, which essentially control for variation in local schools and in all other community characteristics. In general, there is little change in the impacts seen in the first regression.[5] The impacts of parental education decline somewhat, and the impact of household expenditure increases by about 50 percent. This suggests that part of the impact of parental education is in fact due to differences within communities, and the impact of household expenditures is partially masked by variation in community characteristics.

The analysis so far has excluded school characteristics. Yet the impact of school characteristics is of particular interest because governments have much more control over school characteristics than they do over child and household characteristics. However, regressions that include school characteristics could suffer from serious biases, as explained in this chapter's section on data and methodological framework, so the results must be treated with caution. These results are shown in the third regression in table 13.5.

Note that, compared with the first regression in table 13.5, the sample size is slightly lower (1,939 instead of 1,983); 44 observations were dropped because of missing data on local schools.

Before turning to the impact of the school variables, it is worthwhile to check whether the effects of the child and household variables in the first regression were altered by the addition of school variables. In almost all cases, the answer is no. The impacts of the religion variables change somewhat but are still completely insignificant. The only change of interest is that the marginally significant negative impact of the ethnic minority variable is much smaller and completely insignificant. This suggests that much of the negative impact of the ethnic minority variable in the first two regressions is due to differences in the characteristics of schools available to ethnic minorities and Kinh children.

The school variables used in table 13.5 represent almost all of the information on local primary schools contained in the school questionnaire that was a part of the 1998 VLSS. The two exceptions to this are that variables relating to school cost and the student-teacher ratio have not been used. Regarding the first exception, primary schools in Vietnam do not charge tuition, and this is reflected in the data. However, there are reports that some schools charge fees that families must pay. Unfortunately, because such payments are contrary to government policy, it is doubtful whether they are reported accurately in the VLSS data. A variable of particular interest was a dummy variable indicating whether the school reduced or eliminated fees for particular households, such as poor households, ethnic minority households, and so on. Similar data were collected in the household questionnaire, but these data were not closely correlated with the data in the school questionnaire. Thus, this variable was also dropped from the analysis. Finally, the student-teacher ratio was dropped because it is clearly endogenous; any unobserved school characteristic that makes schools more attractive is likely to increase this ratio, which implies that including it as an explanatory variable will almost certainly underestimate any negative impact that it may have on school quality.[6]

Returning to the third regression in table 13.5, begin with the two distance variables. The distance to the nearest primary school has an unexpected positive impact, but it is not statistically significant. This statistical insignificance is not surprising because every community (commune) in the VLSS data has a primary school, so the average distance from the household's village to the nearest school was only 0.6 kilometer (the longest distance was only 5 kilometers). Although the distance to the nearest lower secondary school is longer (an average of 2.3 kilometers), and this does have the expected negative impact, it is not statistically significant (*t* statistic of –1.21). This suggests that the distances to primary and lower secondary schools have little effect on whether children finish primary school.

The next four school variables are based on data collected in the community questionnaire, which asked community leaders about problems with local primary schools. Four dummy variables were created that indicate whether these problems were cited: (a) poor material conditions, (b) lack of school supplies, (c) overcrowding, and (d) low teacher quality. None of these four variables was statistically significant at the 5 percent level, although two were significant at the 10 percent level; in rural communities where schools have poor material conditions or are overcrowded, children were less likely to go to school. Unfortunately, the meaning of the "poor material conditions" variable is rather imprecise. The data in the school questionnaire provide more detail; the estimated impacts of those variables are shown in the remaining rows of the table.

The rest of the variables in table 13.5 are from the school questionnaire of the 1998 VLSS. The first three pertain to observable characteristics of teachers: the percentage of teachers who have the proper credentials to teach primary school (that is, they have completed lower secondary school and have 2 additional years of teacher training), the percentage who have 5 to 9 years of teaching experience, and the percentage who have 10 or more years of teaching experience. The percentage of teachers with proper credentials has a positive and highly statistically significant impact. Approximately 75 percent of primary school teachers have these qualifications. The magnitude of this impact can be seen by predicting the change in the probability of finishing primary school for an otherwise average child when a school in which only one-half of the teachers have these credentials is modified to become one in which all teachers have them. The predicted probability increases by about 5 percent. In contrast, teacher experience has little effect: There is no significant impact of the proportion of teachers with 5 to 9 years of experience, and the impact of teachers with 10 or more years of experience is barely significant at the 10 percent level (*t* statistic of 1.65).

Although the impact of teachers' credentials suggests that better-quality teachers encourage parents to send their children to school, the policy implications may be somewhat more nuanced. In particular, it may be that teachers who obtain credentials are more motivated and thus their motivation is the essential characteristic. If this is the case, providing training to teachers who are currently without credentials may have little effect if the training does not affect their motivation. In fact, it may not be teacher characteristics at all but something else about the school (such as a good principal) that leads to more teachers with these qualifications, in which case the key policy lever is choosing the principal, not the teachers. Such alternative scenarios are possible, but it could also be true that teacher credentials do in fact encourage parents to keep their children in school; further analysis is needed to verify or reject this hypothesis.

The next four variables refer to basic pedagogical materials in the school. Lack of desks has a negative and statistically significant impact on primary school completion. The size of this impact can again be shown in terms of how changes in it affect the probability that children will finish primary school. About 6–7 percent of children in Vietnam attend schools where 10 percent or more of children do not have desks. Providing enough desks to a school that does not have desks for 10 percent of the children (but is average in all other respects) is predicted to raise the probability of finishing primary school by 3 percentage points. The other variables—books per pupil, the presence of blackboards, and poor-quality classrooms—have no significant effects; indeed, all of them have unexpected signs. The insignificant effect of the books per pupil variable may reflect the fact that Vietnamese parents are expected to purchase textbooks for their children; the variable used here refers to any books owned by the school that are lent to students, which occurs rarely (the mean of this variable is 0.05). It is less clear why the blackboard and poor-quality classroom variables are insignificant. One possibility is that they are measured with error, which in general leads to underestimation of their true effects. Alternatively, there may be unobserved school characteristics that are correlated with all four of these variables that could be causing biased estimates for all of them.

A variable of particular interest in table 13.5 is hours per day that the school is in session. Primary schools in Vietnam have unusually short days. The mean number of minutes that a primary school is in session was 189: 3 hours and 9 minutes (see the mean value reported in table 13.4). It would be very useful to have a reliable estimate of the impact of expanding the school day on school completion and student performance. Somewhat surprisingly, the regression in table 13.5 shows no impact at all of hours per day on school completion. Taken at face value, this suggests that parents do not find longer school days more attractive when deciding whether their children should complete primary school. This may reflect the opportunity cost of children's time, but once again unobserved factors correlated with the length of the school day could be producing biased estimates.

The next three school variables in table 13.5 show the availability of some basic amenities—electricity, clean water, and sanitary toilet. The effects of all three on primary school completion are statistically insignificant, providing no evidence that these variables have significant impacts on primary school completion.

The last five variables in table 13.5 cover several different topics. For the first three, there is no significant impact of the presence of a library, the proportion of multigrade classrooms, and the number of shifts operated by the school. It would seem intuitive that a library should attract students, but in this case the estimate was not only insignificant but also had an unexpected negative sign. Multigrade classrooms (teaching students of different grades in the same classroom, often a sign of a small school) and multiple shifts are often thought to be negative factors. Both did have negative coefficients, but neither coefficient was significant. The last two variables focused on whether teaching in ethnic (non-Kinh) languages attracted students; one variable indicates whether some lessons are taught in ethnic languages and the other interacts this variable with the "ethnic minority" dummy variable. Both variables were completely insignificant, suggesting that this policy did not help ethnic minority students complete primary schooling.

As pointed out in table 13.3, rural areas have much lower entrance rates into lower and upper secondary education than do urban areas. Vietnamese policymakers would like to understand why this occurs. This is examined in table 13.6, which presents estimates of the determinants of completion of lower secondary education in rural areas of Vietnam. The sample consists of all individuals ages 20 to 23 who have completed primary school (and thus have had the opportunity to enter lower secondary school). This age range was used because many children in their late teens are still enrolled in lower secondary school (because of late entry into primary school, grade repetition, or both); thus, it is not yet known whether they will complete lower secondary school.

The first regression in table 13.6 includes only child and household variables. As in the primary school completion regressions, the signs of most of these variables are consistent with what one would expect. One surprise is that age has no significant impact. This may reflect the sample consisting of persons ages 20 to 23; many of these individuals finished lower secondary school several years before the 1998 survey was implemented, so the recent trends seen in table 13.2 would not apply.

Most of the remaining child and household variables in the first regression in table 13.6 yield unsurprising results. Female children are somewhat less likely to complete lower secondary school, but this impact is statistically significant only at the 10 percent level. The mother's schooling has a positive effect, but it is not quite significant at the 10 percent level (*t* statistic of 1.60). The father's schooling has a strong and statistically significant positive effect, as does per capita expenditure. Unlike finishing primary school, there is no significantly negative impact of being a member of an ethnic minority group—indeed, the point estimate is positive, although not at all significant. There is no significant effect of being Christian, but being Buddhist has a strongly significant negative impact on the probability of completing lower secondary school. Finally, child height has a positive sign, but again it is far from being statistically significant.

The second set of results in table 13.6 uses community fixed effects to reduce bias caused by correlation between household characteristics and community characteristics. The impacts of three of the variables change. First, the negative effect for girls is halved and thus becomes completely insignificant. Second, the impact of father's years of schooling is reduced by more than one-half and consequently is not even significant at the 10 percent level (*t* statistic of 1.60). Third, the strongly negative impact of being Buddhist is reduced by more than one-half and is no longer statistically significant. These results suggest that some of the effects seen in the first set of results reflect correlation between those variables and some community characteristics.

The third set of results in table 13.6 adds the same school variables used in the analysis of primary school completion.[7] The distances to the nearest lower secondary school and to the nearest upper secondary school both have negative impacts, as would be expected, but neither impact is statistically significant. Thus, access to secondary schools, at least as determined by distance, has no discernible effect on finishing lower secondary school. Only one of the four types of school problems identified in the community

Table 13.6. Determinants of Lower Secondary School Completion
(Logit)

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Mean*	*Standard deviation*
Constant	−8.426	−2.41	n.a.	n.a.	−11.316	−2.71	1.00	n.a.
Age	−0.004	−0.07	−0.011	−0.17	0.030	0.50	21.48	1.11
Female	−0.400	−1.70	−0.193	−0.73	−0.262	−1.04	0.49	0.50
Mother's years in school	0.042	1.60	0.051	1.56	0.047	1.57	4.94	3.28
Father's years in school	0.125	4.76	0.049	1.60	0.092	3.20	6.91	3.41
Log(expenditure per capita)	0.876	4.78	1.009	4.37	1.075	5.37	7.86	0.44
Ethnic minority	0.131	0.51	0.625	1.13	0.470	1.36	0.08	0.27
Buddhist	−0.836	−4.61	−0.392	−1.45	−0.668	−3.68	0.17	0.38
Christian	−0.092	−0.33	0.570	1.50	0.195	0.65	0.09	0.28
Height (cm)	0.009	0.53	0.018	0.87	0.021	1.08	157.1	6.34
Height missing	0.242	1.55	0.088	0.55	0.096	0.62	0.53	0.50
Distance to lower secondary school (km)	n.a.	n.a.	n.a.	n.a.	−0.064	−1.29	1.79	1.83
Distance to upper secondary school (km)	n.a.	n.a.	n.a.	n.a.	−0.004	−0.22	5.77	4.57
Poor material conditions	n.a.	n.a.	n.a.	n.a.	−0.271	−1.43	0.73	0.45

Lack school supplies	n.a.	n.a.	n.a.	n.a.	0.402	2.32	0.62	0.49
Crowded	n.a.	n.a.	n.a.	n.a.	0.055	0.12	0.06	0.25
Low teacher quality	n.a.	n.a.	n.a.	n.a.	–0.166	–0.77	0.13	0.33
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	0.371	1.04	0.86	0.18
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	–0.584	–0.83	0.21	0.16
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	1.141	2.36	0.57	0.24
Percent students without desks	n.a.	n.a.	n.a.	n.a.	0.001	0.07	0.02	0.08
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	–0.696	–2.09	0.30	0.32
Blackboard	n.a.	n.a.	n.a.	n.a.	0.124	0.29	0.84	0.25
Books per pupil	n.a.	n.a.	n.a.	n.a.	0.032	0.22	0.17	0.51
School day (minutes)	n.a.	n.a.	n.a.	n.a.	–0.008	–1.69	210.5	20.4
Electricity	n.a.	n.a.	n.a.	n.a.	0.287	1.29	0.86	0.32
Clean water	n.a.	n.a.	n.a.	n.a.	–0.259	–1.24	0.66	0.46
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	0.018	0.10	0.54	0.48
Library	n.a.	n.a.	n.a.	n.a.	0.064	0.32	0.59	0.48
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	–0.939	–2.56	0.02	0.14
Number of shifts	n.a.	n.a.	n.a.	n.a.	–0.175	–0.81	1.75	0.41
Sample size	1,072		940		961		n.a.	n.a.
Community fixed effects?	No		Yes		No		n.a.	n.a.

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation.

Source: Author's calculations based on the 1998 VLSS.

questionnaire—poor material conditions, lack of school supplies, overcrowding, and low teacher quality—has a statistically significant impact on completion of lower secondary school; lack of school supplies has an unexpected positive effect that is statistically significant at the 5 percent level. One possible interpretation of this result is that parents who care more about their children's education, and thus whose children are more likely to be in school, are more vocal about problems at their local schools.

Of the variables in the school questionnaire, one of the three teacher variables is strongly significant: The presence of teachers with 10 or more years of experience significantly increases the probability of students finishing lower secondary school. The magnitude of this impact implies that improving a school where currently only one-half of the teachers have such experience to the point that three-fourths of the teachers have that experience will increase the probability of finishing lower secondary school by 6.9 percentage points. Yet even though this suggests that teacher quality is important, it is possible that unobserved aspects of teacher quality are the real key factors, as explained above.

Only two of the remaining school variables are statistically significant at the 5 percent level. The percentage of classrooms that are of poor quality has a strongly negative impact on completion of lower secondary school, and the same is true of multigrade classrooms. The impact of poor-quality classrooms implies that a lower secondary school with 30 percent of its classrooms of poor quality (which is true of about one-third of lower secondary schools) would increase the probability of a student finishing that level of schooling by 5 percentage points if it repaired all of those rooms. In comparison, the negative impact of multigrade classrooms is huge: Although only about 2 percent of students are in such schools, they reduce the probability of completing lower secondary school by 23 percentage points. A final, somewhat unexpected result in table 13.6 is that longer school days *reduce* the probability of completing lower secondary school, although this impact is significant only at the 10 percent level. At a minimum, it suggests that increasing the length of the school day will not attract more students.

A final issue to consider regarding school progress in Vietnam is the role of child labor. In general, children who leave school usually begin to work for the family, either for the household farm or business or, less often, for wages. Although it is natural to ask whether child labor "causes" children to drop out of school, one could also ask whether dropping out of school "causes" child labor. In fact, leaving school and starting work are really two complementary parts of a single decision, and it is misleading to think that one part causes the other. Whatever its ultimate causes, child labor is an important issue in Vietnam. For a detailed discussion of child labor, see chapter 14.

Academic Achievement

The remaining regressions in this chapter investigate the determinants of academic achievement in Vietnamese schools, measured in two ways: scores on mathematics and reading tests administered to children in primary and lower secondary schools and self-reported academic achievement. The mathematics and reading test scores come from brief tests administered as part of the 1998 VLSS. The math test consisted of four problems: adding two two-digit numbers, subtracting a one- or two-digit number from a two-digit number, multiplying a two-digit number by a one-digit number, and dividing a two-digit number by a one-digit number. The interviewer then recorded the outcome as one of three codes: can do without difficulty, can do but with difficulty, or cannot do. The reading test consisted of reading two sentences in Vietnamese, with the interviewer recording the result using the same three codes.[8] These tests were not administered to people with an upper secondary or higher education, because it was thought that anyone with such an education would be able to do them without difficulty (this is confirmed below in the discussion of table 13.10). Finally, the self-reported academic achievement question is the response given to the following question (asked only of household members currently in school): "What score did you achieve on the final exams taken in your previous grade?" Four responses were available, ranging from "poor" to "excellent."

Table 13.7 begins by presenting ordinary least squares estimates of the determinants of reading test scores in primary schools. The sample of 3,260 consists of all children ages 6 to 13 who are currently enrolled in primary school. The first set of estimates uses only household and child characteristics. Most of the estimated impacts have the expected signs. Children in higher grades have higher scores, as do children with better-educated fathers and mothers. There are no significant impacts of age (after controlling for grade) and sex. Children from better-off households do somewhat better, but the impact is not statistically significant (*t* statistic of 1.40). Ethnic minority children perform significantly worse, which is not particularly surprising because the reading test was in Vietnamese, but there are no significant differences by religion. Finally, taller children scored significantly higher, which indicates that poor health and nutrition in early childhood have a negative impact on current school performance.

The second set of estimates in table 13.7 imposes community fixed effects to control for unobserved differences in the communities in which the children live. The estimated impacts of most variables change very little, but a few show more sizable changes. First, the impact of parents' education declines and loses much of its statistical significance (both mother's and father's education are now significant only at the 10 percent level). Second, the impact of expenditures per capita doubles and becomes significant at the 1 percent level, indicating that community differences tend to mask its true impact. Finally, the impact of height declines and loses statistical significance (*t* statistic of 1.46), and the Buddhist variable has a positive effect that is significant at the 10 percent level.

The last set of estimates in table 13.7 adds detailed characteristics of the schools the children attend. These are the same variables used in tables 13.5 and 13.6, except that the four problems cited at the community level are excluded because they are not school specific (and, in fact, when added they are almost never significant). The impacts of the household and child level

Table 13.7. Determinants of Reading Test Scores in Primary School

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Mean*	*Standard deviation*
Constant	0.339	1.25	n.a.	n.a.	0.209	0.54	1.00	n.a.
Grade	0.185	11.70	0.182	13.18	0.218	13.34	3.32	1.64
Age	–0.014	–1.26	–0.009	–0.84	–0.006	–0.57	9.32	2.01
Female	0.017	0.93	0.018	1.05	0.018	0.94	0.47	0.50
Mother's years in school	0.009	2.56	0.007	1.84	0.008	1.76	6.04	3.46
Father's years in school	0.012	3.28	0.006	1.91	0.009	2.43	7.10	3.31
Log(expenditure per capita)	0.036	1.40	0.069	2.64	0.069	2.42	7.58	0.46
Ethnic minority	–0.143	–3.00	–0.134	–2.06	–0.142	–2.71	0.19	0.39
Buddhist	0.002	0.05	0.060	1.82	0.060	1.79	0.16	0.37
Christian	–0.007	–0.15	0.024	0.55	–0.012	–0.24	0.11	0.32
Height (cm)	0.004	2.30	0.002	1.45	0.004	2.21	124.3	10.7
Height missing	–0.096	2.19	0.156	2.96	0.152	2.17	0.01	0.08
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	–0.024	–0.36	0.75	0.28
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.108	1.08	0.28	0.20
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.164	2.10	0.43	0.26

Percent students without desks	n.a.	n.a.	n.a.	n.a.	−0.002	−0.66	2.28	7.92
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	0.012	0.23	0.43	0.26
Blackboard	n.a.	n.a.	n.a.	n.a.	−0.115	−1.87	0.73	0.31
Books per pupil	n.a.	n.a.	n.a.	n.a.	0.089	1.33	0.05	0.25
School day (minutes)	n.a.	n.a.	n.a.	n.a.	−0.001	−0.77	187.5	19.8
Electricity	n.a.	n.a.	n.a.	n.a.	0.034	0.96	0.67	0.47
Clean water	n.a.	n.a.	n.a.	n.a.	−0.029	−0.94	0.48	0.50
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	0.011	0.29	0.45	0.50
Library	n.a.	n.a.	n.a.	n.a.	−0.041	−1.29	0.32	0.47
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	−0.082	−1.59	0.15	0.36
Number of shifts	n.a.	n.a.	n.a.	n.a.	−0.068	−1.25	1.95	0.25
Teaching in ethnic language	n.a.	n.a.	n.a.	n.a.	−0.059	−0.57	0.04	0.20
Ethnic language teaching × ethnic minority	n.a.	n.a.	n.a.	n.a.	−0.442	−3.67	0.01	0.12
Sample size	3,260		3,260		2,675		n.a.	n.a.
Community fixed effects?	No		Yes		No		n.a.	n.a.

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation. The dependent variable has a mean of 1.70 and a standard deviation of 0.57.

Source: Author's calculations based on the 1998 VLSS.

variables are similar to what they were in the first two regressions, so the focus is on the school variables, which are the most relevant variables for education policy.

One of the three teacher variables, the percentage of teachers with more than 10 years of experience, has a significantly positive impact. Yet the size of the impact is not particularly large—increasing the proportion of teachers with this experience from one-fourth to one-half increases the predicted test score (which ranges from one to three) by 0.04 point. Of the classroom equipment variables, none is significant at the 5 percent level. One variable, the proportion of rooms with blackboards, is significant at the 10 percent level, but it has an unexpected negative sign. Indeed, with one exception, none of the remaining school characteristics in table 13.7 is statistically significant, not even at the 10 percent level. The exception is the interaction term between teaching in ethnic languages and being an ethnic minority student; this combination has a strong and significantly negative impact on students' reading scores. This is not surprising, given that the reading test was in Vietnamese.

Table 13.8 examines mathematics scores in rural primary schools in Vietnam. As before, the first set of estimates includes only child and household variables. The results are very similar to those for the reading scores, the only exception being that there is no significantly negative impact of being a member of an ethnic minority. This may simply reflect the fact that ethnic minorities are less familiar with the Vietnamese language but have no particular problem learning basic mathematics. The next set of estimates controls for differences across communities. Most of the results are unchanged, the exceptions being that father's education becomes much less important (and loses statistical significance), the impact of per capita expenditures becomes more important (and attains statistical significance at the 1 percent level), and being Buddhist has a positive impact that is statistically significant at the 5 percent level. Note that, in contrast with the results for reading scores, child height retains some statistical significance (at the 10 percent level) when community fixed effects are included.

The final set of estimates in table 13.8 adds the same school variables used in table 13.7. Unfortunately from the viewpoint of policy formulation, only one of the variables has a statistically significant impact; all variables are insignificant at the 10 percent level except that the interaction between teaching in ethnic languages and being an ethnic minority has a significantly negative impact on math test performance. Although there are potential problems concerning biased estimates, these results raise questions about the benefits of teaching in ethnic languages in Vietnamese primary schools, at least the way it is done currently.

The reading and mathematics results just examined are based on very simple tests that may not capture overall student learning very well. An alternative is to use students' self-reported end-of-year examination results. This is done in table 13.9 for the same sample of primary school students examined in tables 13.7 and 13.8 (except that 162 observations were dropped

Table 13.8. Determinants of Math Test Scores in Primary School

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Constant	−0.413	−1.16	n.a	n.a	−0.779	−1.67
Grade	0.301	15.01	0.295	18.74	0.349	17.59
Age	−0.010	−0.64	−0.003	−0.27	−0.005	−0.38
Female	0.002	0.12	0.010	0.51	0.008	0.36
Mother's years in school	0.011	2.27	0.007	1.85	0.009	1.66
Father's years in school	0.011	2.26	0.003	0.78	0.009	1.81
Log(expenditure per capita)	0.039	1.03	0.096	2.89	0.090	2.49
Ethnic minority	−0.069	−1.07	−0.080	−1.32	−0.042	−0.60
Buddhist	−0.028	−0.61	0.076	1.98	0.012	0.28
Christian	−0.034	−0.48	−0.005	−0.12	−0.051	−0.67
Height (cm)	0.004	2.04	0.003	1.73	0.005	2.31
Height missing	0.012	0.11	0.089	0.98	0.072	0.54
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	−0.041	−0.40
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.056	0.36
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	0.139	1.13

(table continues on following page)

Table 13.8. (*continued*)

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Percent students without desks	n.a.	n.a.	n.a.	n.a.	−0.003	−0.93
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	0.070	0.93
Blackboard	n.a.	n.a.	n.a.	n.a.	−0.146	−1.52
Books per pupil	n.a.	n.a.	n.a.	n.a.	0.021	0.30
School day (minutes)	n.a.	n.a.	n.a.	n.a.	−0.001	−0.33
Electricity	n.a.	n.a.	n.a.	n.a.	−0.014	−0.26
Clean water	n.a.	n.a.	n.a.	n.a.	0.068	1.27
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	−0.038	−0.68
Library	n.a.	n.a.	n.a.	n.a.	−0.050	−0.82
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	−0.121	−1.51
Number of shifts	n.a.	n.a.	n.a.	n.a.	−0.072	−1.04
Teaching in ethnic language	n.a.	n.a.	n.a.	n.a.	−0.067	−0.48
Ethnic language teaching × ethnic minority	n.a.	n.a.	n.a.	n.a.	−0.457	−2.50
Sample size	3,260		3,260		2,675	
Community fixed effects?	No		Yes		No	

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation. For means and standard deviations of explanatory variables, see table 13.6. The dependent variable has a mean of 1.43 and a standard deviation of 0.77.

Source: Author's calculations based on the 1998 VLSS.

Table 13.9. Determinants of Examination Rank in Primary School

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Constant	0.654	1.92	n.a.	n.a.	0.059	0.13
Grade	0.081	4.16	0.081	4.61	0.069	3.43
Age	–0.086	–5.34	–0.079	–5.31	–0.079	–4.88
Female	0.111	4.32	0.113	4.51	0.124	4.24
Mother's years in school	0.014	2.74	0.020	3.44	0.012	2.54
Father's years in school	0.027	5.48	0.028	5.74	0.031	5.89
Log(expenditure per capita)	0.191	5.05	0.162	3.85	0.186	4.67
Ethnic minority	–0.129	–3.19	–0.025	–0.57	–0.088	–2.07
Buddhist	0.027	0.73	0.074	1.66	0.059	1.48
Christian	–0.049	–1.08	–0.013	–0.21	–0.020	–0.43
Height (cm)	0.004	1.59	0.001	0.62	0.004	1.58
Height missing	0.027	0.24	0.122	1.22	0.088	0.60
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	0.096	1.32
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	–0.103	–0.88
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	–0.040	–0.45
Percent students without desks	n.a.	n.a.	n.a.	n.a.	0.002	0.60
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	0.047	0.89
Blackboard	n.a.	n.a.	n.a.	n.a.	0.084	1.35
Books per pupil	n.a.	n.a.	n.a.	n.a.	0.138	2.00
School day (minutes)	n.a.	n.a.	n.a.	n.a.	0.001	1.07

(table continues on following page)

Table 13.9. (*continued*)

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*
Electricity	n.a.	n.a.	n.a.	n.a.	0.055	1.40
Clean water	n.a.	n.a.	n.a.	n.a.	0.014	0.37
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	0.066	1.89
Library	n.a.	n.a.	n.a.	n.a.	0.075	1.82
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	0.041	0.77
Number of shifts	n.a.	n.a.	n.a.	n.a.	0.058	0.89
Teaching in ethnic language	n.a.	n.a.	n.a.	n.a.	−0.108	−2.07
Ethnic language teaching × ethnic minority	n.a.	n.a.	n.a.	n.a.	−0.122	−1.15
Sample size	3,098		3,098		2,512	
Community fixed effects?	No		Yes		No	

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation. For means and standard deviations of explanatory variables, see table 13.6. The dependent variable has a mean of 2.58 and a standard deviation of 0.69.

Source: Author's calculations based on the 1998 VLSS.

because the examination results were missing). As before, the first set of results examines only child and household variables. As one would expect, most of the results are very similar to those in tables 13.7 and 13.8. Grade has a strong positive effect,[9] as does parents' schooling. Being a member of an ethnic minority has a negative effect. The two religion variables have no significant effects.

Yet some results in table 13.9 differ from those in tables 13.7 and 13.8. Some variables that were insignificant in the previous tables display significant effects in table 13.9 (with the same sign as in the earlier table). In particular, age has a significantly negative effect, and the "female" dummy variable and per capita expenditures both have significantly positive effects. The significantly negative effect of age has an obvious interpretation; after grade is controlled for, older students are more likely to be repeaters and thus have shown themselves to be weak students. Finally, the height variable is not quite statistically significant (*t* statistic of 1.59), although it was statistically significant in tables 13.7 and 13.8. Overall, the results are not very different, the main difference being that the results in table 13.9 are often more precisely estimated.

The second set of results in table 13.9 checks whether controlling for community differences changes the results. There is little difference for most variables, which suggests that (for these variables) the relationships of these household and child variables are not artificially induced by correlation of those factors with community characteristics. The two exceptions are that the ethnic minority variable no longer has a statistically significant negative impact and the height variable loses the little significance that it had. These changes suggest that the differences observed in academic achievement of ethnic minority students are due to unobserved differences in communities with and without large numbers of ethnic minorities, and they cast doubt on the impact of child height (an indicator of past nutritional status) on academic performance.

The final regression in table 13.9 adds the same school variables that were used in tables 13.7 and 13.8. On the one hand, if the examination grade variable is more informative than the reading and math tests, one would expect to find more statistically significant impacts. On the other hand, one should keep in mind that the dependent variable is an average over all academic subjects. Of the 16 variables used, 2 were significant at the 5 percent level and 2 more were significant at the 10 percent level. This indicates about the same precision found in the reading test results of table 13.7 (2 variables were significant at the 5 percent level and 1 at the 10 percent level) and more precision than the math results of table 13.8 (1 variable was significant at the 5 percent level and none at the 10 percent level), but it should be remembered that the dependent variables are somewhat different.

Turning to the significant results in table 13.9, more books per pupil, libraries, and having sanitary toilets appear to improve students' academic performance, but teaching in ethnic languages reduces their performance. These results are all reasonable, but they are very different from those in tables 13.7 and 13.8. The only consistency is that all three tables indicate that teaching in ethnic languages has negative effects, although even here the results differ (in tables 13.7 and 13.8, the impact is felt only by ethnic minority students, but in table 13.9, the impact is felt by all students). The fragility of these results suggests that caution is needed when trying to infer policy results from this analysis. Perhaps the main conclusion is that teaching in ethnic languages may cause more harm than good, but further study is needed before changing policies.

The last set of results, in table 13.10, examines (self-reported) student examination performance in lower secondary school. It is based on a sample of 1,601 students between the ages of 11 and 16 who were enrolled in lower secondary school at the time of the survey. It is not possible to compare these results with similar results based on the math and reading tests, because in both tests 99 percent of the students received the top score (that is, they could read the two sentences and do the math problems without difficulty), leaving no variation to analyze.

The first estimates in table 13.10 examine only household and child variables. The results are very similar to those for primary schools: Grade, parents' education (father's but not mother's), being female, and per capita expenditures all have positive impacts, but age and being an ethnic minority member have negative impacts. Height also has a positive impact, although it is significant only at the 10 percent level, and being Christian has a negative impact. Most of these results are similar after controlling for community differences (the second set of results in table 13.10), except that mother's education regains some statistical significance, and per capita expenditures, being an ethnic minority, being Christian, and height lose their significance. These losses of significance suggest that these variables do not have causal effects, but instead are correlated with community variables that have causal effects.

In the third set of results in table 13.10, five variables have positive and strongly significant effects on (self-reported) academic achievement in lower secondary schools: presence of a blackboard, electricity, presence of a sanitary toilet, libraries, and multigrade classrooms.[10] Of these, the first four make intuitive sense, but it is hard to see why multigrade classrooms have a positive effect.

To summarize, most household- and child-level variables have statistically significant effects in the expected direction. There is some evidence, although not very consistent, that children who were malnourished early in life do not go as far or perform as well in school. Several school variables showed statistically significant effects, but these results need to be treated with caution, because they may reflect in part other school characteristics that are more difficult to observe. One particularly interesting result is that there was no evidence that teaching in ethnic languages helps ethnic minority students—indeed, there was some evidence that this had a negative effect—but further study is needed before drawing any policy conclusions.

Table 13.10. Determinants of Examination Rank in Lower Secondary School

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Mean*	*Standard deviation*
Constant	1.370	3.45	n.a.	n.a.	1.580	2.99	1.00	n.a.
Grade	0.089	3.69	0.087	3.85	0.088	3.36	7.31	1.08
Age	−0.116	−6.50	−0.111	−6.64	−0.109	−5.36	13.43	1.42
Female	0.127	4.29	0.135	4.42	0.151	4.72	0.46	0.50
Mother's years in school	0.005	0.78	0.010	1.69	0.008	1.15	6.49	3.72
Father's years in school	0.023	3.58	0.028	4.31	0.029	3.84	7.88	3.15
Log(expenditure per capita)	0.127	3.08	0.040	0.89	0.059	1.27	7.76	0.45
Ethnic minority	−0.160	−2.99	−0.117	−1.27	−0.126	−2.35	0.11	0.32
Buddhist	−0.002	−0.04	0.096	1.70	0.020	0.38	0.14	0.35
Christian	−0.154	−2.94	−0.070	−0.72	−0.164	−2.55	0.10	0.30
Height (cm)	0.005	1.86	0.003	1.34	0.004	1.44	144.7	9.0
Height missing	−0.037	−0.34	0.001	0.01	−0.046	−0.36	0.01	0.10
Teachers with credentials (percent)	n.a.	n.a.	n.a.	n.a.	−0.090	−1.00	0.83	0.21
Teachers with 5–10 years experience (percent)	n.a.	n.a.	n.a.	n.a.	−0.214	−1.04	0.21	0.16
Teachers with 10+ years experience (percent)	n.a.	n.a.	n.a.	n.a.	−0.171	−1.48	0.56	0.25
Percent students without desks	n.a.	n.a.	n.a.	n.a.	−0.000	−0.16	3.17	10.72
Poor-quality classroom	n.a.	n.a.	n.a.	n.a.	0.120	1.60	0.32	0.33
Blackboard	n.a.	n.a.	n.a.	n.a.	0.189	2.70	0.82	0.28
Books per pupil	n.a.	n.a.	n.a.	n.a.	−0.055	−0.89	0.14	0.40
School day (minutes)	n.a.	n.a.	n.a.	n.a.	0.001	0.57	208.7	22.0

(table continues on following page)

Table 13.10. (*continued*)

Variable	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Coefficient*	*t statistic*	*Mean*	*Standard deviation*
Electricity	n.a.	n.a.	n.a.	n.a.	0.197	3.79	0.84	0.36
Clean water	n.a.	n.a.	n.a.	n.a.	−0.005	−0.11	0.63	0.48
Sanitary toilet	n.a.	n.a.	n.a.	n.a.	0.119	2.62	0.51	0.50
Library	n.a.	n.a.	n.a.	n.a.	0.098	2.11	0.57	0.49
Multigrade classrooms	n.a.	n.a.	n.a.	n.a.	0.174	2.22	0.04	0.19
Number of shifts	n.a.	n.a.	n.a.	n.a.	−0.097	−1.63	1.75	0.43
Sample size	1,601		1,601		1,323		n.a.	n.a.
Community fixed effects?	No		Yes		No		n.a.	n.a.

n.a. Not applicable.

Note: All standard errors adjusted for clustered sample design, except the second regression, which is identified solely by within-cluster variation. The dependent variable has a mean of 2.53 and a standard deviation of 0.63.

Source: Author's calculations based on the 1998 VLSS.

Summary and Concluding Comments

Vietnam's impressive economic performance in the 1990s was matched by very good performance in education. This chapter has reviewed changes in that decade and used recent household survey data from 1998 to explain school progress and academic performance. This brief concluding section highlights some of the main findings.

A comparison of household survey data from the early and late 1990s shows increased enrollment in primary and secondary education. This increased participation in schooling is widespread: It is occurring in both urban and rural areas, in all regions, among all income groups, and among all ethnic groups. In fact, not only are ethnic minorities sharing in these educational outcomes, their entrance rates into lower and upper secondary schools are rising much more rapidly than those of the Kinh.

Despite this excellent performance, Vietnam is still behind the East Asian "miracle" countries, and more needs to be done to improve educational outcomes. To assist policymakers in understanding the impact of household and school factors on school progress and academic performance, this chapter presents regression analyses of these two outcomes. The main findings of interest are:

- Much, and perhaps almost all, of the weaker performance of ethnic minority children is due to community factors, as opposed to factors inherent in being an ethnic minority member.
- In several regressions, the impact of providing the lessons in ethnic languages is *negative*, and in no case is the effect ever positive.
- There is some evidence that shorter children, who presumably were malnourished in early childhood, do worse in school, but the effects are not strong and often lose statistical significance.

Although the findings in this chapter should be of some use to policymakers, much more remains to be learned. Indeed, the results here could suffer from a variety of econometric problems that can lead to biased estimates. Further research is needed before making major policy changes. Estimating the impact of government policies on education outcomes is a very difficult task, but a first step has been taken with these results. More steps are needed in the near future, but to do so will require even richer data than are available in the 1998 VLSS.

Notes

The author would like to thank Hải Anh Đặng Hoàng for comments and for excellent research assistance.

1. These numbers are from the Vietnam Living Standards Surveys (VLSSs), which are discussed in detail later in this chapter. The school entrance rates refer to children ages 11–12, 16–17, and 19–20, respectively. These ranges are most informative about eventual entry into the corresponding levels of schooling, because some children start school at a relatively late age and others repeat certain years of

schooling. For example, some children ages 14 and 15 are still in primary school, and thus it is not clear whether they will enter lower secondary school.

2. The 1992–93 VLSS spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted one year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively, in this volume.

3. The seven regions are the Northern Uplands, Red River Delta, North Central Coast, Central Coast, Central Highlands, Southeast, and Mekong Delta.

4. Including children who no longer live with their parents implies that children in the sampled households who are not living with their parents must be dropped, because retaining them would lead to double counting for such children. Thus, the sample used "locates" children according to where their parents are currently living, not where the children currently reside.

5. Fixed effects logit estimates drop communities in which all children finished primary school or no children finished primary school. This reduced the sample size from 1,983 to 1,639. When an ordinary logit is estimated using this smaller sample, the results are very close to those shown in the first regression in table 13.5, which implies that any differences between the first and second set of results in that table are not due to differences in the sample.

6. In regressions that did include this variable (not shown here), it had no statistically significant impact on school progress.

7. The two variables on lessons in other languages were dropped because only one individual in the sample was an ethnic minority member who lived in a community that provided lessons in ethnic languages.

8. The two sentences are: "The household living standards survey is of use to your country and benefits your family. Survey materials will be kept absolutely confidential and will not be used for other purposes except for serving as a basis for the government to research and build socioeconomic policies to stabilize and improve the lives of the people, including the interests of every family."

9. The statistical significance of the grade variable in table 13.9 is lower than in tables 13.7 and 13.8, but this difference is almost certainly due to the fact that the tests in tables 13.7 and 13.8 were the same across all grades, but the criteria used in the end-of-year examinations are presumably more advanced for higher grades.

10. The ethnic language variables were dropped because no ethnic minority members were found in the few schools that indicated that they provided instruction in ethnic languages.

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Part IV

Other Topics

14

Child Labor in Transition in Vietnam

Eric Edmonds and Carrie Turk

Child labor[1] is endemic in most of the world's poorer countries. As a response to chronic poverty and idiosyncratic shocks, poor children around the world are withdrawn from school, if they are attending, and required to make an economic contribution to the household. This may have a positive effect, in allowing the household and children within the household to maintain essential basic consumption in times of real hardship. A moderate amount of work in safe conditions can allow children to develop useful skills and a sense of responsibility. Child labor may also have negative effects, diminishing a child's human capital accumulation, creating an enduring poverty trap (potentially for generations), and exposing children to harmful situations that restrict their physical, psychological, and emotional development. There are clearly documented problems in outlawing all forms of child labor (Crawford 2000). Such prohibitions, if enforced, can cause severe hardship for households that are barely surviving, as well as drive children's economic contributions underground into illegal and exploitative areas of work. At the same time, there is also a need to safeguard children from abuses, to protect them from harmful situations, to ensure their education, and to uphold their basic rights as children.

The incidence of child labor appears to be negatively correlated with living standards. Using a cross-section of countries from 1995, Krueger (1997) shows that child labor virtually disappears once a country's gross domestic product (GDP) per capita reaches US$5,000. He finds that 80 percent of the international variation in child labor can be explained by GDP per capita alone. Vietnam does not appear to be an exception to this relationship. Driven by rural and other reforms in the late 1980s and early 1990s, Vietnam enjoyed rapid economic growth of more than 6 percent per year over the last decade. This in turn generated impressive reductions in the incidence of poverty, with the poverty headcount falling from 58 percent to 37 percent between 1993 and 1998 (World Bank and the Poverty Working Group 1999). Edmonds (2004) documents that the probability that a child (ages 6 to 15) works in agriculture, a family-operated business, or wage employment dropped by 28 percent between 1993 and 1998. He shows that most of the decline in child labor for rural households below the poverty line in 1993 can be explained with improvements in household economic status.[2]

Not all households benefit equally from improvements in living standards. This chapter explores in detail the decline in child labor that Vietnam experienced during the 1990s and documents the heterogeneity across households in both levels of child labor and the incidence of this decline in child labor. The primary aim of this chapter is to develop a set of indicators to help direct policy toward children who remain vulnerable despite general improvements in living standards.

Even after controlling for time-invariant household characteristics, substantial heterogeneity across households is observed in the amount by which child labor declined in Vietnam in the 1990s. Decreases in the probability that children participate in any type of economic activity have been largest in provincial towns, minor cities, the Southeast, and the rural Mekong Delta. Declines in the fraction of children working have been the smallest in urban areas, the Central Coast, and the Central Highlands.

In addition to geographic indicators, other observable household characteristics are associated with variation in the decline in the probability that a child works. Children from ethnic minorities appear to work more than Kinh and Chinese children, but most of this additional work can be explained by time-invariant household characteristics. Ethnic minorities constitute 14 percent of the population of Vietnam, but represent 29 percent of the poor. They have less access to infrastructure, social services, and other resources (Baulch and others 2004). Girls experience smaller reductions in child labor than do boys. Older children experience greater reductions, but that appears to be because older children were more apt to work in 1993. Both a past migration history and the actual departure of a household head are associated with higher levels of child labor, and migrant households experience smaller declines in child labor than do nonmigrant households. The creation of a new home enterprise seems to be associated with smaller declines in child labor, although households that had a home enterprise in 1993 experienced larger reductions in child labor than other households.

Taken together, the results of this chapter paint an optimistic picture for child labor in Vietnam. Children were doing better in 1998 than in 1993. Although there is substantial heterogeneity across households and regions in the amount of reduction in child labor, this chapter does not find any identifiable group outside the Central Highlands that did not experience a decline in child labor between 1993 and 1998. There is still ample scope for policy to help improve the well-being of children, and there are groups of children who remain vulnerable even in the context of rising living standards. Some of the worst forms of child labor are not easily captured with household surveys. Nevertheless, for the average Vietnamese child represented in the Vietnam Living Standards Survey (VLSS), there is every reason to be optimistic about his or her future.

The next section outlines recent trends in child labor in Vietnam and considers these trends in their economic and policy environment. The section following examines how Vietnam's remarkable decline in child labor varies with observable household characteristics, including child age and gender, household location, living standards, migration history, enterprise status, and ethnicity. The chapter concludes with a summary of findings and a discussion of what these findings imply for the future of child labor in Vietnam.

The Child Labor Environment

This chapter relies on the VLSS. There have been two nationally representative rounds of the VLSS. The first round, conducted in 1992–93, interviewed 4,800 households, collecting data on a wide variety of household characteristics and activities. The second round took place in 1997–98 and followed a similar questionnaire and field design.[3] The 1998 VLSS was designed to be a nationally representative, stand-alone, cross-sectional survey sampling 5,999 households, but it also revisited 4,305 households from the 1993 VLSS. When the analysis is based on nationwide comparisons, the two rounds of the VLSS are treated as separate, nationally representative (when appropriately weighted), cross-sectional surveys. The descriptive work is completed with regression analysis, where the sample is limited to the panel households that appear in both rounds of the survey.

Recent Trends in Child Labor

There are limitations associated with using the VLSSs to investigate patterns and trends in child labor. First, some of the most exploitative forms of child labor, such as child prostitution, are likely to be hidden because they are illegal. Second, the VLSSs collected little information on working conditions. Whether or not work is harming the development of a child lies partly in the nature of the work and the exposure to physically hazardous or psychologically stressful conditions, or both. Because the VLSSs did not attempt to document working conditions and the data on hours worked in agriculture are not comparable between surveys, the quantitative analysis focuses on participation in work rather than working conditions. The analysis is supplemented by drawing on a growing body of qualitative studies that examine issues around child labor. Also, some of the children who are laboring are likely to be hidden. Street children,[4] for example, are often not part of households and are therefore likely to be omitted from household surveys. Households of unregistered migrants are less likely to be included in the VLSS (World Bank and the Poverty Working Group 1999), though studies suggest that children from such households are more likely to work for a living (Save the Children Fund [SCF] U.K. 1999).

The VLSSs may also have missed the labor activities of children who have left their household. Children who have been "trafficked" overseas are very likely to be working, but because they no longer reside in Vietnam, they will not show up in household survey data. Similarly, case study literature documents children leaving their parental home to stay and work with other families for certain periods, either in exchange for board, lodging, and education or to work for a wage as a domestic helper (SCF U.K. 1997; Vietnam-Sweden Mountain Rural Development Program [VN-Sweden MRDP] 1999). The work of these children may not be adequately captured by the data because the children very often remain both unregistered in the host family (survey respondents may not consider the child when listing household residents or members) and absent from the family home (SCF Sweden and University of Social Sciences and Humanities [USSH] 2000).

Fortunately, it is possible to assess the scale of this missing children problem with the VLSS data. The 1993 survey collected a household roster of all individuals in the household at the time of the survey, and the 1998 survey asked about the location of each of those members. Table 14.1 reports the status in the 1998 VLSS of the 6,003 children ages 0 to 10 years who were in panel households during 1993. Children ages 10 and under in the 1993 survey were between 5 and 15 in the 1998 survey and are thus included in this chapter's data analysis. Ninety-two percent of children ages 0 to 10 years in 1993 reappeared in the 1998 round of the survey. Of the missing 8 percent, 42 children had died. Slightly more than half of the dead are boys, and 87 percent of the surviving, out-of-residence children departed the household when their family moved. Of the remaining 56 children, 31 (55 percent) are

Table 14.1. The Out-Migration of Children from Panel Households

Category	*Number of children*
Children ages 10 and under in 1993 VLSS (panel households): 100 percent	6,003
Children still in household in 1998 VLSS: 92 percent	5,540
Children in 1993 VLSS not in residence in 1998 VLSS ("missing"): 8 percent	463
Of missing, those who died: 9 percent	42
Missing who survived	421
Of missing who survived: children who moved with their families	365
Missing who survived but did not move with their families	56
Of missing who survived but did not move with their families: girls who married	11
Of missing who survived but did not move with their families: boys who married	9
Missing who survived but did not move with their families or marry	36

Source: Author's calculations using the 1993 and 1998 VLSSs.

female, and 11 of these females left the household for marriage. Nine of the 25 males (45 percent) left the household for marriage. Thus, of 6,003 sampled children between the ages of 0 and 10 in 1993 in panel households, a total of 36 appear to have left the household for reasons other than death, parental movements, or marriage.

The reasons given for migration of these 36 children are evenly split among employment, schooling, and other. Nine of the 20 girls report leaving home for employment, whereas only 3 of the 16 boys do. However, 8 of the 16 boys report leaving for "other" reasons (only 4 girls report "other"). Thus, although departing from one's household for work is undoubtedly an important event in the lives of those children being sent away, this experience does not appear to be an integral part of the childhood experience of either the average boy or the average girl and is unlikely to substantively alter the conclusions.

The VLSS surveys present several ways to define child labor. These definitions are presented in table 14.2. For each household member age six and older, the VLSS asked whether the person works for pay outside the household ("works for wages outside household"), works for the household in agriculture ("works in agriculture for household"), and works for the household in self-employment or a household-run business ("works in business for household"). These three work categories are referred to collectively in this chapter as "traditional work." The survey also asked whether a person performs household work and chores such as cleaning, cooking, washing, shopping, collecting water or wood, and building or maintaining the house, its surroundings, or furniture. Collectively, this set of activities is referred to in this chapter as "household work."[5]

This chapter's emphasis on household work in addition to traditional work contrasts with much of the recent academic literature, which ignores household work and focuses on traditional work alone. Ignoring work in the production of nontraded household goods would raise three main conceptual issues. First, when a child works outside of his or her household as a paid domestic servant or a slave, that child is classified as a child laborer under the most stringent of definitions. It seems hard to defend reclassifying the child's production activities as something other than work if the child's employer changes. Second, treating the production of nontraded goods as something other than child labor makes it difficult to interpret the meaning of the state of "not working." For example, if home production is ignored in the definition of child labor, a child who stops limited work in a family business to take over extensive household responsibilities (say, because of the absence of a parent) would appear to stop working. Third, an assertion that child participation in the production of nontraded goods is not of academic or policy interest seems hard to defend, given the findings of this chapter. In particular, household work is the main activity children participate in other than schooling, and some of the most interesting differences between households in child labor in the 1990s appear to take place in the household production of nontraded goods.

Table 14.2. Participation in Child Labor in Past Seven Days, by Type of Work, for Children Ages 6 to 15 Years

	1993		*1998*	
Indicator	*Mean*	*Standard error*	*Mean*	*Standard error*
Work (percent)				
Works for wages outside of household	2.3	0.3	1.3	0.2
Works in agriculture in household	25.6	1.6	19.3	1.7
Works in business in household	4.4	0.6	2.6	0.4
Works in traditional work	30.7	1.5	22.0	1.6
Works in household work	52.8	1.2	53.0	1.6
Works	62.1	1.3	56.8	1.5
Schooling (percent)				
Attends school	0.765	0.013	0.880	0.010
Works, attends school	0.448	0.014	0.481	0.018
Works, does not attend school	0.175	0.009	0.087	0.007
Hours for all				
Hours in traditional work	9.050	0.478	1.180	0.138
Hours in household work	5.973	0.196	4.431	0.190
Total hours	15.021	0.548	5.572	0.204
Hours for those who work				
Hours in traditional work	29.461	0.758	32.118	1.811
Hours in household work	11.310	0.317	8.352	0.264
Total hours	24.189	0.665	10.349	0.337

Note: Population means weighted to reflect sampling probabilities. Standard errors are corrected for clustered sample design. The 1993 data are from a sample of 6,071 children ages 6–15 representing a population of 16,340,704. The 1998 data are from a sample of 7,071 children ages 6–15 representing a population of 19,117,671. Hours for those who work refers to those who work in the specified category. Total hours for all do not add up precisely to the sum of hours for all in traditional and hours for all in household work because of some missing observations of hours worked in household work.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

Table 14.2 documents the economic activities of children ages 6 to 15 in both rounds of the VLSS. The outstanding feature of table 14.2 is that a majority of children in Vietnam were engaged in some form of economic activity within the seven days before the household's interview. This is true in both the 1993 and 1998 rounds of the VLSS. However, participation rates declined by 9 percent between the survey years—from 62 to 57 percent. This decline is composed of a large (28 percent) decline in participation in traditional work and a small (0.4 percent), statistically insignificant increase in participation in household work.[6] Within the category of traditional work, children were most likely to be engaged in agricultural work within the household. The participation rate in agriculture within the household in 1993 is 26 percent. This declined to 19 percent in 1998, a 25 percent reduction relative to the 1993 level. Work outside the household and work for a home enterprise were rare, with participation rates of 2 percent and 4 percent, respectively, in 1993. However, both of these categories experienced large, statistically significant percentage reductions in the 1998 VLSS. Work outside the household declined by 44 percent. Work in a home enterprise declined by 42 percent.

The Economic and Policy Context

These changes in child labor are taking place in a rapidly evolving economic and policy environment. The rural reforms of the late 1980s returned responsibility for agricultural production to the autonomous farming household, and this reform is correlated with impressive growth in agricultural output. Over the 1990s, agricultural GDP grew by nearly 5 percent a year, prompting a rise of 60 percent in farm incomes between 1993 and 1998 (World Bank 2000). The industrial sector has also been expanding rapidly, growing at 13 percent a year between 1993 and 1998. Policies that promoted capital-intensive industries and protected domestic markets have meant that industrial employment over this period grew relatively slowly (at approximately 4 percent a year over the same period). The introduction of a new Enterprise Law in 2000 and recent announcements that the government of Vietnam intends to embark on further reforms to create a stronger environment for enterprise and international trade suggest that a more labor-intensive sector may develop rapidly over the coming years. Recent estimates based on General Statistical Office (GSO) data suggest that 300,000 new jobs were created in the private sector during 2000 (World Bank 2000).

EDUCATION. Government policies in the post-Independence period have demonstrated a commitment to achieving universal primary education and protecting children from exploitative situations. By 1993, net enrollment rates in primary school reached 87 percent (World Bank [estimates based on VLSS 1993 data] 1999). Earlier emphasis on the provision of education was reinforced in 1991 by the introduction of the Law on the Universalization of Education and by the 1992 Constitution, which asserts that primary education is both free and compulsory. Although tuition fees are not charged for primary education, many sources have described the burdensome nature of a whole range of other costs associated with educating children (ActionAid 1999; Oxfam U.K. 1997; World Bank 1999). These studies suggest that the costs became more onerous over the 1990s and that they are an important cause of interrupted education. Recent estimates using VLSS data suggest that the costs of educating one student at the primary level are equivalent to nearly 5 percent of nonfood expenditure for a household in the lowest quintile of the population in the 1998 VLSS, and that the household's primary school costs rose between 1993 and 1998 (Government of Vietnam–Donor Working Group 2000). Households in the lowest quintile are well below the poverty line. As such, any nonfood expenditure diverts funds from basic consumption needs (World Bank and the Poverty Working Group 1999). Much of the qualitative literature on child labor and working children in Vietnam tracks a path from household economic difficulties to withdrawing children from school to, shortly afterward, scaling up the economic activity of children as a strategy for coping with hardship (SCF U.K. 1998, 1999; VN-Sweden MRDP 1999).

Even though the costs of educating children can be considerable, enrollment rates in all levels of schooling rose over the 1990s. Table 14.3 contains school enrollment rates by quintile and level of schooling for 1993 and 1998. In 1998, net enrollment in primary education (grades 1–5) was 91 percent, up from 87 percent in 1993, with little difference between the enrollment rates of girls and boys. In 1998, enrollment in lower secondary school (grades 6–10) had climbed to 62 percent, up from 30 percent in 1993. However, poor children have generally lower enrollment rates at all levels of

Table 14.3. School Enrollment Rates, by Quintile
(percent)

Enrollment rate/indicator	*Primary* 1993	*Primary* 1998	*Lower secondary* 1993	*Lower secondary* 1998	*Upper secondary* 1993	*Upper secondary* 1998	*Postsecondary* 1993	*Postsecondary* 1998
Net enrollment rate								
Vietnam	87	91	30	62	7	29	3	9
Poorest quintile	72	82	12	34	1	5	0	0
Most well-off quintile	96	96	55	91	21	64	9	29
Gross enrollment rate								
Vietnam	120	115	42	78	9	36	4	12
Poorest quintile	100	112	15	47	1	8	0	0
Most well-off quintile	130	104	77	105	24	75	13	37

Note: Net enrollment rates refer to enrollment rates of children in the relevant age range. Gross enrollment rates are the ratio of the number of enrolled students to the number of children in the relevant age range.Thus, gross enrollment rates can be over 100 if children who are not of the appropriate age enroll in a given level of schooling.

Source: Nguyen 2004, based on estimates from the 1993 and 1998 VLSSs.

schooling (table 14.3), and the quality of education services varies widely across the country. Moreover, Vietnam has one of the shortest primary school curricula in the world in terms of hours in the classroom (though this is currently under revision after the National Assembly's adoption of Resolution Number 40/2000/QH on curriculum reform), and, particularly in rural areas, Vietnam's schools do not demand more than a few hours' attendance a day (Department for International Development 2001). For many children, progress through primary school is fully compatible with a moderate amount of work, either inside or outside the household, paid or unpaid. In fact, for some children, the costs of pursuing education may necessitate economic activity.

A child has only so much available time, and time spent working may reduce time in school, time studying, or leisure time. A vast descriptive literature suggests that low levels of work are compatible with continued school enrollment, but, as hours worked increase, schooling and work become incompatible. Even if school enrollment is compatible with child labor, work may still affect a child's human capital accumulation. First, a working child may be enrolled in school, but it is not clear that time spent in class is observed with enrollment information. Second, physically being in school is only a necessary, but not a sufficient, condition for learning. Work may limit the child's energy for school, or it may limit the child's ability to develop skills outside the classroom. Third, even if working has no effect on schooling whatsoever, leisure and play are important in a child's development. Play enables a child to develop his or her social skills and creative thinking skills. It is possible that this cost to a child could be even greater than the lack of general skill accumulation. Of course, the types of general skills that a child learns in school are not the only types of skills that are useful. A child may use the skills developed while working throughout life. Thus, the relationship between schooling and child labor is very difficult to analyze. This is further complicated because it is not possible to differentiate between whether children work because they do not attend school or they do not attend school because they work.

With this in mind, school enrollment rates in 1993 and 1998 are examined for different work categories. Nothing can be said about the quality of time spent in school for working children, and the working child's consumption of leisure is not observable. With these caveats, however, it seems useful to consider school enrollment rates by the type of work performed by a child and examine how school enrollment rates vary through time in each work category. This is shown in table 14.4.

Each cell in table 14.4 is calculated by stratifying the sample by each row. Hence, in the first row, school enrollment rates are computed for all children who do not work. In the third row, school enrollment rates are computed for all children who work in agriculture for their household. Any individual child can appear in multiple rows. For example, if a child works in agriculture and a home enterprise, that child is counted in both rows. The first two columns calculate school enrollment rates by year for all ages. The

Table 14.4. School Enrollment by Age and Type of Work in Past Seven Days
(percent)

	All (ages 6–15)		Ages 6–11		Ages 12–13		Ages 14–15	
Category	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*	*1993*	*1998*
Does not work	83.3	92.3	83.7	92.9	88.3	93.3	67.0	85.8
Works for wages outside household	15.9	7.5	46.2	39.9	32.4	16.2	4.5	4.0
Works in agriculture in household	63.0	74.7	89.8	93.3	66.3	80.6	34.0	58.3
Works in business in household	48.9	59.7	86.8	90.1	58.8	62.9	28.1	51.4
Works in traditional work	59.3	70.2	89.5	92.6	63.2	76.9	30.9	53.3
Works in household work	72.5	86.3	88.8	96.0	72.1	88.2	43.0	72.4
Works	71.8	84.7	89.2	95.5	70.7	86.7	41.6	69.6

Source: Authors' calculations from the 1993 and 1998 VLSSs.

remaining columns compute school enrollment rates for children ages 6–11, 12–13, and 14–15.

Several interesting traits appear in table 14.4:

- School enrollment rates were generally highest for nonworking children: 88 percent of 12- to 13-year-olds who did not work were enrolled in school in 1993, but only 71 percent of 12- to 13-year-olds who worked attended school in 1993. The only exception to this is for primary school–age children (ages 6 to 11). In this group, children who worked reported slightly higher enrollment rates, but this difference in enrollment rates for primary school–age children is not statistically significant.
- In both 1993 and 1998, children were least likely to attend school if they worked outside the household (only 8 percent of children in this group enrolled in school in 1998) or if they worked in a household-run business. The majority of children were able to both enroll in school and work in agriculture or household work. For those above the age of 11, however, children who worked in any type of traditional work had enrollment rates that were (statistically) below enrollment rates for children who did not work.
- Between 1993 and 1998, school enrollment rates increased across all rows of table 14.4 except for those children who worked outside the household. School enrollment rates were actually lower for children

who worked outside the household in 1998, but this lower rate of school enrollment is statistically significant at the 10 percent level for only one age group: children ages 12 to 13.

- Except for children ages 6 to 11, school enrollment rates increased more between 1993 and 1998 for working children than for nonworking children. Part of this may be attributable to the fact that school enrollment rates are bounded at 100 percent, and they started off very close to 100 percent for nonworkers in 1993. In addition, work could have been becoming more compatible with schooling in 1998. One mechanism for this increase in the compatibility between schooling and working might be a reduction in hours worked that accompanies the reduction in work participation rates observed in this chapter. Hence, the VLSS data demonstrate that older children who work are less likely to be enrolled in school than older children who do not work, and children who work are more likely to be enrolled in school through time.

LEGISLATION. Vietnam was the second country in the world, and the first country in Asia, to sign the International Convention on the Rights of the Child (the Convention) in 1990. Article 32 of the Convention underscores the need for governments to "recognize the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous to or interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development." The government of Vietnam has acted on this Convention through a number of legislative and regulatory measures, seeking to maintain an uneasy balance between allowing children to contribute to their own survival in times of hardship and safeguarding children's rights to physical and intellectual development. Among these measures, of particular importance are the Law on Child Protection, Care and Education (1991); the 1992 Constitution of the Socialist Republic of Vietnam (especially Article 65); the Labor Code (1994); many decrees and circulars that clarify specific issues in connection with child labor; and Decision Number 134/1999/QD-TTg, which approved the Program of Action to protect vulnerable children in 1999–2002.

The outcome of these laws, decrees, regulations, and instructions is a regulatory framework that outlines the key definitions and priorities in relation to child labor. A child is a person younger than age 18 (according to the 1992 Constitution), but Articles 119–122 of the Labor Code specify conditions under which adolescents or juniors (15- to 18-year-olds) may work legally. Limitations that apply to the employment of 15- to 18-year-olds include restrictions on:

- Working more than 7 hours a day or 42 hours a week
- Working under dangerous conditions[7]
- Being forced to work or being involved in abusive or exploitative work.

Junior employees between the ages of 15 and 18 are entitled by law to the same wages as adults, provided they are performing the same work. Children younger than 15 are allowed to work in a very restricted range of activities specified by Vietnam's Ministry of Labor, Invalids and Social Affairs (MOLISA) (Circular Number 21/1999/TT-BLDTBXH), but they are not permitted to work more than 4 hours a day or 24 hours a week, must be over the age of 12, and may work only with written consent of their parents or sponsors. The employer is obliged to ensure the child's schooling. Children younger than 13 can be employed legally if they are being trained in certain occupations identified by the MOLISA (Decree Number 90/CP).

The government of Vietnam ratified the International Labour Organisation (ILO) Convention Number 182 on the Worst Forms of Child Labour in November 2000. By so doing, the government has indicated its commitment to eliminating "the worst forms of child labor" as defined in Article 3 of Convention 182 and is in the process of drafting a plan to implement the requirements of Convention 182 (MOLISA 2001).

Vietnamese tradition accords an important role for children within the household and, in common with many cultures, a moderate amount of work within the household can be considered positive for the physical, intellectual, and personal development of children. This is legal as long as it is not harmful, dangerous, or exploitative and it does not interfere with the completion of primary education (Institute of Labor Science and Social Affairs [ILSSA] and University of Wollongong 2000).

Winners and Losers among Child Laborers

The allocation of child time is an important component of a household's decisionmaking process. The household must weigh the value of child time spent in many activities, including schooling, wage work, work inside the household, and work in household chores or other components of household production. The value of child time in any of these activities may depend on both child and household attributes. This section uses the existing qualitative literature on child labor to identify key child and household attributes that may be associated with heterogeneity across households in how child labor declined in Vietnam in the 1990s. The goal of this section is to consider several indicators that may be useful for directing policy toward children that have missed experiencing the dramatic declines in child labor that have occurred in recent history.

The section begins with two key child attributes that are responsible for much of the variation across children in child labor: age and gender. Second, the variation in economic progress across regions in Vietnam has been a theme throughout this book, and the child labor literature is also concerned with differences in child labor trends across regions. Thus, regional patterns in child labor are discussed. Finally, several other household attributes that have drawn considerable attention in the qualitative literature are considered in the third part of this section. These household attributes include living standards, adult migration, enterprise ownership, and ethnicity.

Child Attributes: Age and Gender

The types of work that a child can perform vary with the child's age and may vary with the child's gender. A 6-year-old child is a less capable worker in most activities than a 15-year-old. Gender-typing of economic and household activities can lead to different age-gender distributions of children's activities. If boys and girls perform different types of activities, it is possible that they have been differentially affected by the changes that Vietnam experienced in the 1990s. In this section, changes in child labor are considered by gender, then gender differences by age are discussed.

Table 14.5 presents participation rates in various types of economic activities by gender. Girls were more likely to work than were boys in both the 1993 and 1998 VLSSs. Higher participation rates in traditional work appear to be driven by greater participation by girls in the home enterprise. Also, girls are more apt to participate in household work. Most of the large gender differences in participation in any form of work (in table 14.5, the lines titled simply "Works") appear to be due to the substantially higher participation rates of girls in household work. The reduction (in percentage terms) in participation rates between the two rounds of the VLSS is larger for boys,

Table 14.5. Participation in Child Labor in Past Seven Days, by Gender, for Children Ages 6 to 15 Years
(percent)

	1993		*1998*	
Gender/category	*Mean*	*Standard error*	*Mean*	*Standard error*
Boys				
Works for wages outside household	2.2	0.3	1.2	0.2
Works in agriculture in household	25.4	1.7	19.1	1.9
Works in business in household	3.6	0.5	2.5	0.5
Works in traditional work	29.9	1.6	21.6	1.9
Works in household work	45.2	1.6	46.8	1.8
Works	57.9	1.6	52.5	1.8
Girls				
Works for wages outside household	2.4	0.4	1.4	0.3
Works in agriculture in household	25.9	1.7	19.4	1.7
Works in business in household	5.3	0.7	2.7	0.5
Works in traditional work	31.6	1.5	22.4	1.6
Works in household work	60.7	1.3	59.6	1.6
Works	66.5	1.3	61.3	1.6

Source: Authors' calculations from the 1993 and 1998 VLSSs.

although the declines in level of participation are nearly identical for boys and girls.

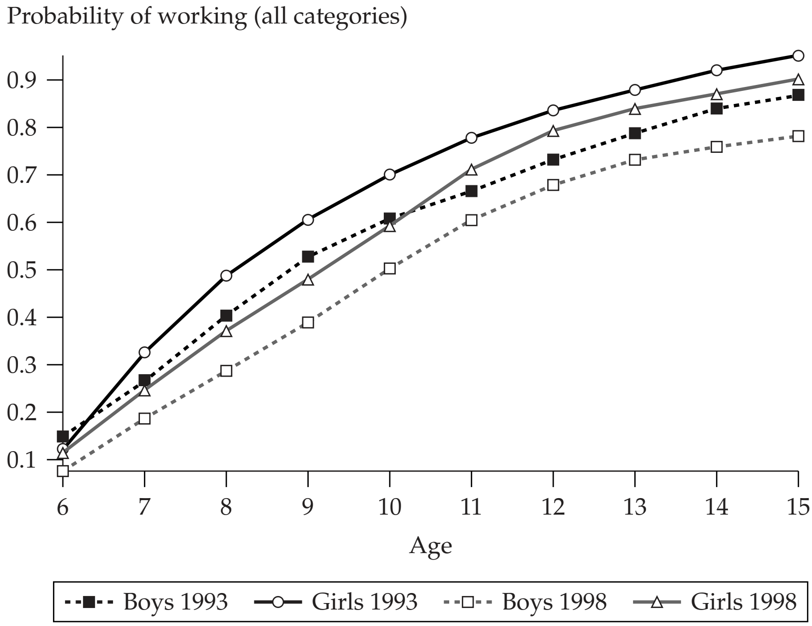
However, the activities of boys and girls differ with their age. Thus, although there may be little difference between the way boys and girls as groups benefit from the growth in Vietnam in the 1990s, there may be important differences by age. Figure 14.1 presents child labor participation rates by age and gender.[8] Throughout this chapter, figures similar to figure 14.1 are examined. Hence, it is important that the interpretation of figure 14.1 be clear. Figure 14.1a considers participation in all categories of work. Figure 14.1b considers only participation in traditional forms of work (the difference between the two being household work).

Each line in figure 14.1 connects the participation rates by age for the group indicated in the legend. The vertical axis is labeled the "Probability of working." It is interpreted as being the fraction of children at a given age in a given group (for example, boys in 1993) who were working or being the probability, upon observing a child at the indicated age in the given group, of finding that the child works. When multiplied by 100, these are identical to the labor participation rates in the tables.

The large drop in the probability that a child works, as well as the improvements experienced by each gender, is evident in these figures. However,

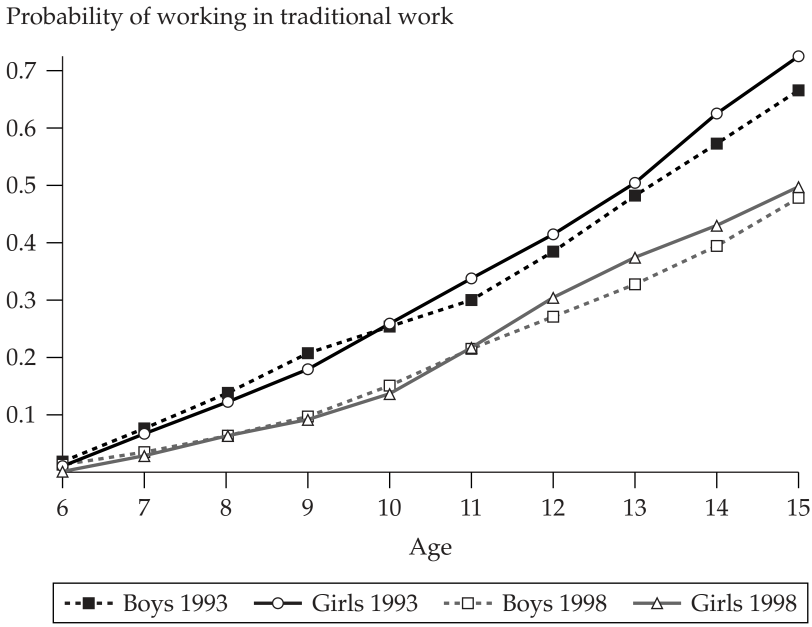
Figure 14.1. Participation in Work, by Age and Gender

a. All work categories



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Traditional work

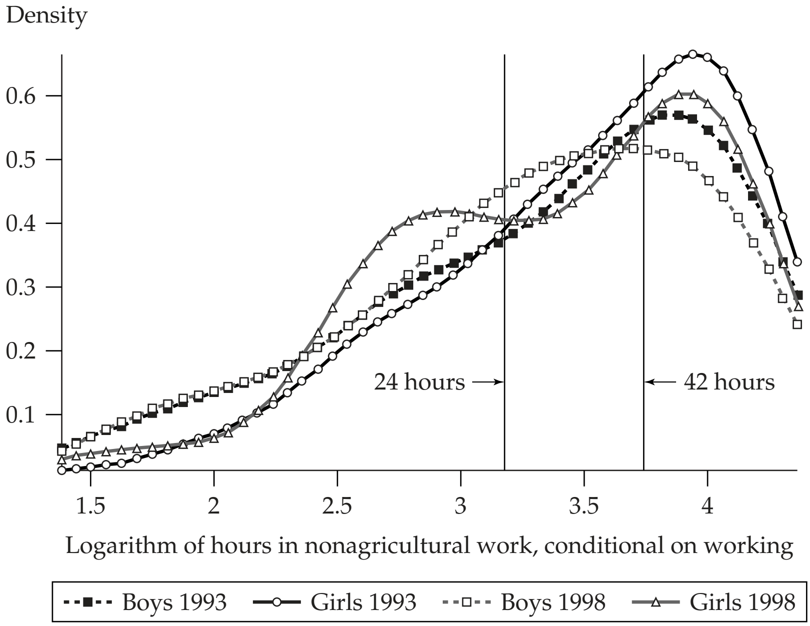


Source: Authors' calculations from the 1993 and 1998 VLSSs.

there are some interesting age-gender differences evident in figure 14.1. In figure 14.1a (all work categories), the largest drop in work probabilities appears between the ages of 8 and 10. These are primary school ages. The decline in work is smaller in older age groups, particularly for girls. However, for traditional work the decline in labor participation is greatest for older (post–primary school) ages. In figure 14.1b, girls older than 11 are more likely to engage in traditional work than are boys, although the differences are very small. Both boys and girls experienced a similarly large drop in participation rates in traditional work between 1993 and 1998. The magnitude of this (percentage point) drop increases with age. Because older children were substantially more likely to do traditional work in 1993, it makes sense that they should have experienced the largest reductions over time.

The interpretation of these gender differences is complex. Boys and girls may have different economic opportunities open to them, and the value of their time outside work may vary dramatically. Within the household, members may not agree on how to allocate child time. It is particularly important to recognize that the benefits from any particular decision may not accrue to those bearing the costs associated with that decision. This repeatedly emerges as a theme in studies on children in Vietnam. It is common, for example, to see one child (often a girl) withdrawn from school and put to work so that the other children can continue their educations (SCF U.K. 1999).

Figure 14.2. Distribution of Hours Worked in Nonagricultural Traditional Work



Source: Authors' calculations from the 1993 and 1998 VLSSs.

An important part of the difference in work participation between boys and girls lies in their contribution to household work; thus, it is likely that the gender division of labor and gender-based inequities in decisionmaking within the household are important determining factors. This issue will be reexamined in the conclusion of this chapter.

There also appear to be gender differences in hours worked. Figure 14.2 examines the distribution of hours worked in nonagricultural traditional work for children who work. The questionnaires from the 1993 and 1998 VLSSs are virtually identical with respect to child labor, except for a substantive change in the way hours worked in agriculture are collected. Consequently, only hours worked in wage work and work for the home enterprise ("nonagricultural traditional work") can be compared.

Figure 14.2 contains nonparametric estimates of the density of the logarithm of hours worked in the past week.[9] The densities for 1993 and 1998 and for boys and girls are estimated separately. In the 1993 density estimates, the density of time spent working for girls is more concentrated than for boys. This is made evident by the higher peak in excess of 42 hours of work in the week before the survey. Moreover, boys in 1993 were substantially more likely to work fewer than 24 hours than were girls. Girls were more likely observed working for more than 42 hours per week.

The distribution of hours worked changed significantly in 1998. For both boys and girls, there was a drop in the mass of workers working in excess of 42 hours. For boys, there was an increase in the mass working close to 24 hours a week. For girls, two clear mass points emerged in the 1998 distribution. The largest subset of girls worked more than 42 hours a week (although the fraction of girls working 42 hours declined between the two years). However, in 1998 there was a mass of girls who worked slightly fewer than 24 hours a week. The 1998 densities have not been corrected to reflect the fact that the probability of observing a child working in nonagricultural work is lower in 1998. Hence, the type of children pictured in the 1993 distribution might be different from the children remaining in the 1998 distribution. Nevertheless, to the extent that the children working in nonagricultural work in 1993 and 1998 are comparable, the densities in figure 14.2 are consistent with many girls shifting from a large number of work hours in 1993 to relatively few work hours in 1998.

Figure 14.2 shows that a considerable number of those children, particularly girls, who work outside agriculture are working hours above the legal limits set out in the Labor Code. Forty-five percent of these children are working in enterprises with five or fewer employees, which are not bound by the Labor Code, but these legal limits are still relevant as indicators of what Vietnamese society and legislators have decided is acceptable within the specific social, cultural, and economic context of Vietnam. The mean for the child doing nonagricultural traditional work in 1998 is still 34 hours of work a week, above the legal maximum set by MOLISA for children younger than 15 years. These children could be described as vulnerable in the sense that their working arrangements might be restricting their well-being and interfering with their basic rights as identified in Article 32 of the International Convention of the Rights of the Child. The concentration of children working more than 42 hours a week is especially worrying, because this exceeds by some margin the legal limits established for the 15–18-year age group. In the data used in this chapter, only 15 percent of the children who work more than 42 hours are even enrolled in school. A study of working children in Ho Chi Minh City (Viet Nam Youth Institute 1999) corroborates this pattern, indicating that working hours for girls peaked at a higher level than for boys and at levels above the maximum limit set by law.

Residential Location

The distribution of improvements in living standards has been different across rural and urban areas of Vietnam (Glewwe and Nguyen 2004). For that reason alone, differences might occur in improvements in the child labor situation across rural and urban areas (or in even greater geographic detail). However, children also engage in different types of economic activities in rural and urban areas. Table 14.6 describes the types of activities undertaken by boys and girls of different ages in Ho Chi Minh City, and table 14.7 considers the activities of children in rural Vietnam.

Table 14.6. Starting Age of Work of Children in Different Occupations, Ho Chi Minh City

Children's ages (years)											
6	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
Selling lottery tickets											
Peeling onions (at home)											
Making match boxes (at home)											
Weaving mats and baskets (at home)											
Scavenging at the dumpsite											
	Making shoes (support workers—local)										
		Filling bobbins (at weaving enterprises)									
		Catching grasshoppers									
				Making ball-point pens (boys)							
					Making lanterns						
					Classifying waste plastic (at home)						
					Making operating parts of lamps						
						Recycling glass					
						Making ball-point pens (girls)					
						Making chains					
						Making silk-screen prints					
						Making bag wheels					
						Selling noodle soup					
							Making nem chua (fermented pork)				
							Making furniture and wooden art products				
								Making scales			
								Recycling glue			
								Making chalk			
								Recycling plastic (boys)			
								Making shoes (migrant support workers)			
									Making plastic sandals		
									Making bicycle tires		
									Sorting or recycling plastic (at factories—girls)		
										Dyeing materials	
											Catching locusts
6	7	8	9	10	11	12	13	14	15	16	17

Source: SCF U.K. 1999.

Both tables are taken from participatory research with working children in different locations in Vietnam. The scope of activities open to younger children in rural areas is much greater than it is in urban areas. Thus, because of both the nature of the economic change in Vietnam and differences in the activities of children between rural and urban areas, it is important to

Table 14.7. Starting Age of Work of Children in Different Occupations, Rural North Central Coast Region

Children's ages (years)											
4	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	15
Look after younger siblings											
Sweep house and yard											
Watch house											
	Wash dishes										
	Feed chickens										
	Collect pig feed										
	Catch crabs, shrimp, and snails										
	Dig up worms for ducks										
		Wash clothes									
		Cook food for humans									
		Cook food for pigs									
		Feed pigs									
			Fetch fuelwood								
				Boil water							
				Dry paddy							
				Process cassava							
					Tend cows and buffalos						
					Collect grass						
					Fetch water						
					Collect cattle manure						
					Harvest rice						
						Transplant rice					
							Weed and irrigate crops				
							Plow and harrow fields				
							Collect firewood from forest				
								Mill and husk paddy			
									Wage labor		
											Fish
											Migrate
4	5	6	7	8	9	10	11	12	13	14	15

Source: SCF U.K. 1997.

examine differences in child labor improvements by geographic area. The initial focus here is on rural and urban differences, followed by a discussion of differences across the 10 main geographic regions in Vietnam. (The 10 regions are major urban areas, minor urban areas, provincial towns, the Northern Uplands, the North Central Coast, the Central Highlands, the Red River Delta, the Southeast, the Central Coast, and the Mekong Delta.)

Table 14.8 considers participation in each of the different work categories by geographic location (rural or urban). Participation rates are much higher in rural areas than in urban areas. This is true in both traditional work and household work. The extra participation in traditional work appears to be primarily in agriculture, because children seem to have similar levels of

Table 14.8. Participation in Child Labor in Past Seven Days, by Residential Location, for Children Ages 6 to 15
(percent)

	1993		1998	
Area/category	*Mean*	*Standard error*	*Mean*	*Standard error*
Urban				
Works for wages outside household	2.8	0.5	1.7	0.5
Works in agriculture in household	7.1	2.2	2.8	1.4
Works in business in household	5.4	1.1	1.6	0.4
Works in traditional work	14.9	2.5	6.1	1.5
Works in household work	44.3	3.3	40.5	2.6
Works	48.7	3.4	42.2	2.6
Rural				
Works for wages outside household	2.2	0.3	1.2	0.2
Works in agriculture in household	29.8	1.8	22.7	2.0
Works in business in household	4.2	0.6	2.8	0.5
Works in traditional work	34.3	1.7	25.3	1.9
Works in household work	54.7	1.3	55.7	1.8
Works	65.1	1.4	59.8	1.8

Source: Authors' calculations from the 1993 and 1998 VLSSs.

participation in wage work or in home enterprises in both urban and rural areas. The reduction in work participation rates through time is slightly greater in percentage terms in urban areas; the reason may be that the probability a child worked in urban areas was smaller in 1993 than in 1998. There is a notable difference in the changes in child labor through time between rural and urban areas; this can be seen in the probability that a child works in a home enterprise. Participation rates in a home enterprise for a child in an urban area drop by 70 percent to 0.02 between 1993 and 1998. In rural areas, the incidence of working in a home enterprise drops by 34 percent. This larger decline in urban areas occurs despite generally higher participation rates in home enterprises in urban areas in 1993. This may be the result of increases in rural, nonfarm enterprises.[10] This issue will be further explored in the subsection on enterprise ownership.

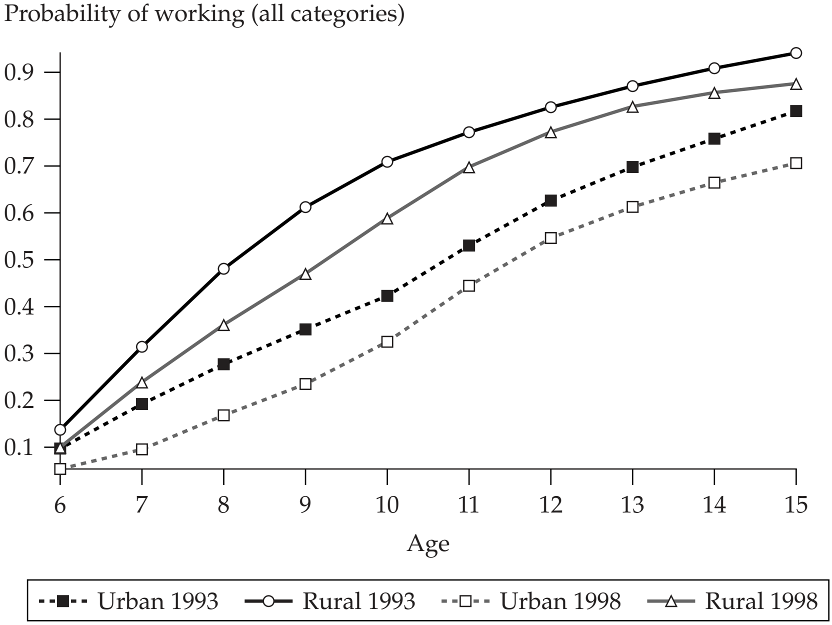
The description of child work in tables 14.6 and 14.7 suggests that there are important differences associated with age in the allocation of child time between urban and rural areas. Thus, work participation rates are first considered by age. Figure 14.3 replicates the methodology used in figure 14.1 (by age and gender figures). Each line in figure 14.3 represents a separate regression for each urban and rural region, as well as for each round of the survey.

Children in rural areas are much more likely to work, at every age, than are children in urban areas. Considering all forms of work (figure 14.3a), urban-rural differences in work probabilities appear largest for children ages 8 to 11. In this same group, the largest reductions in work probabilities for rural areas between the 1993 and 1998 VLSSs are found. Urban areas appear to have experienced an approximately uniform reduction in work probabilities between 1993 and 1998. Consequently, for children ages 8 to 11, rural-urban differences appear to have decreased between 1993 and 1998, but for older children they appear almost unchanged.

When traditional work is considered (see figure 14.3b), the evidence looks different. Here, the probability of working appears to decline more for older children in both rural and urban areas. Older children are much more likely to engage in traditional work, so it is not surprising that they would experience greater reductions in the probability of working in traditional work. As with all forms of work, children in rural households are more likely to engage in traditional work at every age past six years. However, the largest reductions in traditional work appear to take place among older, urban children. Recent work on poverty in Vietnam shows how per capita expenditures in urban areas have risen almost twice as fast (by 9.9 percent a year) over the 1993–98 period, as did the per capita expenditures in rural areas, which rose 5.4 percent a year (World Bank and the Poverty Working Group 1999). Given the strong correlation between household economic

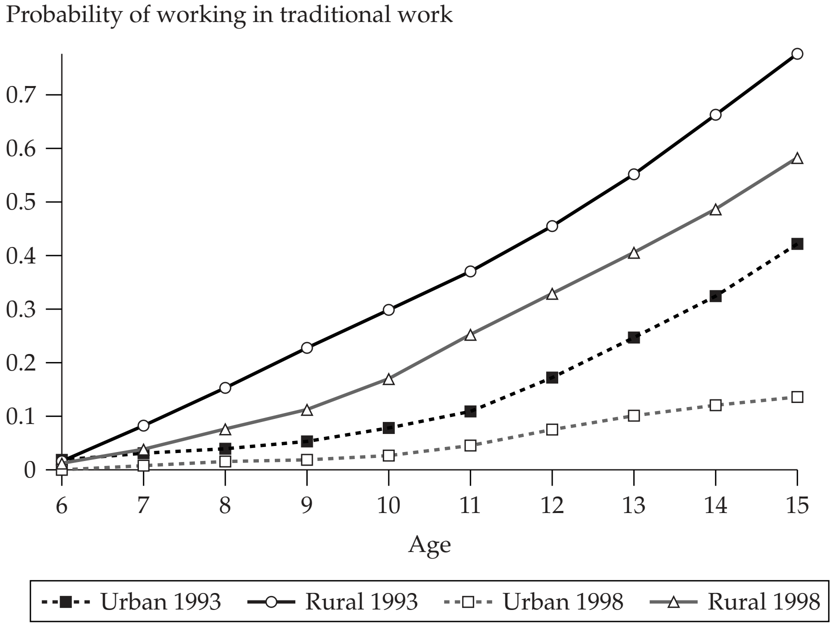
Figure 14.3. Participation in Work, by Age and Location

a. All work categories



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Traditional work



Source: Authors' calculations from the 1993 and 1998 VLSSs.

status and child labor participation documented by Edmonds (2004), these large reductions in traditional work for older, urban children are likely the result of the relatively high economic growth rates in urban areas.

Comparing households in different settings is difficult—the argument can be made that households in rural areas are fundamentally different from households in urban settings. The consequences of improvements in standards of living may be very different in the two environments. To compare improvements in child labor in one geographic region with another, or to compare improvements in cities to those in provincial towns or the countryside, a linear regression framework is used. In each regression, the dependent variable is an indicator with a value of one if a child works (in all work or in traditional work) and zero otherwise. Each regression is estimated using the linear probability model with controls for differences associated with a child's age, gender, and the year of observation in each regression.[11]

Table 14.9 considers how changes in child labor vary across the 10 main geographic regions of Vietnam. Minot and Baulch (2004) examine how other measures of poverty vary across Vietnam. In addition to the age, gender, and year controls, the regression in table 14.9 also controls for time-invariant household characteristics by including household fixed effects. These household fixed effects control for factors such as the remoteness of a

Table 14.9. Regional Differences in the Decline in Child Labor, Linear Probability Model, Household Fixed Effects Results
(multiplied by 100 gives percent)

Dependent variable	*All work Coeff.*	*Traditional work Coeff.*
Change in rural Mekong Delta	−0.250**	−0.181**
	(0.033)	(0.023)
Changes relative to the rural Mekong Delta		
Urban areas		
Major urban	0.191**	−0.024
	(0.078)	(0.034)
Minor cities	0.029	−0.027
	(0.056)	(0.050)
Provincial towns	−0.023	−0.026
	(0.063)	(0.036)
Rural areas		
Northern Uplands	0.077*	−0.020
	(0.041)	(0.047)
Red River Delta	0.143**	0.066
	(0.050)	(0.041)
North Central Coast	0.048	0.131**
	(0.051)	(0.051)
Central Coast	0.207**	0.073
	(0.051)	(0.061)
Central Highlands	0.287**	0.079
	(0.095)	(0.074)
Southeast	0.038	0.083**
	(0.059)	(0.038)
Adjusted R^2	0.432	0.410

*Significant at 10 percent level.
**Significant at 5 percent level.

Note: Standard errors in parentheses. All regressions include a quadratic in age and gender, a constant, a year effect, and household fixed effects. Standard errors are corrected for arbitrary heteroskedasticity and the cluster/time design of the survey. The interpretation of −0.25 in the first row is that the probability a child works in the rural Mekong Delta declines by 25 percentage points, and so on through all later regressions.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

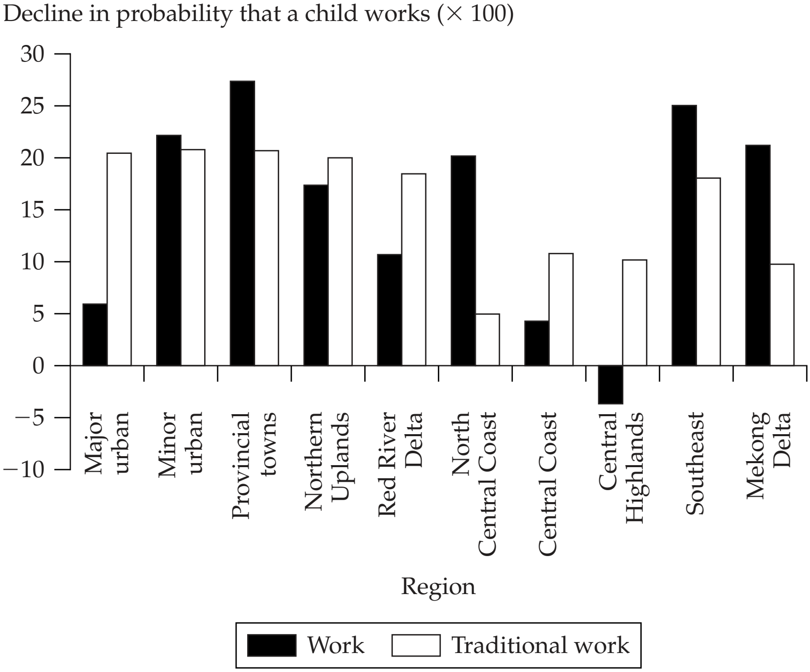
household's location, its ethnicity, the household's size (but not changes in household size), the education of the head of the household, or any other household traits that do not change over time. Throughout this study, the regression results aim to document differences in declines in child labor across observable household characteristics. The results should not be interpreted as the impact of any given characteristic on child labor. For example, the largest declines in child labor are in the Mekong Delta. If a household from the Central Highlands were picked up and moved to the Mekong Delta, there is no reason to believe that the Central Highlands household would experience the same decline in child labor as other households in the Mekong Delta.

Table 14.9 shows the change in child labor that occurs in the rural Mekong Delta and the additional changes (relative to the Mekong Delta) that occur in other administrative regions. Thus, in the first column, the probability that a child works in any type of work declines by 0.25 (or 25 percentage points) in the rural Mekong Delta after household fixed effects and child attributes are controlled for. However, the probability that a child in major urban areas works in any type of work declines by only 0.059 (5.9 percentage points: $-0.250 + 0.191$). For all forms of work (first column), it can be seen that most areas of Vietnam decrease their child labor by less than the rural Mekong Delta. The particularly large declines in child labor in the rural Mekong Delta may stem in part from Vietnam's integration into world rice markets (Edmonds and Pavcnik 2002). The only region that experiences larger reductions than the Mekong Delta is provincial towns. However, for traditional work, major urban areas, minor urban areas, and provincial towns all decrease the probability that their children work by more than the rural Mekong Delta.

The percentage point change can be calculated for each of the regions in table 14.9 in both all work and traditional work for every region. These changes can be seen graphically in figure 14.4.

Provincial towns have experienced the largest reductions in both categories of work. Nevertheless, there is an increase in the probability that a child works in the rural Central Highlands. The Central Highlands is the second poorest region in Vietnam, with more than one-half the population living below the poverty line in 1998.[12] The incidence of "hunger poverty" barely fell at all in the period between the two surveys, and the poverty gap index shows poverty to be deeper here than elsewhere in the country (World Bank and the Poverty Working Group 1999). School enrollment rates are lower in the Central Highlands than elsewhere in the country for all levels of education (Nguyen 2004). The difference between traditional work and household work implies that this increase in work probabilities in the Central Highlands is driven by participation in household work, but there is an active labor market associated with the coffee plantations in the rural Central Highlands, and it is possible that this influences the results here. This could be the case if increased demand for adult labor shifts the burden of household work to children. Also, the rural Central Highlands is a destination for migrant agricultural workers (including children) during the coffee harvest (SCF U.K. 1997), and this may also contribute to the unusual result here. There is also a concentration of ethnic minorities in the rural Central Highlands. There is a discussion in this chapter's section on ethnicity of the finding that the slight increase in children who work in the Central Highlands is not the result of the greater presence of minorities in the Central Highlands.

Figure 14.4. Reductions in the Probability That a Child Works in the Past Seven Days, by Region, Household Fixed Effects Results



Source: Authors' calculations from the 1993 and 1998 VLSSs.

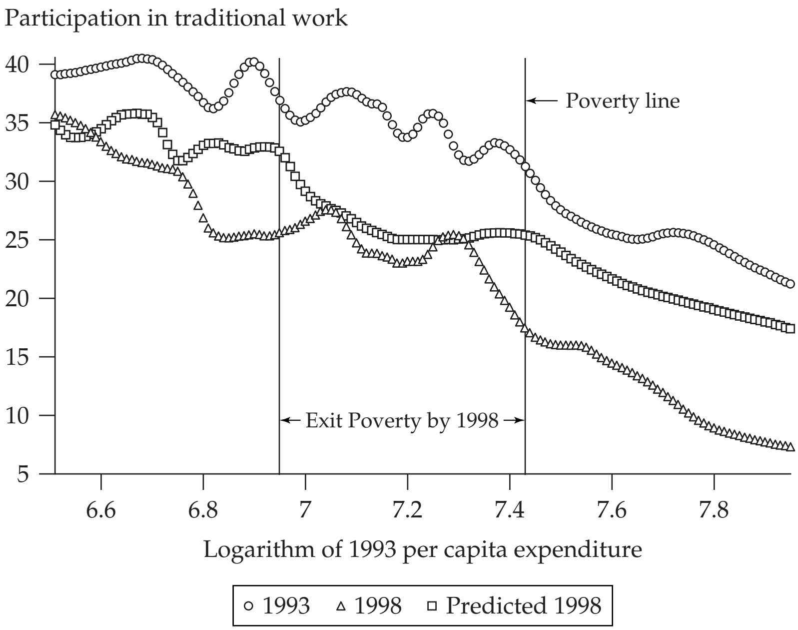
Other Household Characteristics

LIVING STANDARDS. The effect of improvements in living standards on child labor has recently received substantial attention. Ample qualitative studies suggest that improvements in living standards in Vietnam have enabled children to work less. Interviews with working children in a range of different situations and locations identify the strong causal link between poverty and child labor. Though these studies do not really permit authoritative quantification, they do indicate that grinding poverty is the primary reason for leaving home to find work for at least three-quarters of the respondents. This is often tied in discussion to the need to assist families in paying debts and servicing debt interest payments. These debts have often been acquired in response to a health crisis or other shock in the household (Bond and Hayter 1998; International Labour Organisation–International Programme for the Elimination of Child Labour [ILO-IPEC] 2000) or to invest in housing (Youth Research Institute and Barnen 1999).

The experiences of households in the VLSSs appear consistent with this qualitative literature. In the VLSSs, household living standards are measured with the logarithm of per capita expenditure. There are two justifications for looking at expenditure rather than income. First, most households do not participate exclusively in formal labor markets. Hence, calculating income is very difficult. Second, although income is variable, households tend to try to smooth consumption through time, and the expenditure measure in the VLSS is designed to approximate household consumption. In the extreme, the permanent income hypothesis suggests that households consume their permanent income so that consumption represents the household's information about the income path before it.

Edmonds (2004) studies the relationship between living standards and child labor in the VLSSs, and his results are reproduced here. First (using nonparametric regression techniques), he calculates participation rates in traditional work across the range of the per capita expenditure distribution. His estimates for children ages 6 to 15 are in figure 14.5. Actual participation rates in 1993 are at the top of the figure (labeled with "o"), and 1998 participation rates are at the bottom of the figure (labeled with "Δ"). Second, using the VLSSs, Edmonds calculates by how much living standards improve for

Figure 14.5. Living Standards and the Decline in Child Labor



Source: Edmonds 2004.

each household between 1993 and 1998. He then uses the cross-sectional relationship between child labor and living standards from 1993 (the "o" line) to predict what child labor participation rates should be in 1998, based only on improvements in living standards. This prediction is the middle line in figure 14.5 and is marked with "□." The rightmost vertical line in figure 14.5 is the 1993 poverty line, and the range between the poverty line and the leftmost vertical line indicates the range of households that exit poverty between 1993 and 1998.

Most of the decline in child labor experienced in Vietnam in the 1990s can be explained by improvements in living standards. For households that exit poverty between 1993 and 1998, living standards can explain most (80 percent) of the decline in child labor. Improvements in living standards explain less of the change in child labor for children in households far above the poverty line in 1993, or for children in households that persist in poverty between 1993 and 1998. Improvements in living standards vary a great deal across households in Vietnam; the remainder of this chapter considers how improvements in child labor vary across different subgroups of the population.

MIGRATION. Many case studies highlight migrants as a particularly vulnerable group in Vietnam. A Participatory Poverty Assessment in Ho Chi Minh City (SCF U.K. 1999) illustrates the multiple disadvantages faced by migrants, particularly those who lack official registration. Official registration can be important in determining the access of migrant children to mainstream education and the access of migrant families to subsidized health care and credit facilities (World Bank and the Poverty Working Group 1999). Migrants are often moving because of economic circumstances, so children in migrant households would be more apt to need to work. In addition, the process of migration itself may influence the likelihood that a child works because of the disruption in the child's life associated with the move.

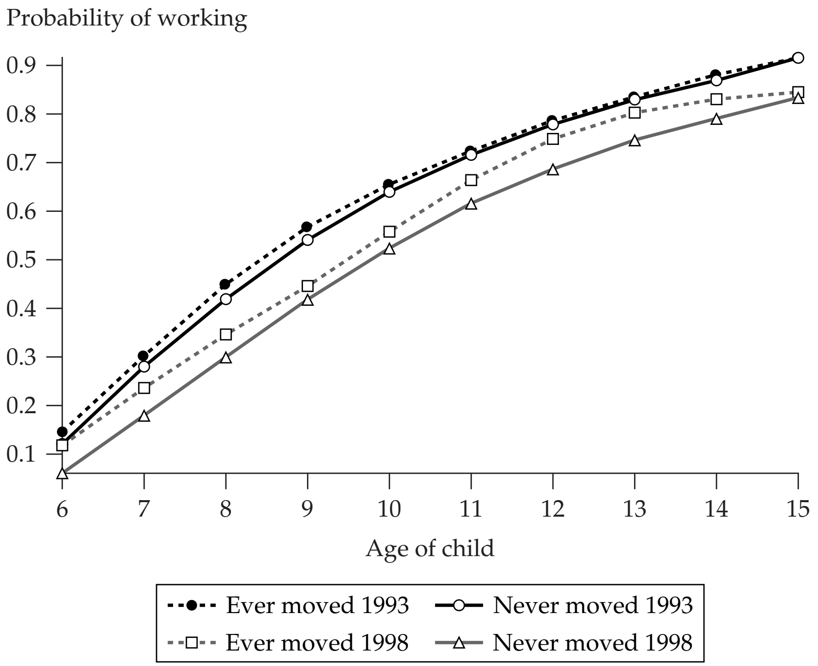
Figure 14.6 considers the relationship between work participation and whether the household head has ever moved. A household where the head has ever moved is defined here as a "migrant" household.[13] Households that have moved were more likely to have children work in both traditional and all forms of work in both 1993 and 1998. When traditional work and household work (figure 14.6a) are considered, it is obvious that participation rates in child work were very similar in migrant and nonmigrant households for all ages in 1993. In fact, for children ages 10 and older, the probability that a child works appears virtually identical across migrant and nonmigrant households. In 1998, however, much larger differences were seen between migrant and nonmigrant households. This difference is attributable to large declines in the probability that a child works in nonmigrant households. Furthermore, the distinction between migrant and nonmigrant households appears to increase between 1993 and 1998, especially for children ages 11 to 14. In this age group, participation rates appear similar in 1993 in both migrant and nonmigrant households.

Figure 14.6b presents the probability that a child does traditional work, by age and migration. For both types of households, declines are observed in the probability that the child does traditional work—much as we have seen throughout this paper. In traditional work, we observe greater drops in participation in traditional work for nonmigrant children between the ages of 10 and 13. It is interesting that for 15-year-olds, migrant households actually have a slightly reduced probability of doing traditional work.

Of course, household heads who have moved are likely to be substantively different from heads who have never moved. Thus, the regression methodology described in the context of table 14.9 is used again here. These results are shown in table 14.10. Columns (1)–(4) focus on participation in all forms of work, as in figure 14.6a, and columns (5) and (6) are for participation in traditional work only. To gauge the relative changes in child labor for households whose heads have ever moved in 1993, a variable is included that is the interaction of head ever moved before 1993 and a variable to indicate that an observation is from 1998. Hence, the interpretation of the first row in table 14.10 is the change in child labor participation experienced by a household where a head ever moved before 1993 relative to the change in

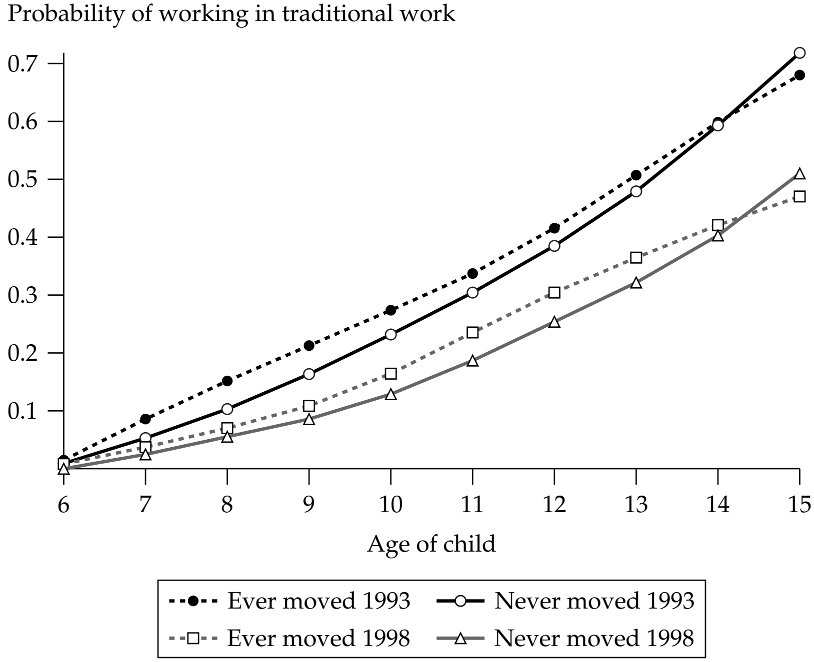
Figure 14.6. Participation in Work, by Age and Migration Status of Head

a. All work categories



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Traditional work



Source: Authors' calculations from the 1993 and 1998 VLSSs.

child labor experience by households where the head has never moved. Thus, a positive regression coefficient indicates smaller declines in child labor for households where the head moved relative to the decline experienced in households where the head has never moved.

After controlling for child characteristics, column (1) of table 14.10 shows that households where the head has ever moved experience smaller declines in child labor. However, households with a head who has moved may be in different areas from households where the head has never moved. For example, there may be more people who have moved in cities than in remote rural areas. Hence, column (2) controls for differences in the residential location of ever movers with commune fixed effects. The table also controls for differences across regions in the declines in child labor with region × time effects (these are the regression coefficients in table 14.9). After controlling for differences in the location of movers, the results change. Column (2) demonstrates greater reductions in ever-mover households. Controlling for household differences [in column (3)] attenuates the relationship between ever-movers and child labor further. Hence, most of the differences in figure 14.6 appear to owe more to differences in the location of households with heads who have moved than to something intrinsic in moving itself. A similar result is seen in traditional work in column (5).

Table 14.10. Adult Migration History and Child Labor in the Past Seven Days, Linear Probability Results
(multiplied by 100 gives percent)

	All work				*Traditional work*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Dependent variable	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
Head ever moved × 1998	0.017	−0.011	−0.003		−0.028	
	(0.019)	(0.013)	(0.022)		(0.020)	
Father resident				0.028		−0.036
				(0.038)		(0.028)
Mother resident				−0.016		0.038
				(0.046)		(0.037)
Head moved				0.059**		0.034*
				(0.020)		(0.020)
Commune effects	No	Yes	No	No	No	No
Household effects	No	No	Yes	Yes	Yes	Yes
Region × time effects	No	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.260	0.372	0.431	0.432	0.410	0.410

*Significant at 10 percent level.
**Significant at 5 percent level.

Note: Standard errors in parentheses. Standard errors are corrected for arbitrary heteroskedasticity and the cluster-time design of the survey. All regressions include a quadratic in age and gender, a constant, and a year effect. "Head ever moved" is an indicator for if the head reported ever having moved in 1993. It is interacted with the year effect for 1998. Hence, it has the interpretation of being the extra change in child labor in households where the head had moved before 1993 in addition to the general decline in the population.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

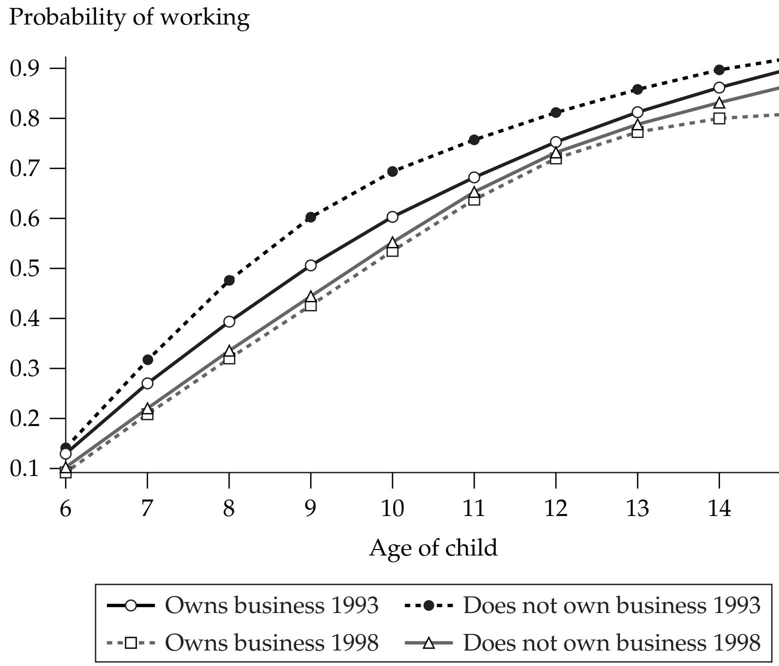
In general, the VLSSs did not capture households that moved between 1993 and 1998. However, households where one or more members have departed or returned are observed. In columns (4) (all work) and (6) (traditional work), the effect on child labor of change in the residency patterns of parents or household head can be seen. A substantially smaller decline in child labor can be seen in households where the head has changed between rounds of the VLSS. This smaller decline in child labor appears to be in both household work and traditional work, because there is a significant, but slightly smaller, effect of changes in the household head on traditional work. It is obviously not clear whether this additional work in households that have migrant heads is directly attributable to the departure of the head or if there are common factors that cause both.

ENTERPRISE OWNERSHIP. Whether or not a household owns a business is likely to influence the economic activities of children. It is easier for a child to work inside his or her home than for an outside employer, so more child labor would be expected in households with home enterprises. Furthermore, it is often easier for children to begin to contribute to home enterprises at an earlier age than it is for a child to perform the manual labor of agriculture. Nevertheless, generally better-off households can afford to start home enterprises, and better-off households often enjoy better access to formal financial services and information, which are important in the establishment of household enterprises (Vijverberg and Haughton 2003; World Bank 1999). Three issues are important here. First, are households with home enterprises more likely to have children work? Second, are changes in child labor different in households with and without a home enterprise? Third, are changes in child labor associated with changes in home enterprises?

Are households with home enterprises more likely to have children work? Figure 14.7 considers the probability that a child works by whether the household operates its own enterprise. As has been seen in every figure, there are uniformly lower probabilities that a child worked in 1998 for both traditional and all work participation rates. Two interesting characteristics are unique to figure 14.7. First, in both work categories and years, children

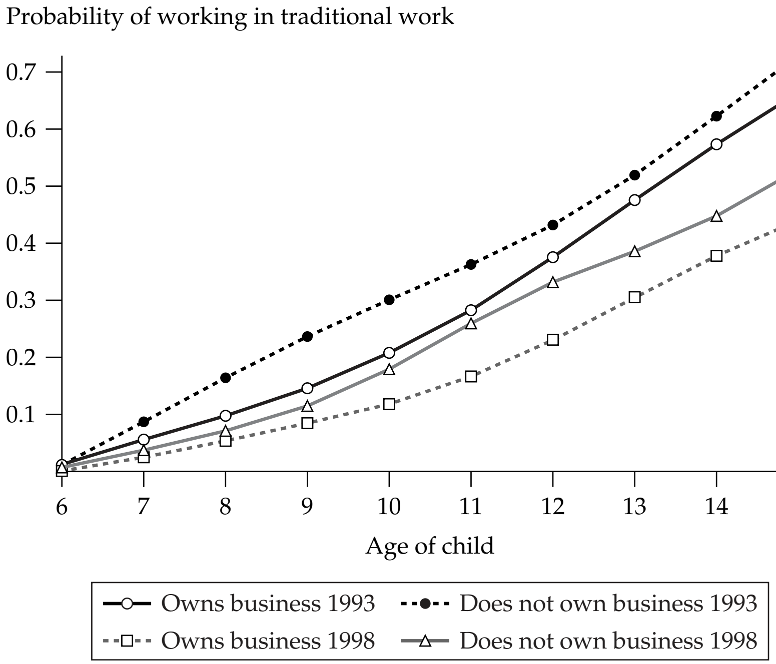
Figure 14.7. Participation in Work, by Age and Household Enterprises

a. All work categories



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Traditional work



Source: Authors' calculations from the 1993 and 1998 VLSSs.

in households without a home enterprise work more than children in households with a home enterprise. This is difficult to explain, but the authors suspect (supporting evidence in the next paragraph) that this result is attributable to households with family businesses living in better-off areas and being more affluent, on average, than households that do not operate a home enterprise. Second, in 1998 the difference between households with and without a home enterprise was greater in traditional work than in all work. This suggests that children who are performing generally less traditional work in households with a business must be contributing more household work in 1998 than are children in households without a business. This extra household work in households with businesses in 1998 appears especially large for children between the ages of 9 and 13.

Are changes in child labor different in households with and without a home enterprise? Much of the extra decline in child labor associated with the ownership of a home enterprise appears to come from the location of household enterprises. Table 14.11 returns to the regression approach used in table 14.10. In columns (1) and (4) for all work and traditional work, differences among children in age, gender, and year of the survey have been controlled for. There are greater declines in child labor in nonfarm, rural households and in households that own a business. In fact, the probability

Table 14.11. Enterprise Ownership and Child Labor in the Past Seven Days, Linear Probability Results
(multiplied by 100 gives percent)

	All work			*Traditional work*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Dependent variable	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
Nonfarm, rural household	−0.031	−0.023		−0.074**	−0.056**	
	(0.023)	(0.015)		(0.018)	(0.016)	
Owns business	−0.035**	0.009	0.039**	−0.040**	0.005	0.036*
	(0.014)	(0.010)	(0.017)	(0.014)	(0.011)	(0.020)
Commune effects	No	Yes	No	No	Yes	No
Household effects	No	No	Yes	No	No	Yes
Region × time effects	No	Yes	Yes	No	Yes	Yes
Adjusted R^2	0.263	0.372	0.432	0.199	0.353	0.410

*Significant at 10 percent level.
**Significant at 5 percent level.

Note: Standard errors in parentheses. Standard errors are corrected for arbitrary heteroskedasticity and the cluster-time design of the survey. All regressions include a quadratic in age and gender, a constant, and a year effect.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

that a child works in all work categories is a statistically significant 6.6 percentage points lower in a rural, nonfarm household that owns a business than in a rural farm household. Children in these rural, nonfarm households with businesses experience even larger relative declines in traditional work relative to children in rural farm households. The probability that a child does traditional work declines by an additional 11.4 percentage points in rural, nonfarm households with a business. However, after controlling for commune differences and region-time differences (columns (2) and (5) of table 14.11), children in households owning a business experience slightly smaller declines in child labor than children in households without a business. However, the difference in declines in child labor associated with business ownership is not statistically significant.

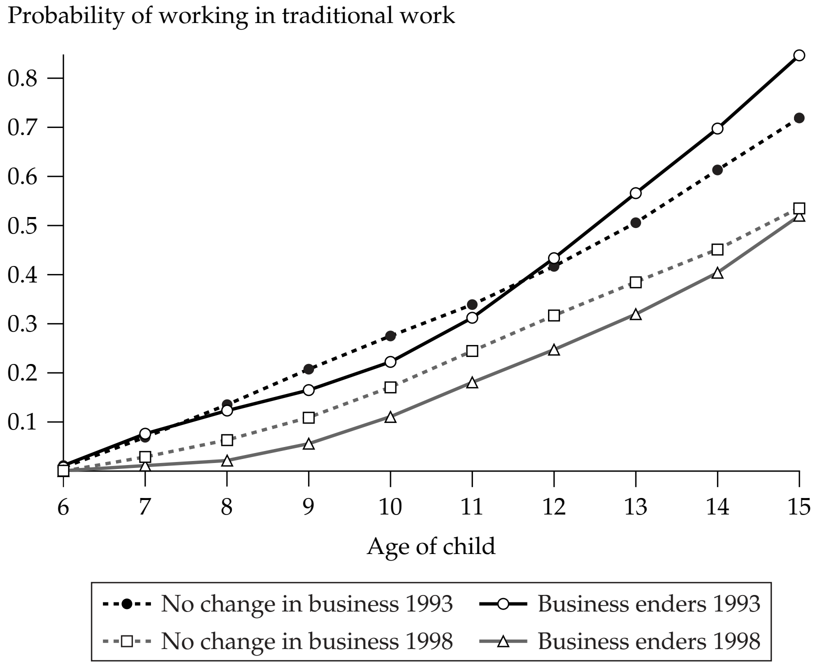
Are changes in child labor associated with changes in home enterprises? Although the hypothesis that the differences in child labor associated with enterprise ownership (figure 14.7) stem from differences in the location of enterprises is not rejected, there is strong evidence that changes in household enterprise status are associated with changes in the economic activities of children. Columns (3) and (6) of table 14.11 include controls for household differences with household fixed effects and a variable that indicates whether a household owns a business. With the household fixed effects, the coefficient on this variable is interpreted as how a change in whether the household owns a business is associated with changes in child labor. In both traditional work and household work, creating a new home enterprise between rounds of the VLSS is associated with smaller reductions in the probability that a child works. The effect of owning a home enterprise is slightly larger for all work than for traditional work. Thus, the creation of a home enterprise seems to lead to more work (relative to a child in a household that did not create a business) for children in both traditional and household work.

The changes in home enterprises that took place between 1993 and 1998 involved both openings and closings. Thus, the finding that creating a home enterprise leads to more work relative to a child in a household that did not open a business also implies that closing a home enterprise is associated with a larger decline in the probability that a child works. Figure 14.8 compares children in households that open and close a family business between the 1993 and 1998 rounds of the VLSS to children in households that had no change in family business.

Figure 14.8a compares children in households with businesses that closed between 1993 and 1998 (more precisely, the household reported at least one enterprise in 1993 and did not report any enterprises in 1998) with children in households that did not change their household enterprise

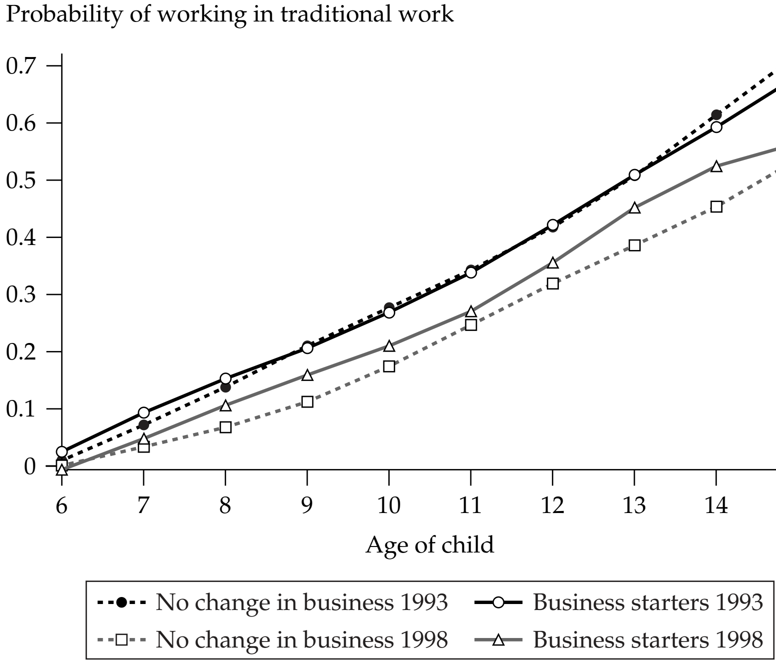
Figure 14.8. Participation in Traditional Work, by Age and Household Enterprise Change

a. Closed business



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Opened business



Source: Authors' calculations from the 1993 and 1998 VLSSs.

status. Figure 14.8b compares children in households with businesses that opened (that is, no enterprise was reported in 1993, and at least one enterprise was reported in 1998) to children in households that did not change.

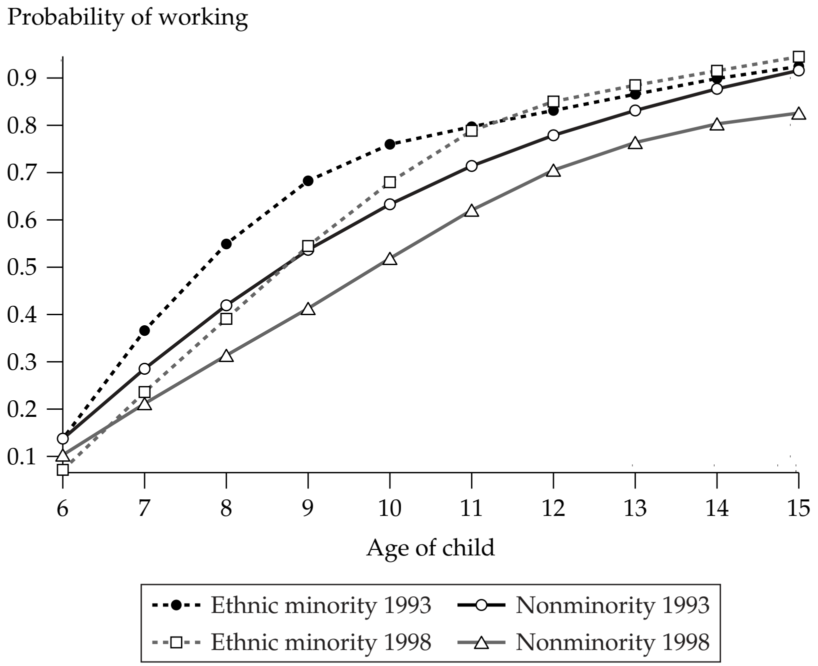
Two interesting trends emerge from figure 14.8. First, in figure 14.8a, households whose businesses ended between 1993 and 1998 experienced larger reductions in the probability that children ages 12 to 15 participated in traditional work than households without a change in enterprise status. Younger children appeared to experience approximately the same drop in households that close and do not close businesses. This large drop in child labor for older children in households that closed their businesses appears to come from the fact that these older children in 1993 were more likely to be working in traditional work. A possible explanation for this higher level of work is that these older children are working to help in the home enterprise. It is surprising that children in households that closed businesses have lower work probabilities than the general population. Households that owned businesses in 1993 were generally better off (in 1993 and 1998) than households that did not own businesses in 1993; it is possible that this explains why they had lower work probabilities in 1998 than the general population. This would then imply that the closure of the household enterprise was not a permanent, negative shock to household well-being.

Second, it can be seen in figure 14.8b that children in households that opened home enterprises between 1993 and 1998 experienced smaller drops in child labor in that period. Households that opened enterprises between 1993 and 1998 and households that had no change in enterprises between 1993 and 1998 appear to have had very similar probabilities of having a child work in 1993. However, children in households that opened enterprises worked more in 1998. This is true at every age, but it appears largest for ages 12 and 13. This trend takes place despite the fact that households that created new enterprises are generally better off than households that do not. Hence, households in new businesses appear to rely on family labor to help with the business.

ETHNICITY. Recent analysis of poverty in Vietnam illustrates that consumption poverty among ethnic minority groups is declining far more slowly than for the majority (that is, ethnic Vietnamese [Kinh]) population (Baulch and others 2004; World Bank and the Poverty Working Group 1999). Social indicators for ethnic minority groups also lag behind. Because reductions in child labor in general have been closely associated with improvements in per capita expenditures, it is important to examine how child labor has changed for those groups whose poverty appears to be particularly

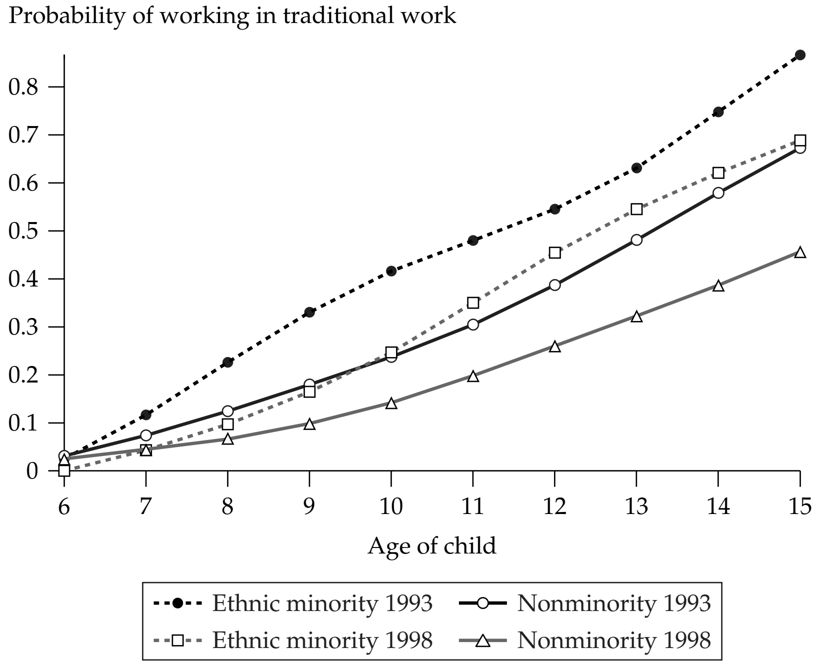
Figure 14.9. Participation in Work, by Age and Ethnicity

a. All work categories



Source: Authors' calculations from the 1993 and 1998 VLSSs.

b. Traditional work



Source: Authors' calculations from the 1993 and 1998 VLSSs.

intractable. The unusual trends observed in the rural Central Highlands (figure 14.4), where a concentration of ethnic minorities lives, raise the possibility that child labor for ethnic minorities is not dropping as rapidly as for the majority. The question this section addresses is whether there is any evidence that children in minority households have reduced their child labor by less than the majority ethnic groups.

In both traditional work and household work, ethnic minorities tend to work more than nonminority groups. In the "all work" category, a slight increase can be observed in the probability that ethnic minority children older than age 11 worked between 1993 and 1998. For traditional work in figure 14.9b, it can be seen that ethnic minority children in 1998 worked more than nonminority children in 1993. However, there is no observable increase in the probability that children worked between 1993 and 1998 in traditional work. Thus, part of the increase between 1993 and 1998 in the "all work" category must stem from increases in household work.

The differences between ethnic minorities and others in the "all work" category appear to be largely the result of differences in the geographic location of ethnic minorities. However, in traditional work, there are differences between ethnic minorities and others, even when household fixed effects are controlled for. The linear regression results are in table 14.12.

Table 14.12. Ethnic Minorities and Child Labor in the Past Seven Days, Linear Probability Results
(multiplied by 100 gives percent)

	All work			*Traditional work*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Dependent variable	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*	*Coeff.*
Ethnic minority × 1998	0.117**	0.028	0.017	0.124**	0.063**	0.084*
	(0.033)	(0.022)	(0.035)	(0.044)	(0.027)	(0.046)
1998	−0.100**	−0.195**	−0.252**	−0.135**	−0.163**	−0.189**
	(0.024)	(0.028)	(0.033)	(0.024)	(0.020)	(0.024)
Commune effects	No	Yes	No	No	Yes	No
Household effects	No	No	Yes	No	No	Yes
Region × time effects	No	Yes	Yes	No	Yes	Yes
Adjusted R^2	0.264	0.372	0.432	0.197	0.352	0.411

*Significant at 10 percent level.
**Significant at 5 percent level.

Note: Standard errors in parentheses. Standard errors are corrected for arbitrary heteroskedasticity and the cluster-time design of the survey. All regressions include a quadratic in age and gender, a constant, and a year effect. "Ethnic minority" is a dummy variable that is 1 if the household was identified as a minority household in the VLSS in 1993. It is interacted (first row) with the 1998 indicator so that the reported coefficient has the interpretation of being the extra change in the probability a child works in a minority household relative to the decline experienced by nonminority households.

Source: Authors' calculations from the 1993 and 1998 VLSSs.

Two variables are reported in table 14.12. The 1998 indicator reports the average decline in child labor across all households between 1993 and 1998. The coefficient on "ethnic minority × 1998" reports the extra increment experienced by ethnic minorities. Column (1) controls for child attributes and demonstrates that child labor appears to increase in the "all work" category for ethnic minorities between 1993 and 1998. In traditional work [column (4)], there is a 13.5-point decline in child labor in nonminority households between 1993 and 1998 but only a 1.1-point decline for minorities. Columns (2) and (5) control for community fixed effects and region × time effects. In the "all work" category, the hypothesis that minorities experience the same decline as the rest of the population cannot be rejected. However, a statistically significant, smaller decline in child labor can be observed in traditional work for minority households. Columns (3) and (6) include household fixed effects. This further attenuates minority and nonminority differences in the "all work" category. However, significantly smaller declines in traditional work can be observed for minority households. It is interesting that in the region × time effects (not pictured in table 14.12), for both traditional work and the "all work" category, controlling for a household's minority status does not change the fact that households in the Central Highlands experience smaller improvements in child labor than do households in the rural Mekong Delta.

Conclusion

This chapter demonstrates overwhelming evidence of a reduction in child labor over the 1990s. The survey of qualitative work presented here suggests that rising living standards have been important in driving this reduction in child labor, and the quantitative results of this and other studies are consistent with these qualitative findings. Children of both sexes and all ages in almost all rural and urban areas have experienced large declines in child labor during the 1990s. Ethnic minority children and the children of recent migrants appear to remain particularly vulnerable even by the late 1990s. They are more likely than nonminority children to work at all ages and in all work categories. Children of all ethnicities in the Central Highlands appear to have missed many of the improvements in the 1990s, and children in the rural Mekong Delta and in provincial towns experienced the largest declines in child labor.

The evidence from qualitative and quantitative work presented here suggests that children still working in Vietnam are doing so because their families are too poor to support the basic needs of the family without the children's economic contributions. This link between poverty and child labor is clearly important in shaping appropriate policy responses and public action. It indicates, first, that a future development path that puts equitable growth and poverty reduction at its core (such as the government of Vietnam's recently articulated Socioeconomic Development Strategy 2001–10) is likely to generate further reductions in child labor.

Second, the link between poverty and child labor demonstrates that, at the household level, there should be concern surrounding the hardship that could confront poor families—including their children—if attempts are made to eliminate child labor without due consideration of the consequences for household income. This underscores the need for government responses to child labor to be formulated in a participatory way that involves all stakeholders at appropriate times, including working children and their families. Moreover, almost all child labor within Vietnam appears to take place within the homes of working children. Thus, active outreach to the families of working children may be the only way to address the circumstances of most working children in Vietnam. Mechanisms to involve vulnerable children in planning are not well developed within government, though there have been some interesting innovations piloted by nongovernmental organizations.

These trends identified from the analysis of the VLSS data are undeniably positive in terms of child welfare. It would be misleading, however, to suggest that either the problem of child labor will completely evaporate as the economy continues to grow over the next decade or child labor has ceased to be a problem for policymakers. Economic growth over the 1990s has not delivered benefits evenly across all groups of children and households, and a number of concerns remain despite the general pattern of improvement:

- Though the trends indicate that working children reduced their number of working hours during the 1993–98 period, there is clear evidence (figure 14.1) that there is a group of child laborers, including many girls, involved in traditional work who are still working hours well in excess of the legal maximum set for their age group (24 hours a week). Indeed, those under age 15 are working hours well in excess of the legal maximum (42 hours) for an older category of 15- to 18-year-olds. The fact that they are working outside legal limits suggests that enforcement of child labor regulations is not influencing their work patterns and must raise the question of whether other safeguards designed to protect young workers are effectively enforced. The VLSSs tell us little about this, but other studies suggest that these safeguards may not be enforced (ILSSA and University of Wollongong 2000). Moreover, there does not appear to be any mechanism in place through which these safeguards could be applied to the activities of children within their own household. As the environment for enterprise development improves and more competition is introduced, the issue of working conditions may become more important. Limited information on labor standards and working conditions is publicly available. MOLISA conducts regular labor force surveys, but these alone may be unable to pick up potential problems of deteriorating labor standards—particularly for children—as industrial growth continues.
- At every age group, girls are more likely to work than boys (figure 14.2). In particular, girls bear a greater burden of household work at every age than do their male counterparts. The literature on women in Vietnam clearly illustrates that this pattern of women shouldering heavier daily workloads continues into adulthood (Population Council 1999; World Bank and the Poverty Working Group 1999); Although net enrollment rates in primary school are similar for boys and girls for the country as a whole, there is a disparity in the lowest expenditure quintile of the population (where 80 percent of girls are enrolled in school compared with 84 percent of boys). It appears that girls may be more vulnerable than boys under situations of economic stress.

Actions to address gender-based inequities in decisionmaking within the household are likely to be fundamental to reducing the domestic workload of girls. This, in turn, may require longer-term attitudinal change by both men and women to overcome gender-based stereotyping of roles and responsibilities. In the short term, attitudinal differences may be circumvented by policies such as school subsidies or targeted inventions that lower the costs of schooling girls or mitigate households' need for the labor of girls.

There is considerable need for further research into the vulnerabilities of girls in poor households and especially for an assessment of specific interventions that might reduce their work burden.

- Ethnic minority children work more than nonminority children at all ages. Qualitative studies suggest that concerns raised over differences in work patterns for boys and girls may be particularly acute in ethnic minority areas, and the burden of work inside the household for girls is likely to be more onerous and more likely to interfere with education for girls than for boys (Duong 1997; VN-Sweden MRDP 1999). With regard to traditional work, ethnic minority children have experienced smaller reductions in the likelihood of working than have nonminority children. Other work shows how ethnic minority children suffer multiple disadvantages. They are more likely to live in poverty, have less access to health and education services (World Bank 1999; World Bank and the Poverty Working Group 1999), are more likely to be malnourished, and are less likely to survive childhood (Ministry of Health 2000). Their parents are less likely to have access to information and are more likely to be isolated from broader policymaking and decisionmaking processes (World Bank and the Poverty Working Group 1999). Addressing child labor among ethnic minority groups is unlikely to be effective if the many other deprivations they face are not simultaneously addressed. These are critical areas for public action that should form part of the ethnic minority development plans that the government of Vietnam has undertaken to formulate over the coming years (Socialist Republic of Vietnam 2001).
- Some of the patterns observed raise the question of whether the government of Vietnam's development strategies for the next 10 years might exacerbate some forms of child labor. The government's Socioeconomic Development Strategy 2001–10 implies that rural-to-urban migration is likely to increase. (The urban population is predicted to increase to 30–33 percent by 2010, a rate of increase beyond natural population growth.) Though VLSS data are likely to exclude much of the unregistered migrant community in urban areas, children of migrants are more likely to work, on average, than other children. This is strongly reinforced by other studies (Caseley and Buom n.d.; SCF U.K. 1999). Children of migrants will demand particular attention in the future if a concerted program of support to child laborers is to be developed as Vietnam becomes more urbanized. In particular, it will be important to ensure that children of migrants are not denied access to basic services because of their residential status (SCF U.K. 1999).
- Government strategies (Communist Party of Vietnam 2000; Ministry of Agriculture and Rural Development 2000) envisage a shift in the rural economy that places far greater emphasis on nonfarm activities and employment generation. This is widely accepted as being an

important step in raising agricultural productivity and incomes and reducing rural poverty (World Bank 2000) and, by extension, child well-being. This analysis shows that children in households that start new enterprises work more than do children in households without home enterprises or with stable, long-term enterprises. Agencies concerned with child welfare must remain vigilant to possible changes in the profile of child labor as rural livelihoods become more dependent on nonfarm sources of income.

- Although enrollment rates in primary education are high for a country of this level of per capita GDP, and are good for both nonworking and most categories of working children (table 14.4), children who work outside the household emerge very clearly as a group who are educationally at risk. These children need to be targeted carefully under the government of Vietnam's Education for All initiative. Children's abilities to combine work and education may be undermined as full-day primary schooling is introduced over the next few years. Education may well become less compatible with working while simultaneously becoming more expensive if the costs of extending the hours of education are borne privately. It is too early to anticipate what impact this change might have on child labor, but careful monitoring will be important.
- Finally, there are categories of child labor that defy easy monitoring but that are both harmful—falling within the ILO description of the "worst forms of child labor"—and reportedly on the rise. Though there are no clear estimates of the number of children involved in the commercial sex industry, for example, some studies indicate that the sex industry is expanding rapidly, and as many as one-third of commercial sex workers are children (ILO-IPEC 2000). Street children and underage domestic workers are vulnerable to abuse because of the nature of their work, and they are likely to be neglected or underrepresented in current data collection. The scale of child labor in these areas is very difficult to assess, given current information, but reports suggest that it is on the rise (Bond and Hayter 1998; SCF Sweden and USSH 2000; Youth Research Institute and Barnen 1999). There have also been reports that children working in gold mines are both unregistered (and unenumerated) and forced to continue working through the practice of withholding wages (SCF U.K. 1997). It will be important to generate more reliable indications of the extent of these very harmful and exploitative forms of child labor if effective action is to be designed and implemented.

Notes

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1. In much of the literature on child labor, distinctions are made between children "working" and child "labor." The former is often used to describe situations where children's economic contribution is not harmful to their overall development, and child "labor" describes situations where a child's opportunities for development are being constrained by his or her work. In this chapter, the terms "labor" and "work" are used interchangeably.

2. Glewwe and Jacoby (1998), in looking at retrospective school enrollment and labor market information in the 1992–93 Vietnam Living Standards Survey, argue that schooling declined and formal labor market participation rates increased in Vietnam from 1986 to 1991. Unfortunately, there are no data available to link these patterns to changes in household economic status.

3. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

4. The term "street children" is used here to describe children who are working on the streets and who live on the street (with or away from their families) or who live in basic shelter away from their families or who return at night to live with their families off the street. This is a mixed group of children with different vulnerabilities.

5. Household work information is missing for 47 children (0.4 percent of the total sample). Six of these children report doing traditional work. Thus, throughout this chapter when participation in traditional work is considered, there will be 41 more children than when work participation across all categories is considered, and 47 more children than when work participation in household work is considered. Because household hours are missing for these 47 children, all "hours worked" observations contain 47 fewer children than do "hours in traditional work" observations.

6. When changes in child labor through time are discussed in this chapter, either percentage point changes (calculated by subtracting the 1998 participation rate from the 1993 participation rate) or percentage changes (calculated by dividing the percentage point decline by the 1993 base) will be considered. With the first method, the fraction of children doing traditional work drops by 8.7 percentage points; in the second, there is a 28 percent decline in participation in child labor.

7. This is defined by Circular Number 09/TTLB, 13.4.95, issued by the Ministry of Labor, Invalids and Social Affairs (MOLISA) and the Ministry of Health, which specifies 13 harmful situations and 81 forbidden occupations.

8. Though the sample sizes in the VLSSs are relatively large, when children are separated by age and by gender the number of children of a given age and gender becomes relatively small. Hence, estimates of child labor participation rates are smoothed using a nonparametric (local) regression smoother. The lines are local regression lines estimated with an Epanechnikov kernel and a bandwidth of 0.9. With such a small bandwidth, these regression lines look only slightly smoother than just the raw, by age, sample means. Later, when the sample is bifurcated by household characteristics where the number of children at a given age is very small, a larger bandwidth is used, and this regression procedure imposes more smoothing.

9. Density estimates are kernel densities estimated with a Gaussian kernel and a bandwidth chosen by Silverman's rule of thumb (1986).

10. Vijverberg and Haughton (2003) examine the growth and survival of household enterprises in more depth.

11. Age and gender differences are controlled for by a quadratic in age and gender plus all interactions. Standard errors are corrected for commune (psu)/survey round clustering and arbitrary heteroskedasticity.

12. The poverty headcount and the incidence of food poverty here are calculated based on VLSS consumption data.

13. In practice, most households that report the head having ever moved report doing so within the past five years. Thus, using a more narrow definition does not affect these conclusions.

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15

Economic Mobility in Vietnam

Paul Glewwe and Phong Nguyen

Vietnam enjoyed high rates of economic growth in the 1990s. One consequence of this growth was a remarkable decrease in the rate of poverty, from 58 percent of the population in 1993 to 37 percent in 1998 (General Statistical Office 2000). Yet over the same period, inequality rose—the Gini coefficient of inequality for consumption expenditures increased from 0.330 to 0.354.[1] This suggests that better-off Vietnamese households experienced greater increases in per capita consumption expenditures than did poorer households. Indeed, the per capita expenditures of the poorest 20 percent (quintile) of the population was D (dong) 854,000 in 1993 and D 1,099,000 in 1998 (both in 1998 prices), which implies an increase of 29 percent. The analogous figures for the most well-off quintile of the population were D 3,911,000 and D 6,032,000, implying an increase of 54 percent.

Yet this depiction of the consumption expenditures of the most well-off as growing at a much faster rate than the consumption expenditures of the poor is somewhat misleading. It is highly unlikely that all of the households that were in the poorest quintile of the population in 1993 were again in the poorest quintile in 1998; some of them may have moved up into more affluent groups. This implies that, looking at *the same households* in both years, the households that were in the poorest quintile in 1993 experienced a gain in consumption expenditures greater than 29 percent. Similarly, some of the households that were in the top quintile in 1993 almost certainly were no longer in that category by 1998, so that looking at the same households would show growth in consumption expenditures of less than 54 percent among the most well-off quintile.

The extent to which this movement of households' relative positions in the distribution of consumption expenditures tempers this scenario of increasing inequality is an important policy question. Another way to think about this issue is that the *long-run* distribution of consumption expenditures (and also of income) is more equally distributed than the *short-run* distribution if some individuals or households are poor in some years and others are poor in other years. Such economic mobility is a crucial aspect of the distribution of consumption expenditures and how that distribution changes over time. This chapter examines economic mobility in Vietnam in the 1990s, using recent household survey panel data from that country.

Economic mobility is measured by comparing the incomes or expenditures of individuals or households over time. In practice, data are needed from a household survey that follows the same individuals or households over time. Recent examples of such studies are Fields and Ok (1999), Gardiner and Hills (1999), Gottschalk (1997), and Maasoumi and Trede (2001). A serious problem with any empirical work on economic mobility is that household income (and household expenditure) is likely to be measured with a large amount of error. This measurement error exaggerates both the amount of inequality at a given point in time and the degree of economic mobility over time.

This chapter uses estimation methods that minimize the bias caused by measurement error. It begins with a brief discussion of the measurement of economic mobility, then shows how bias due to measurement error can be overcome in measures of mobility based on the correlation of individual or household income (or expenditure) over time. It then applies this method to a large panel dataset from Vietnam and finds that at least one-half of measured mobility is due to measurement error.

Economic Mobility: Concepts and Measurement

Economic mobility focuses on changes in an individual's or household's income over time.[2] Yet the term "mobility" is often used in different ways. For example, an economy experiencing high economic growth that raises the incomes of all members may be characterized as having a large degree of mobility because everyone's income is increasing. However, there may be little change in individuals' income *shares* at each point in time, so that people do not change their relative positions in the distribution of income. In contrast, this chapter is interested in mobility in terms of its potential to reduce inequality in the distribution of long-run income, which implies a focus on changes over time in the relative position of individuals or households in the distribution of income. This concept of mobility is often referred to as *relative* mobility.

The most common relative mobility measures are those based on correlation of functions of the income variable. Let y_1 be the distribution of income in time 1 and let y_2 be the distribution of income for the same households or individuals in time 2. The simplest mobility measure can be defined as $1 - \rho(y_1, y_2)$, where $\rho(y_1, y_2)$ is the correlation coefficient of y_1 and y_2. (The correlation coefficient is the covariance of y_1 and y_2 divided by the standard deviation of y_1 and the standard deviations of y_2.) If income shares do not change at all between the two time periods, then y_1 and y_2 are perfectly correlated, so that $\rho(y_1, y_2) = 1$ and the above mobility measure will be zero, signifying no mobility. In contrast, if y_1 and y_2 are completely uncorrelated, so that any given household's income in the first time period has no relationship at all to its income in the second time period, then $\rho(y_1, y_2) = 0$ and the above mobility measure equals one, which can be thought of as "full" mobility.

Mobility measures based on the correlation coefficient range from zero (no mobility) to one (full mobility). In almost any data from any country, mobility will be somewhere between these two extremes.[3] In fact, this approach to measuring mobility can be generalized to include correlation between (monotonic) transformations of the income variable at two time points. For example, instead of examining the correlation between y_1 and y_2 one could use the correlation of the *rank* of y_1 and y_2, where the rank is one for the poorest person, two for the second poorest person, and so forth. Other mobility measures have been proposed using other transformations: For example, the Hart (1981) index uses the correlation of the logarithm of y_1 and y_2. In this chapter, several transformations will be used to check the robustness of the findings. All of these mobility measures satisfy fundamental properties that a mobility index should have (see Glewwe [2003] for details).

All mobility measures suffer from a serious problem—they exaggerate the extent of economic mobility when the income variable is measured with error. To see this problem, note that empirical studies of economic mobility typically use data from household surveys, which collect data on households' incomes, expenditures, or both. Anyone who has observed how such data are collected understands that these variables are measured with error—in some cases, with a large amount of error (see Deaton [1997], Deaton and Grosh [2000]). By definition, virtually any measure of mobility will overestimate true mobility because fluctuations in measured income that are purely due to measurement error are mistakenly interpreted as actual income fluctuations. The simplest example of this is the case of no mobility at all. In this case, actual mobility should be zero, but random measurement error in the data will show some (spurious) mobility and thus will exaggerate the extent of actual mobility.

The rest of this section explains in detail why errors in the measurement of income and expenditures exaggerate the extent of mobility and how instrumental variables estimation can be used to correct for the bias caused by measurement error. Readers with an economics or statistics background should have no difficulty understanding the technical details of this argument. Readers with less technical backgrounds may find it somewhat challenging and thus may want to turn directly to the beginning of the next section.

The bias caused by random measurement error can be demonstrated more formally with mobility measures that are based on the correlation of functions of the income variable. Let $m(y_1, y_2)$ denote the simplest type of such a mobility measure, that is, $m(y_1, y_2) = 1 - \rho(y_1, y_2)$. In equation 15.1, the correlation coefficient is defined as:

$$\rho(y_1, y_2) = \frac{\sigma_{y_1,y_2}}{\sqrt{\sigma^2_{y_1}\sigma^2_{y_2}}} = \frac{\sigma_{y_1,y_2}}{\sigma_{y_1}\sigma_{y_2}} \tag{15.1}$$

where σ_{y_1,y_2} indicates covariance and σ_{y_1} and σ_{y_2} indicate standard deviations.

If the measurement errors in the two periods are uncorrelated with each other, $\rho(y_1, y_2)$ in equation 15.1 will be underestimated, implying that mobility—which equals $1 - \rho(y_1, y_2)$—will be overestimated. More specifically, if random errors are added to y_1 and y_2, the numerator in equation 15.1 will be unchanged, but the denominator will become larger:

$$\rho_{me}(y_1, y_2) = \frac{\sigma_{y_1,y_2}}{\sqrt{\left(\sigma_{y_1}^2 + \sigma_{e_1}^2\right)\left(\sigma_{y_2}^2 + \sigma_{e_2}^2\right)}}$$

$$= \rho(y_1, y_2)\sqrt{\frac{\sigma_{y_1}^2\sigma_{y_2}^2}{\sigma_{y_1}^2\sigma_{y_2}^2 + \sigma_{y_1}^2\sigma_{e_2}^2 + \sigma_{e_1}^2\sigma_{y_2}^2 + \sigma_{e_1}^2\sigma_{e_2}^2}}$$

where $\rho_{me}(y_1, y_2)$ is the observed correlation when measurement error is present and e_1 and e_2 are the random measurement errors added to y_1 and y_2, respectively. Intuitively, these random errors add "noise" to y_1 and y_2. The larger the amount of noise, the less correlated will be y_1 and y_2, moving $\rho(y_1, y_2)$ closer to zero and increasing $m(y_1, y_2)$.

Fortunately, there is a simple way to estimate $\rho(y_1, y_2)$ that avoids measurement error bias.[4] All that is needed are instrumental variables that are correlated with y_1 and y_2 but uncorrelated with e_1 and e_2. To see this, recall that in a simple ordinary least squares (OLS) regression of a variable x_1 on a constant term and one other variable, call it x_2, the estimated coefficient for x_2, call it $b_{1\mathrm{LS}}$, has a probability limit (plim) equal to $\sigma_{x_1,x_2}/\sigma_{x_2}^2$. Similarly, a regression of x_2 on x_1 produces an estimated coefficient, call it $b_{2\mathrm{LS}}$, that has a plim equal to $\sigma_{x_1,x_2}/\sigma_{x_1}^2$. Thus, to estimate the correlation coefficient ρ between y_1 and y_2, one can regress y_1 on y_2 and y_2 on y_1 and then take the square root of the products of the associated coefficients:

$$\mathrm{plim}\left\lfloor\sqrt{b_{1\mathrm{LS}}b_{2\mathrm{LS}}}\right\rfloor = \sqrt{\frac{(\sigma_{y_1,y_2})^2}{\sigma_{y_1}^2\sigma_{y_2}^2}} = \rho(y_1, y_2)$$

where $b_{1\mathrm{LS}}$ is the coefficient from an OLS regression of y_1 on y_2 and $b_{2\mathrm{LS}}$ is the coefficient from an OLS regression of y_2 on y_1. Of course, if $b_{1\mathrm{LS}}$ and $b_{2\mathrm{LS}}$ are taken from simple OLS regressions, this estimate of $\rho(y_1, y_2)$ will still suffer from measurement error. It is possible, however, to use instrumental variables to correct for this measurement error (assuming that credible instruments can be found) and then to use the two b_{LS} coefficients to obtain a consistent estimate of $\rho(y_1, y_2)$.

Although this method to overcome bias due to measurement error works perfectly well in theory, finding suitable instrumental variables is not a simple task. Several problems can arise. Consider estimation of $\rho(y_1, y_2)$ by means of instrumental variables (the same reasoning applies for correlation between transformations of y_1 and y_2). If there were data on y_1 and y_2 without measurement error, it would be possible to consistently estimate $\rho(y_1, y_2)$ as the square root of the product of the OLS estimates of β_1 and β_2 from the following two regressions:

$$y_1{}^* = \alpha_1 + \beta_1 y_2{}^* + u_1 \tag{15.2}$$

$$y_2{}^* = \alpha_2 + \beta_2 y_1{}^* + u_2 \tag{15.3}$$

where asterisks denote variables that are measured without error. The u terms are, by definition, uncorrelated with the regressors in each equation. Unfortunately, one never observes y_1^* or y_2^* but instead observes:

$$y_1 = y_1^* + e_1 \tag{15.4}$$

$$y_2 = y_2^* + e_2 \tag{15.5}$$

where y_1 and y_2 denote observed values and e_1 and e_2 are random measurement errors. Substituting (15.4) and (15.5) into (15.2) and (15.3) gives the following relationships between observed variables:

$$y_1 = \alpha_1 + \beta_1 y_2 + u_1 + e_1 - \beta_1 e_2 \tag{15.6}$$

$$y_2 = \alpha_2 + \beta_2 y_1 + u_2 + e_2 - \beta_2 e_1. \tag{15.7}$$

For equation 15.6, an instrumental variable is needed that is correlated with y_2^* (and thus correlated with y_2) but uncorrelated with $u_1 + e_1 - \beta_1 e_2$, and for equation 15.7, an instrument is needed that is correlated with y_1^* (and thus with y_1) but uncorrelated with $u_2 + e_2 - \beta_2 e_1$.

Turn to the requirement that the instrument for y_1, denoted as z_1, must be uncorrelated with $u_2 + e_2 - \beta_2 e_1$. Consider an instrument for household per capita income or expenditure that has some causal relationship, such as land or capital stock or the education of the head of household. The first-stage equations for y_1^* and y_2^* are:

$$y_1^* = \gamma_1 + \delta_1 z_1 + v_1 \tag{15.8}$$

$$y_2^* = \gamma_2 + \delta_2 z_2 + v_2. \tag{15.9}$$

Even if such an instrumental variable is completely uncorrelated with the measurement errors e_1 and e_2, it can be shown that z_1 will be correlated with u_1. Indeed, as explained in Glewwe (2003), attempts to estimate correlation of y_1^* and y_2^* using causal instrumental variables z_1 and z_2 will produce estimates of the correlation of z_1 and z_2, not of y_1^* and y_2^*. One interesting example is the case where z does not change over time, so that $z_1 = z_2$; it can be shown that using this instrument will always yield a correlation coefficient of unity between y_1 and y_2.

This problem with causal variables as instruments implies that repeated measurements of y_1 and y_2 should be used as instrumental variables. For example, income and expenditure could be treated as two separate measurements (with error) of an underlying "standard of living" variable. Thus, income could be used as an instrument for expenditures and vice versa. Glewwe (2003) shows that the estimated correlation coefficient does not depend on which is the instrument and which is the instrumented variable, and this method provides unbiased estimates of the correlation coefficient if the measurement errors at the same time point across the two measurements are uncorrelated (one must also assume that measurement errors are not correlated over time *across* the two different types of measurement). If the measurement errors are positively correlated between the two different measurements at one time point, instrumental variable (IV) estimates will overestimate mobility; if they are negatively correlated, IV estimates will underestimate mobility.

To make these estimation issues more concrete, consider using income as an instrument for expenditures. This variable is constructed using different sections of the household questionnaire from Vietnam, so that random errors in recording data on the expenditure questions should have no effect on errors in recording data on the income questions. However, it is possible to imagine circumstances where observed income is positively correlated with measurement error in the expenditure variable. For example, suppose that some survey respondents are worried that the interviewer is a tax collector in disguise. These respondents may underreport both income and expenditures, so that the measurement errors in observed incomes are positively correlated with measurement errors in the expenditure data. Another scenario is an interviewer who wants to finish the interview quickly. He or she may not ask probing questions about additional sources of income and additional types of expenditure, leading to the same problem. Finally, it is possible to have situations where the respondent is not the person most knowledgeable about household income and expenditure (perhaps because the most knowledgeable person is temporarily away) and thus does not report some types of income and expenditure.

To summarize, this discussion suggests that any instrumental variable that has a causal role will yield inconsistent estimates of mobility, and an instrumental variable based on repeated measurements will tend to overestimate mobility. The ideal instrument would be a repeated measurement variable for which there is a good argument that its measurement errors are uncorrelated with those of the variable of interest. Anthropometric measurements, particularly those based on weight, are probably the best variables of that type. A final point is that when there is more than one instrumental variable, the assumption that all the instruments are uncorrelated with the (composite) error term can be tested using a standard overidentification test (see Davidson and MacKinnon [1993]).

Mobility in Vietnam in the 1990s

Vietnam provides an excellent case for studying mobility. In the 1980s, it was one of the poorest countries in the world. During the 1990s, its high rate of gross domestic product growth (8 percent) made it one of the most successful countries in reducing poverty and raising living standards. The reasons behind this success are currently under study. Despite these achievements, there is concern that the benefits of this economic growth are not being shared by all members of the population (World Bank 1999).

Background and Data

Another advantage of studying Vietnam is the availability of high-quality panel data. The data used in this chapter are taken from two household surveys conducted in the 1990s. The 1993 Vietnam Living Standards Survey (VLSS) was conducted from October 1992 to October 1993, collecting data from 4,800 households that made up a nationally representative sample. The 1998 VLSS was conducted from December 1997 to December 1998. It sampled 6,002 households, including about 4,300 of the households interviewed in the 1993 survey. Both surveys are patterned after the World Bank's Living Standards Measurement Study household surveys, which have been conducted in about 30 developing countries (Grosh and Glewwe 1998, 2000).

The two VLSSs contain a large amount of data on many different topics. The appendix to chapter 1 of this volume provides a brief description of these surveys; for detailed information, see World Bank (2000, 2001).[5] The focus of this chapter is on the overall economic welfare of households, particularly the mobility of household welfare over time. In both surveys, the indicator of economic welfare is per capita household consumption expenditures. Although income data exist, they are likely to be less accurate than expenditure data. More important, standard economic theory measures individual and household utility in terms of consumption expenditures, not income per se. However, income data can be useful. In particular, they can be used as an instrumental variable for per capita expenditures.

A final issue to address regarding the data is the number of households in the panel dataset and whether these households are a representative sample of Vietnamese households interviewed in the 1993 survey. This information is summarized in table 15.1. Of the original sample of 4,800 households, all but 96 (2 percent) were selected to be reinterviewed in the 1998 survey.[6] Of the 4,704 selected households, 404 (8.4 percent) were not reinterviewed in the 1998 survey. More specifically, interviewers were instructed to return to the dwelling that the household inhabited in the 1993 survey. If the household had moved within its village, interviewers attempted to find them and complete the interview. If the household had moved outside the village, no attempt was made to reinterview them. If some household members moved and others remained in the original dwelling, the interview was done using all the current inhabitants of the original dwelling (both original members and newcomers).

Thus, of the 4,800 households interviewed in 1993, 4,300 were reinterviewed in 1998, which is a retention rate of 89.6 percent. However, some of the households that remained may have rather tenuous links to the original household. First, households for which the head in 1993 is no longer a household member in 1998, and the new head in 1998 was not a member in the 1993 survey, should probably be excluded. Doing this eliminates 24 households, slightly reducing the retention rate to 89.1 percent. The remaining 4,276 households are the first sample used in this chapter. A stricter definition of household retention is to require that at least one-half of the individuals who were members in either 1993 or 1998 were members in both years. Doing this eliminates another 440 households, which leads to a retention rate of 79.9 percent.[7] The remaining 3,842 households are the second sample used in this chapter.

Table 15.1. Panel Attrition

Indicator	*Households*	*Individuals*
Sample attrition over time		
Sample in 1993 survey	4,800	23,839
Excluded from 1998 survey	96 (2.0%)	421 (1.8%)
Entire household moved	404 (8.4%)	1,786 (7.5%)
Remaining households	4,300 (89.6%)	21,632 (90.7%)
Among remaining 4,300 households		
Head is the same in both years	4,276 (89.1%)	21,538 (90.3%)
50 percent or more members are the same in both years	3,836 (79.9%)	19,100 (80.1%)
50 percent or more members are the same in both years, plus six "natural" cases	3,842 (80.0%)	19,119 (80.2%)

Note: The six natural cases refer to households in which no one moved in or out of the household in the past five years, but death or birth led to cases where the number of household members present in both years was less than 50 percent of the individuals who were members in either year. Examples are a household with three adults in 1993, of which two had died by 1998, and a household with a married couple in 1993 who had had three children by 1998.

The figure of 19,119 includes 1,660 individuals in panel households who joined the household after 1993. When those individuals are excluded, the number of individuals who were members in the 3,842 households in both years is 17,459, which is 74.5 percent of the individuals originally surveyed in all 4,800 households in 1993.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Measured Mobility without Correction for Measurement Error

By definition, mobility measures summarize in a single number the relationship between the distribution of income at two points in time. These numbers do not always have intuitive appeal, so it is useful to start by depicting mobility in the form of transition matrices. Table 15.2 presents (relative) transition matrices for Vietnam from 1993 to 1998, using the VLSS data. In each year, households are grouped by quintiles (poorest 20 percent, next poorest 20 percent, and so on, up to the most well-off 20 percent) to see how frequently they move across these groups. To check for robustness, both samples of panel households that were described above are used—one in which households are assumed to be the same if the head in one year was also a household member in the other year, and the other in which at least one-half of the individuals who were members in either 1993 or 1998 were members in both years.

The results appear to display a substantial amount of mobility. Only 41 percent of the population remained in the same quintile in the two years; about 40 percent moved up or down by one quintile, and 19 percent moved up or down by two or more quintiles. These results are almost identical for the two samples. Thus, ignoring measurement error, one might conclude that the modest increase in inequality in Vietnam in the 1990s is not a major

Table 15.2. Transition Matrix for Vietnam, 1993 and 1998

	1998 quintile					
1993 quintile	*1*	*2*	*3*	*4*	*5*	*Row total*
			Head of household is the same			
1	2,186	1,143	689	332	45	4,395
	(10.2%)	(5.3%)	(3.2%)	(1.5%)	(0.2%)	(20.4%)
2	1,069	1,366	1,180	615	146	436
	(5.0%)	(6.3%)	(5.5%)	(2.9%)	(0.7%)	(20.3%)
3	501	936	1,169	1,244	501	4,351
	(2.3%)	(4.4%)	(5.4%)	(5.8%)	(2.3%)	(20.2%)
4	163	569	1,038	1,463	1,073	4,306
	(0.8%)	(2.6%)	(4.8%)	(6.8%)	(5.0%)	(20.0%)
5	48	148	440	929	2,536	4,101
	(0.2%)	(0.7%)	(2.0%)	(4.3%)	(11.8%)	(19.1%)
Column total	3,967	4,162	4,516	4,583	4,301	21,529
	(18.4%)	(19.3%)	(21.0%)	(21.3%)	(20.0%)	(100.0%)
			50 percent or more of household members are the same			
1	2,007	1,054	620	242	33	3,956
	(10.5%)	(5.5%)	(3.3%)	(1.3%)	(0.2%)	(20.7%)
2	909	1,302	1,086	568	113	3,978
	(4.8%)	(6.8%)	(5.7%)	(3.0%)	(0.6%)	(20.8%)
3	463	874	1,077	1,127	402	3,943
	(2.4%)	(4.6%)	(5.6%)	(5.9%)	(2.1%)	(20.6%)
4	131	492	924	1,325	876	3,748
	(0.7%)	(2.6%)	(4.8%)	(6.9%)	(4.6%)	(19.6%)
5	36	106	385	792	2,160	3,479
	(0.2%)	(0.6%)	(2.0%)	(4.2%)	(11.3%)	(18.2%)
Column total	3,546	3,828	4,092	4,054	3,584	19,104
	(18.6%)	(20.0%)	(21.4%)	(21.2%)	(18.8%)	(100.0%)

Note: All numbers and percentages are in terms of individuals, not households.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

concern, because low levels of household expenditures appear to be a temporary phenomenon for many households. In particular, about one-half of the population that was in the poorest quintile of the population in 1993 was no longer in that bottom quintile in 1998.

How does this degree of mobility manifest itself in terms of mobility measures based on correlations of functions of the household expenditure variable? The answer is seen in table 15.3. As long as incomes are not negatively correlated over time, correlations will lie between zero (complete mobility in the sense that incomes in period 1 and period 2 are uncorrelated) and one (no mobility). Thus, all mobility measures based on correlation of

Table 15.3. Estimated Mobility, Ignoring Measurement Error

Mobility index	*Sample in which head of household is the same in both years*	*Sample in which 50 percent of members are the same in both years*
$1 - \rho(y_1, y_2)$	0.309	0.299
	(0.011)	(0.012)
$1 - \rho(\sqrt{y_1}, \sqrt{y_2})$	0.292	0.278
	(0.011)	(0.011)
$1 - \rho\left(y_1^2, y_2^2\right)$	0.395	0.394
	(0.012)	(0.013)
$1 - \rho(\text{rank}(y_1), \text{rank}(y_2))$	0.331	0.316
	(0.011)	(0.012)
$1 - \rho(\ln(y_1), \ln(y_2))$	0.298	0.282
	(0.011)	(0.011)
Number of households	4,281	3,845

Note: Standard errors in parentheses.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

functions of the income variable will lie between one (complete mobility) and zero (no mobility). The mobility measures in table 15.3 range between 0.278 and 0.395, which in general indicates substantial mobility, although it is further from complete mobility than from complete immobility.

The main point of table 15.3 is to show how the mobility seen in the transition matrices of table 15.2 is measured by these mobility indexes. With one exception, the different mobility measures give similar results. Specifically, when the mobility index based on the correlation of the square of the income is excluded, the indexes range from 0.278 to 0.331. The highest value—0.395—occurs for the mobility index based on squaring the income variable.

The mobility shown in tables 15.2 and 15.3 is almost certainly overestimated because it ignores measurement error. This issue is addressed in the next subsection, but before turning to that, it is useful to demonstrate that the regression approach is in fact an alternative way to estimate the correlation coefficient. This is seen in table 15.4 for the simple correlation coefficient. The first line shows the correlation coefficients for per capita expenditures in the two years for both samples of households, which is simply one minus the associated mobility index given in table 15.3. The second line shows the OLS estimates of the parameter β_2, the "slope" coefficient from a regression of 1993 per capita expenditures on 1998 per capita expenditures and a constant term. The third line shows the estimate of β_1, the slope coefficient from a regression of 1993 per capita expenditures on 1998 per capita expenditures and a constant term. The fourth line demonstrates that the square root of the product of the estimates of these two coefficients yields the (estimated) correlation coefficient.

Table 15.4. Correlation Coefficients without Correction for Measurement Error

Statistic	*Sample in which head is the same in both years*	*Sample in which 50 percent of members are the same in both years*
$\rho(y_1, y_2)$	0.691	0.701
	(0.011)	(0.012)
β_2(OLS)	0.315	0.327
	(0.013)	(0.015)
β_1(OLS)	1.517	1.502
	(0.107)	(0.106)
$\sqrt{\beta_1\beta_2}$ (OLS)	0.691	0.701
	(0.028)	(0.029)

Note: OLS = Ordinary least squares. Standard errors in parentheses. Standard errors for OLS estimates account for clustered sample design. Standard errors for estimates of $\sqrt{\beta_1\beta_2}$ calculated using the delta method.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Estimates of Mobility Corrected for Measurement Error

Once suitable instrumental variables are found, estimates of β_1 and β_2 that are free of attenuation bias can be obtained and then be used to calculate mobility. This was done for the mobility index $1 - \rho(x, y)$ for three different types of instrumental variables. The first instrumental variable is simply household income per capita. Household income is collected in a different part of the VLSS questionnaire than the data used to calculate household expenditures, which reduces (but does not necessarily eliminate) the possibility that random errors in reported household expenditures spill over into the household income variable. Of course, household income is likely to be measured with random error as well, but as long as those errors are unrelated to the errors in the expenditure variable, it is still a valid instrumental variable.

The first row of table 15.5 shows estimates of economic mobility when per capita expenditures are instrumented using household income. As expected, the estimated mobility is much lower than the uncorrected estimates given in table 15.3. The figures in brackets show the IV-corrected estimates as a percentage of the uncorrected estimates. This figure is 56 percent for the "head same" sample and 53.8 percent for the "50% of members same" sample. Recall that if measurement errors in income are positively correlated with measurement errors in expenditures, then these IV estimates will overestimate true mobility. This implies that these estimates can be thought of as upper bounds of the true amount of mobility. Thus, nearly half, and perhaps even more than half, of the mobility shown in table 15.3 is due to measurement error and is therefore spurious.

Table 15.5. Estimated Mobility Using Three Different Types of Instrumental Variables

Instrument set	*Sample in which head is the same in both years*	*Sample in which 50 percent of members are the same in both years*
Per capita income		
$1 - \rho(y_1, y_2)$	0.173 [0.560]	0.161 [0.538]
Durable goods		
$1 - \rho(y_1, y_2)$	0.102 [0.330]	0.118 [0.395]
$\chi^2(5)$ tests:		
β_2	86.5***	95.7***
β_1	69.7***	85.0***
Body mass index		
$1 - \rho(y_1, y_2)$	0.121 [0.392]	0.101 [0.338]
Per capita income and body mass index		
$1 - \rho(y_1, y_2)$	0.167 [0.553]	0.153 [0.512]
$\chi^2(1)$ tests:		
β_2	0.4	0.4
β_1	2.6	3.5*

*Significant at 10 percent level.

***Significant at 1 percent level.

Note: Numbers in brackets are the estimated mobility as a fraction of estimated mobility (ignoring measurement error) given in table 15.3.

Source: Authors' calculations using the 1993 and 1998 VLSSs.

Because use of income as an instrumental variable is likely to overestimate mobility, it is useful to estimate mobility by using other plausible instrumental variables. One possibility is the ownership of basic durable goods, such as televisions, bicycles, motorcycles, video cassette player-recorders (VCRs), and refrigerators. Households should make many fewer errors in reporting this information relative to reporting their incomes. If they make no errors at all, then there can be no correlation between errors in reported income and errors in the ownership of durable goods (because the latter type of error is always equal to zero).

Estimates of mobility that correct for measurement error by using the ownership of durable goods as instrumental variables are reported in the second row of table 15.5. For both samples, the reported mobility is even lower than when household income is used as an instrument. Specifically, mobility is estimated to be 0.102 for the "head same" sample and 0.118 for the "50 percent of members are the same" sample. Taken at face value, these estimates suggest that almost two-thirds of the observed mobility in Vietnam seen in table 15.3 is purely due to measurement error in the expenditure variable.

Yet there are conceptual problems with durable goods as an instrumental variable. First, it is possible that some durable goods are forgotten altogether (or deliberately omitted) during the interview. This could cause positive correlation in the measurement errors of expenditures and of durable goods, because the expenditure variable used here includes the estimated "use value" derived from the ownership of durable goods. Such correlation would lead to overestimation of mobility. Second, and more seriously, even if there were no measurement error in durable goods, it is possible that this instrument is correlated with the u terms in equations 15.2 and 15.3. Because durable goods by definition last a long time, their production of use value in both time periods is similar to the impact of using causal variables as instruments. Thus, these instrumental variables will not provide consistent estimates of mobility.

The validity of durable goods as instrumental variables was checked using overidentification tests for the regressions corresponding to equations 15.2 and 15.3. This is possible because there were six durable goods used as instruments (color televisions, black and white televisions, bicycles, motorbikes, VCRs, and refrigerators). The results are shown in the third and fourth rows of table 15.5. The overidentification tests strongly reject the assumption that the instrumental variables are uncorrelated with the composite error terms in equations 15.4 and 15.5, so the estimates of mobility based on durable goods as instrumental variables must be discarded.

A final instrumental variable considered in this chapter is the average body mass index (BMI) of adults ages 18 and over. The VLSSs collected height, weight, and arm circumference information from all household members. This can be used to calculate each adult's BMI, which is defined as the weight of an individual (in kilograms) divided by the square of his or her height (in meters). Very simply, this indicates how "heavy" a person is given his or her height. Poorer individuals have leaner diets and thus are less heavy. The key advantage of using BMI is that any measurement errors in it are extremely unlikely to be correlated with measurement errors in household expenditures. First, this information was not collected by the interviewer who filled out the household questionnaire, but instead it was filled out by a completely different survey team member. Second, none of the scenarios describing how income and expenditures may be correlated (such as households fearing tax collectors or interviewers wanting to finish the interview quickly) provides a coherent story as to why errors in the measurement of BMI should be correlated with errors in the measurement of household expenditures. Nevertheless, there is a potential that BMI is correlated with the u terms in equations 15.2 and 15.3. A "thin" person in 1993 may have a compromised ability to earn income not only in that year but also in future years, which implies that BMI in 1993 may have a direct causal relationship with household income and expenditures in 1998. This would lead to underestimation of the true amount of mobility.

The fifth row of table 15.5 provides estimates of the mobility index $1 - \rho(y_1, y_2)$ using household BMI (averaged over all adult household members) as an instrumental variable. Mobility is estimated at 0.121 for the "head same" sample and 0.101 for the "50 percent of members are the same" sample. As explained, this is a lower bound on the true value of mobility. This implies that true mobility may be only about one-third of the mobility measured without correcting for measurement error.

As a final check on the regression results obtained from using household income and BMI as instrumental variables, both were used as instruments. The results are shown in the last three rows of table 15.5. Predicted mobility is slightly lower than it was when income alone was used. More interesting, because there are two instrumental variables, the exclusion restrictions can be tested using an overidentification test. In contrast to the case where durable goods were used, this specification easily passes the overidentification test in three of four cases, and in the fourth case the hypothesis that the instruments are not correlated with the compound error term can be rejected only at the 10 percent level. These estimates suggest that about one-half of measured mobility is spurious, which implies that true mobility is much lower than seen in tables 15.2 and 15.3.

Conclusion

Vietnam's rapid economic growth and relatively stable distribution of income suggest that all socioeconomic groups are benefiting from the booming Vietnamese economy. Moreover, simple calculations using panel data suggest that there is a large amount of economic mobility within Vietnam, which is appealing because it suggests that the long-run distribution of income is more equal than the distribution at any given point in time. However, such estimates of mobility may well overestimate true mobility because there is a large amount of measurement error in the data.

This chapter applies a simple method to estimate economic mobility that corrects for bias caused by measurement error in the variable of interest. When applied to the data from Vietnam, it shows that almost one-half, and perhaps even more, of economic mobility is an artifact of measurement error and is thus illusory. This implies that Vietnam's worries about increasing inequality cannot be dismissed by pointing to high economic mobility, because such mobility is much lower than simple calculations suggest. Given the Vietnamese government's desire to minimize increases in inequality as economic growth continues, efforts to keep inequality from increasing must be in the forefront of the government's agenda.

Notes

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1. In this chapter, we focus on consumption expenditures instead of income because expenditure data are, in general, more accurate (see Deaton and Grosh [2000]).

2. Following the literature on the measurement of mobility, this section refers to households' incomes, rather than to their consumption expenditures. However, everything in this section also applies to analyses based on household expenditures.

3. In theory, negative correlation in incomes over time could exist; this would lead to mobility measures greater than one. But such a relationship, which would imply that households that are better off than average in the first time period would be poorer than average in the second time period, has never been found in data from any country.

4. The problem of measurement error and the use of instrumental variable methods to deal with it have been used in the literature on intergenerational mobility. See, for example, Solon (1992).

5. These documents can be downloaded from the Web site http://www.worldbank.org/lsms/lsmshome.html.

6. The 96 excluded households were all from the Red River Delta region. They were excluded because the 1998 survey oversampled certain regions. The Red River Delta was not one of the oversampled regions, so fewer households were needed from it even though the sample size of the survey was increased from 4,800 to 6,002.

7. This retention rate includes six "natural cases" in which the number of household members present in both years was less than 50 percent of the individuals who were members in either year; no one moved in or out of the household during the five-year time period because all changes were due to births or deaths. Examples are a household with three adults in 1993, of which two had died by 1998, and a household with a married couple in 1993 who had had three children by 1998.

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16

Private Interhousehold Transfers in Vietnam

Donald Cox

This chapter investigates patterns of private, interhousehold income transfers using the 1992–93 and 1997–98 Vietnam Living Standards Surveys (VLSSs).[1] Several questions will be explored, such as "Do private transfers help equalize incomes?" "Has Vietnam's rapid economic growth during the 1990s diminished the importance of private transfers?" "What are the socioeconomic and demographic factors most strongly associated with transfers?" "How much private transfer income flows from adult children to their parents?" "How much flows from parents to children?" "How do gifts differ from informal loans?"

There are several reasons why private income transfers between households are important, especially for a poor but rapidly growing country such as Vietnam. Private transfers can perform the same functions that public transfers do in richer countries. For example, private old-age support can function like social security for many elderly households. Furthermore, since the earliest analyses of private transfer behavior, economists have speculated that private and public transfers can interact. Most notably, Becker (1974) and Barro (1974) argued that expansions of public transfers could conceivably "crowd out" existing private transfers, leaving the distribution of living standards largely unchanged.

Nevertheless, the specter of crowding out is not the only reason to be interested in private transfer behavior. Private transfers have been found to resemble credit markets in helping households overcome borrowing constraints (Cox 1990), and they can assist households in dealing with risk (Cox and Jimenez 1998; Morduch 1995; Townsend 1994). Furthermore, they can help finance human capital investment by providing support to younger workers who have recently left home. Private income transfers could represent one side of a transaction where in-kind help is exchanged between households (Bernheim, Shleifer, and Summers 1985; Cox 1987).

The descriptive work in this chapter does not settle any of the deeper issues connected with crowding out or motivations for private transfers. Instead, it is a first step toward understanding the basics of private transfer behavior in Vietnam. For example, for the problem of crowding out to have any policy relevance, private transfers need to be widespread and large enough to be supplanted by public transfers. Obviously, if there are few private transfers to begin with, not much would be crowded out by the expansion of public safety nets. Private transfers are indeed common and substantial in Vietnam, however, especially as a means of support for the elderly.

Furthermore, much of the analysis in this chapter makes use of the panel aspect of the VLSSs. Despite the value of panel data for studying private transfer behavior, few true panel studies exist.[2] After exploring the relationship between changes in private transfers and changes in household socioeconomic and demographic variables, this study finds that private transfers appear responsive to changes in earning potential and life events, such as retirement or widowhood.

The analysis is limited by the data in two ways. First, though private transfers can take many forms, such as time spent helping someone or the provision of moral support and companionship, this chapter's focus is on money transfers. The only in-kind transfers that are examined here are the money value of in-kind gifts included with monetary gifts. Second, though many transfers occur within rather than between households, almost all of this analysis is concerned with the latter.

In addition, this work has a narrower definition of private transfers than the one used in earlier, related work that uses only the 1993 VLSS (Cox, Fetzer, and Jimenez 1998). There are two reasons for narrowing the definition. First, the focus here is on transfer measures that contain information about the sources of transfers received and the destinations of transfers given, to analyze the directions of transfers according to generation. Not all private transfer measures in the earlier work provide information about generational directions of transfers. Second, this study concentrates on transfers that are measured consistently between the 1993 and 1998 surveys in creating a panel for private transfers.

There is a further methodological limitation of this study. The analyses were limited to simple cross-tabulations to provide an overview of the data that is wide ranging and simple, rather than narrow and nuanced. This descriptive work is intended to stimulate interest in testing some of the more complex policy and behavioral issues, such as crowding out.

Despite the simple methods, this chapter reaches several firm conclusions about private transfers:

- Rapid economic growth has not diminished the importance of private transfers in Vietnam.
- Private transfers are the main means of income redistribution in Vietnam; they are more than twice the size of public transfers.
- Private transfers flow mostly from adult children to their parents, rather than the other way around.

- Those who give transfers are in better economic condition than those who receive them.
- Inflows of private transfers increase upon retirement of the household head.
- Few gifts are given to nonrelatives, but half of all loans are made to nonrelatives.
- Receiving private transfers in 1993 increased the chances of receiving them in 1998, but a nontrivial number of households changed from givers to recipients, or vice versa, between surveys.
- Most private transfers flow between households sharing the same locale, but many transfers cross regional boundaries, and a significant fraction of transfer income is received from foreign sources.
- Victims of Typhoon Linda, a devastating storm that hit Vietnam's southernmost provinces just before the 1998 survey, appeared to receive increased private transfers as a consequence of that disaster.
- Though private transfers are widespread in Vietnam, they are not ubiquitous; half of the households neither gave nor received any gifts or loans in 1998, for instance.

Some background is needed to help put the results in perspective. Vietnam experienced extraordinary economic growth in the 1990s, with living standards a full two-thirds higher at the decade's end than at its beginning. Vietnam is still a poor, agrarian economy, but it has become a lot less poor—and less agrarian—in recent years. Headcount poverty plunged from 58 percent to 37 percent from 1993 to 1998, thanks to broadly based growth (Glewwe, Gragnolati, and Zaman 2000). Agriculture accounted for a mere 25 percent of gross domestic product (GDP) at the end of the decade, compared with more than 40 percent at the beginning of the decade. Despite agriculture's dwindling share of GDP, farm productivity growth has been impressive. Increased rice yields have made Vietnam the world's second leading rice exporter.

Vietnam's growth is due to two things. The first is a series of reform policies (*Doi Moi*—"renovation") allowing free enterprise in farming, foreign direct investment, and elimination of price controls and trade barriers. The second, related to the first, is the start of a transition from agriculture to manufacturing.

Despite recent, dramatic progress, Vietnam still has a severe poverty problem, which its public safety nets are ill equipped to handle (van de Walle 2004). An alternative to public safety nets is the system of informal, private safety nets in the form of interhousehold transfers. Cox, Fetzer, and Jimenez (1998) have explored the extent, magnitude, and patterns for these transfers in Vietnam using the 1993 VLSS. That study indicated that private transfers were large and widespread and frequently followed patterns similar to means-tested public transfers, in that they appeared to flow from better-off to worse-off households. Cox, Fetzer, and Jimenez concluded by noting the difficulty of predicting the response of private transfers to economic liberalization on the basis of a single cross-section of data.

This chapter extends that work by adding information from the 1998 VLSS. These two waves make it possible to track Vietnam's private transfers during a time of rapid economic growth and examine how they are related to changes in household incomes and life events. Another extension of the earlier work is to focus separately on familial giving versus lending; Cox, Fetzer, and Jimenez (1998) focused mostly on aggregated transfers.

Conventional wisdom suggests that economic growth would weaken a household's ties with extended kin living elsewhere and would contribute to the ascendancy of the nuclear family.[3] It also suggests that growth would alter the direction of private transfers, with less going from children to parents and more going from parents to children.

It is important to know what growth did to Vietnam's interhousehold transfers. If, for example, extended familial networks do indeed begin to fall apart, growth might worsen income uncertainty and inequality. Furthermore, the change in the direction of transfers—the so-called demographic transition—could threaten to leave a generation of elderly people deprived of familial support. Conversely, failure to attain demographic transition could leave younger persons short of the funds needed for acquiring human capital.

Rapid economic growth in the region is, of course, not unprecedented; its impact on family networks in other countries has not gone unnoticed. Most notably, Lee, Parish, and Willis (1994) found that the rapid economic growth in Taiwan, China, did little to diminish children's support for their parents. Similar to Taiwan, Vietnam has a Confucian heritage that emphasizes filial loyalty to parents. Also similarly to Taiwan, Vietnam's patterns of intergenerational support have changed little in the face of rapid economic growth.

The first section of this chapter discusses patterns in private transfer and panel evidence. Then the geography of private transfers is investigated: how much is transferred within regions versus how much is transferred between regions, for example, and how much is transferred in faster versus slower growing areas. The final section describes private transfer inflows for households affected by Typhoon Linda.

Patterns in Private Transfers

The description of private transfers in this chapter begins with separate discussions of the 1993 and 1998 VLSSs, then proceeds to a description of panel evidence, which concentrates on the changes in household characteristics and their relationship to changes in private transfers.

Cross-Sectional Patterns, 1993 Vietnam Living Standards Survey

The 1993 VLSS was a nationwide household survey of 4,800 households. The VLSS is part of the World Bank's Living Standards Measurement Study, which collects information about household living standards for several developing countries. The VLSS gathered data about the education, health, and employment of household members, as well as about household composition, income, and expenditures.

INTER-VIVOS TRANSFERS ("GIFTS") 1993. The 1993 VLSS measured private transfers in the form of money and goods transferred between households. The head of the household was asked questions about transfer inflows in the module for nonlabor income: "During the past 12 months has any member of your household received money or goods from persons who are not members of your household? For example, [has a member received] assistance sent by relatives working elsewhere or by children of household members, by friends or by neighbors?"

The head was then asked to provide the names of those who sent transfers and their relationship to the person in the household who received them (father or daughter, for instance). The head was also asked to place a monetary value on in-kind transfers received.

Transfer outflows were asked about in the module for household expenses. The question for outflows mirrors that of inflows. The head was asked: "During the past 12 months has any member of your household provided money or goods to persons who are not members of your household? For example, [has a member provided assistance to] children or relatives living elsewhere or to other persons?"

Paralleling what was asked about inflows, the head identified the person who sent each transfer and that person's relationship to the recipient. These transfers do not include remittances from someone temporarily away from home, because that person is still considered a household member, and the question is concerned only with transfers between households. Thus, a household is defined as a "recipient" if there is an affirmative answer to the question about transfer inflows, and a "giver" if there is an affirmative answer about outflows.

About one-third of the households in the 1993 survey were involved with private transfers—as defined above—either as givers, recipients, or both (table 16.1).[4]

Table 16.1. Households Involved in Private Transfers, 1993

Category	*Number*	*Percent*
Households involved in private transfers that	1,567	32.8
Only gave	597	12.5
Only received	780	16.3
Both gave and received	190	4.0
Households that neither gave nor received transfers	3,211	67.2
Total	4,778	100.0

Source: Author's calculations from the 1993 VLSS.

Table 16.2. Transfers and Total Income, 1993

Indicator	*Private*	*Public*
Transfers as a percentage of total income		
All households	7.9	2.3
Recipient households	32.0	11.7
Number of recipient households	970	1,014
Percentage of recipient households with pretransfer income in lowest quintile	25.0	21.8

Source: Author's calculations from the 1993 VLSS.

Table 16.3. Household Economic Situation by Transfer Status, 1993

Indicator	*Net givers*	*Net recipients*	*Others*
Pre–private transfer income per year (thousand dong)	1,728	1,147	1,171
Post–private transfer income per year, (thousand dong)	1,633	1,689	1,171
Average percentage of economically active people in the household	57.8	50.5	55.0
Percentage with unemployed members	7.1	8.7	5.0
Percentage with educated household head	43.1	40.6	35.6
Number of households	646	913	3,219

Source: Author's calculations from the 1993 VLSS.

For the whole sample, including those who did not receive anything, transfer receipts accounted for 8 percent of total household income (table 16.2). For only the sample of recipients, transfer receipts accounted for nearly one-third of income. Public transfers are as widespread as private transfers, but they are smaller, averaging slightly more than 2 percent of income for the whole sample (table 16.2).

How do private and public transfers compare in their ability to reach the poorest households? First, consider the distribution of income before public or private transfers (that is, pretransfer income) and focus on the 20th percentile. Twenty-five percent of private transfer recipients had pretransfer incomes that fell short of the 20th percentile, compared with 22 percent of public transfer recipients. Thus, at least by this crude measure, private transfers appear marginally better targeted to the poor.[5]

How do households giving private transfers differ from those receiving them? Table 16.3 contrasts the economic situation of givers, recipients, and those doing neither. Because some households both gave and received, net transfers are used to determine the excess of receipts over gifts and vice versa.

Givers are in better economic condition than recipients. Consider household income before private transfers, or pre–private transfer income. For recipients, this is income minus net transfers; for givers, income plus net transfers. (Incomes are measured on an annual per capita basis and are expressed in thousands of dong per year [TDY].) Average pre–private transfer income of givers far exceeds that of recipients—1,728 TDY versus 1,147 TDY. At 1,171 TDY, the income of those neither giving nor receiving ("others") is in between these values but closer to that of recipients. Private transfers narrow the disparity between giver and recipient income, reducing the average income of givers to 1,633 TDY and raising that of recipients to 1,689 TDY. Note, too, that the posttransfer income of recipients exceeds that of the two other groups.[6]

Givers are better off than recipients in other ways besides pre–private transfer income. They have a larger proportion of economically active people in the household and experience a bit less unemployment. They are also better educated: Relatively more giver households are headed by someone with at least a lower secondary education.

The figures in table 16.3 do not prove that private transfers flow from better-off to poorer households. Proof would require a dataset with matched donors and recipients. The VLSS records only one side of the transaction. It could be, for instance, that recipients have received their transfers from households even poorer than they. But the VLSS is a random sample of households, so the difference in the means of giver and recipient incomes is an unbiased estimate of the mean difference of giver and recipient incomes.[7]

Givers and recipients have different demographic characteristics, as well (table 16.4). Recipient households are more likely to be headed by an older person or a woman, and giver households are less likely to be headed by a younger person. Minority households, which make up 13.2 percent of the whole sample, are underrepresented among both givers and recipients.[8]

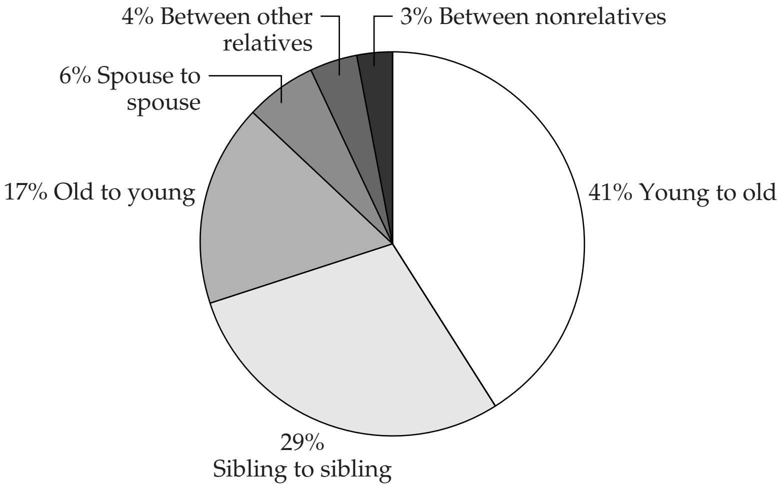
Interhousehold transfers and migration obviously have a lot to do with one another. An adult child making an interhousehold transfer to parents must have already left home. But what about a son or a daughter who takes a distant but temporary job and remits to parents? The VLSS downplays these transfers because it treats temporary migrants as members of the household. This is probably why having a person temporarily absent from the household matters so little for transfers.[9] Net recipients have only a

Table 16.4. Household Demographics by Transfer Status, 1993

Variable	*Net givers*	*Net recipients*	*Others*
Headed by young (percent)	7.9	11.1	11.8
Headed by elderly (percent)	13.2	26.1	15.1
Headed by female (percent)	20.9	35.9	21.5
With absent members (percent)	10.6	12.6	10.2
Household size (number of members)	5.8	5.4	5.9
Number of households	646	913	3,219

Source: Author's calculations from the 1993 VLSS.

Figure 16.1. Generational Directions of Private Transfers, 1993



Source: Author's calculations using VLSS.

slightly higher percentage of absent members than the other households (table 16.4).

Table 16.4 shows that the elderly (defined as ages 60 and older) are overrepresented among transfer recipients, but the young (defined as ages 30 and under) are not. These figures suggest that transfers tend to flow from young to old; more detailed calculations reinforce this result. Givers were asked to name the relationship of the recipient (his or her father, sister, son, father-in-law, and so on). Similarly, recipients were asked to name the relationship of the donor. Transfers were classified by generational direction, using information about transfers received and transfers given. For instance, transfers given to older people were summed with transfers received from younger people to get total transfers from young to old. Transfers from old to young, sibling to sibling, and so forth were computed the same way.[10] Figure 16.1 displays this breakdown of private transfers.

Figure 16.1 illustrates the importance of private old-age support in Vietnam. The value of transfers from young to old is more than twice as large as that from old to young (41 percent and 17 percent, respectively). This is exactly the opposite of what is observed in developed countries. (In the United States, for example, financial transfers from young to old are rare; most transfers go in the opposite direction, according to Cox and Raines [1985].) Figure 16.1 is also striking in the importance of transfers between siblings, which account for 29 percent of transfer flows.

Most (92 percent) of what are called "young-to-old" transfers are transfers from children to their parents or parents-in-law, and nearly all (98 percent) of what are called "old-to-young" transfers are transfers from parents to their children or children-in-law.[11]

LOANS, 1993. In addition to gifts, the 1993 VLSS contains information on interhousehold borrowing but little about lending. This discrepancy was fixed in the 1998 VLSS, so a detailed discussion of loans is deferred until the next section. But the reasonably detailed information in the 1993 VLSS about borrowing is nonetheless useful, because it shows that loans were widespread in 1993. Including loans in the definition of transfers received would almost double the percentage of recipient households, from 23 percent to 43 percent. Adding loans to gifts in the definition of transfers nearly doubles the percentage of private transfers in total income, from 8 percent to 15 percent. These issues are explored further in the next section, which analyzes the more comprehensive data on loans in the 1998 VLSS.

Cross-Sectional Patterns, 1998 Vietnam Living Standards Survey

One of the reasons for conducting the 1998 VLSS was to create a panel by reinterviewing the 1993 VLSS households. Before analyzing the panel, though, two simpler issues are explored, using only the 1998 cross-section of the VLSS. The first issue concerns the stability of the cross-sectional private transfer patterns over time. They are indeed quite stable: The patterns found in 1993 are mostly repeated in 1998. The second issue concerns changes in the 1998 survey. Households were asked more detailed questions about interhousehold loans and public transfers, and they were asked what their gifts and loans were spent on (that is, to finance a consumer durable, to buy food, and so on).

The 1998 VLSS is larger than the 1993 VLSS: 1,200 new households were added to facilitate disaggregated analyses. The new households are not a self-weighted sample; urban areas and certain regions were oversampled.[12] For this reason, the survey weights are used in the tables below.

A comparison of the two cross-sections shows that Vietnam's economic growth has not reduced its private transfer activity; transfers were just as large and widespread in 1998 as they were in 1993. Table 16.5 classifies households according to their involvement with private transfers in 1998.

Table 16.5. Households Involved in Private Transfers, 1998: A Comparison of Gifts and Gifts Plus Loans

	Gifts		*Gifts plus loans*	
Category	*N*	*Percent*	*N*	*Percent*
Households involved in private transfers that	2,208	37.2	3,112	52.4
Only gave	830	14.0	895	15.1
Only received	1,091	18.4	1,677	28.2
Both gave and received	287	4.8	540	9.1
Households that neither gave nor received	3,732	62.8	2,828	47.6
Total	5,940	100.0	5,940	100.0

Source: Author's calculations from the 1998 VLSS.

Table 16.6. Transfers and Total Income, 1998

Indicator	*Private (gifts)*	*Private (gifts and loans)*	*Public*
Transfers as percentage of total income			
All households	6.8	12.2	3.1
Recipient households	25.3	32.7	17.6
Number of recipient households	1,379	2,217	1,178
Percent of recipient households with pretransfer income in lowest quintile	24.9	22.0	25.9

Source: Author's calculations from the 1998 VLSS.

The first two columns of table 16.5 replicate what table 16.1 does for the 1993 households. The percentage of households participating in private transfers (as givers, recipients, or both) is found to be slightly higher in 1998 than it was in 1993—39 percent versus 35 percent, respectively.

The next two columns in table 16.5 are based on an expanded definition of private transfers, which includes interhousehold borrowing and lending. (This was not possible for the 1993 VLSS, which had only limited information about household lending.) Expanding the definition of transfers to include loans raises the percentage of households involved with transfers to 52 percent from the 37 percent based on only gifts (first row, table 16.5). The loans are large. Adding them to gifts raises the proportion of private transfers in total income to 12 percent from the 7 percent figure based on gifts (table 16.6, second and third columns).

Public transfers were undercounted in the 1993 survey because social subsidies were not specified clearly. The 1998 survey gathered more detail about social subsidies and added questions about government poverty alleviation and nongovernmental organization assistance. Despite these changes, public transfers are still only 3 percent of total income, a good deal less than that of private transfers, regardless of how the latter are defined (table 16.6).[13]

The 1993 survey results suggested that private transfers were slightly better targeted than public transfers. Table 16.6 overturns that conclusion. Among the households receiving public transfers, 26 percent were from the lowest income quintile (where income is measured before the private or public transfers are made). The equivalent figure for households receiving private transfers is either 25 percent or 22 percent, depending on whether loans are counted as part of private transfers. So it appears that, at least by the crude measures in table 16.6, public transfers are slightly better than private ones in reaching the poorest households.[14]

As with the 1993 VLSS, private transfers in the 1998 VLSS appear to flow from better-off to worse-off households. Table 16.7 contrasts the economic characteristics of net givers and net recipients. The entries in table 16.7 marked "Gifts only" replicate for the 1998 VLSS what was done in table 16.3

Table 16.7. Household Economic Situation by Transfer Status, 1998

Indicator	*Net givers*	*Net recipients*	*Others*
Pre–private transfer income per year (thousand dong)			
Gifts only	4,677	2,925	2,634
Gifts plus loans	4,937	2,824	2,622
Post–private transfer income per year (thousand dong)			
Gifts only	4,231	4,035	2,634
Gifts plus loans	4,213	3,940	2,622
Average percentage of economically active people in the household			
Gifts only	57.9	49.4	55.9
Gifts plus loans	57.9	51.5	56.0
With unemployed members (percent)			
Gifts only	2.1	5.3	3.2
Gifts plus loans	2.2	4.5	3.2
With educated household head (percent)			
Gifts only	54.4	44.8	37.1
Gifts plus loans	55.1	41.9	36.0
Number of households			
Gifts only	906	1,292	3,742
Gifts plus loans	1,054	2,041	2,844

Note: Two different criteria for transfer status are used: gifts only and gifts plus loans.

Source: Author's calculations from the 1998 VLSS.

for the 1993 VLSS. As in 1993, the 1998 pre–private transfer income of net givers greatly exceeds that of recipients. Unlike in table 16.3, however, the pre–private transfer income of recipients in table 16.7 is slightly higher than that of "others" (those not involved with private transfers). Another difference in table 16.7 is that it repeats the analysis with transfers defined as loans plus gifts. Table 16.7 shows that, regardless of how private transfers are defined, givers are in better economic condition than recipients (although again, "others" are the poorest of the three groups of households). They also are the least educated of the three groups (table 16.7).

The inclusion of loans does not matter for demographic patterns, either, which are contrasted for givers, recipients, and "others" in table 16.8. The patterns are similar whether or not loans are counted. Note that the patterns for gifts in table 16.8 are similar to their 1993 counterparts in table 16.4.

SOURCES OF LOANS VERSUS GIFTS, 1998. Though the inclusion of loans with gifts matters little for contrasting the characteristics of givers and recipients, the two forms of transfer do differ markedly in one respect. Gifts flow almost exclusively between relatives, but loans do not. Half of all loan money

Table 16.8. Household Demographics by Transfer Status, 1998

Variable	*Net givers*	*Net recipients*	*Others*
Headed by young (percent)			
Gifts only	3.2	4.3	6.5
Gifts plus loans	4.4	5.6	5.8
Headed by elderly (percent)			
Gifts only	12.2	30.2	16.0
Gifts plus loans	12.5	23.6	17.0
Headed by female (percent)			
Gifts only	22.1	33.4	21.5
Gifts plus loans	20.6	29.8	21.5
With absent members (percent)			
Gifts only	12.6	10.8	9.4
Gifts plus loans	11.8	10.9	9.1
Household size (number of members)			
Gifts only	5.3	5.0	5.6
Gifts plus loans	5.2	5.2	5.7
Number of households			
Gifts only	906	1,292	3,742
Gifts plus loans	1,054	2,041	2,844

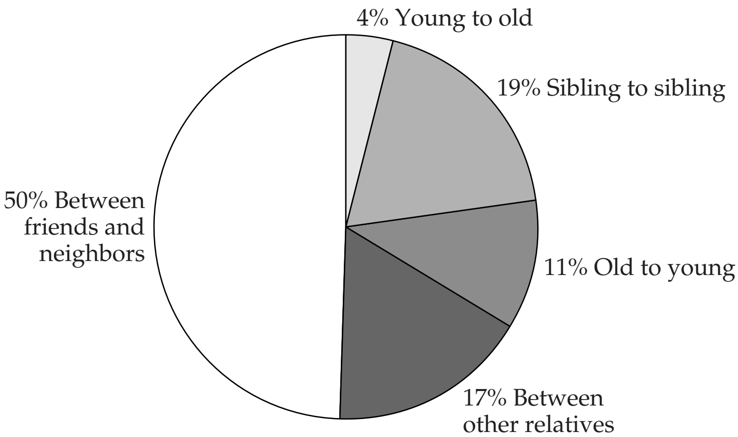
Note: Two different criteria for transfer status are used: gifts only and gifts plus loans.
Source: Author's calculations from the 1998 VLSS.

flows between nonrelatives, described by survey respondents as "friends" or "neighbors." These informal loans made up one-third of total lending. The remaining two-thirds came from formal or quasi-formal sources such as banks, government credit programs, cooperatives, revolving credit associations, or moneylenders, and these are not counted as interhousehold loans.[15]

People who borrowed from other households reported their relationship to the creditor (that is, parent, child, friend); those who lent money reported their relationship to the borrower. Half of the value of these informal loans occurs among nonrelatives (figure 16.2). The equivalent figure for gifts is a mere 2 percent (figure 16.3).

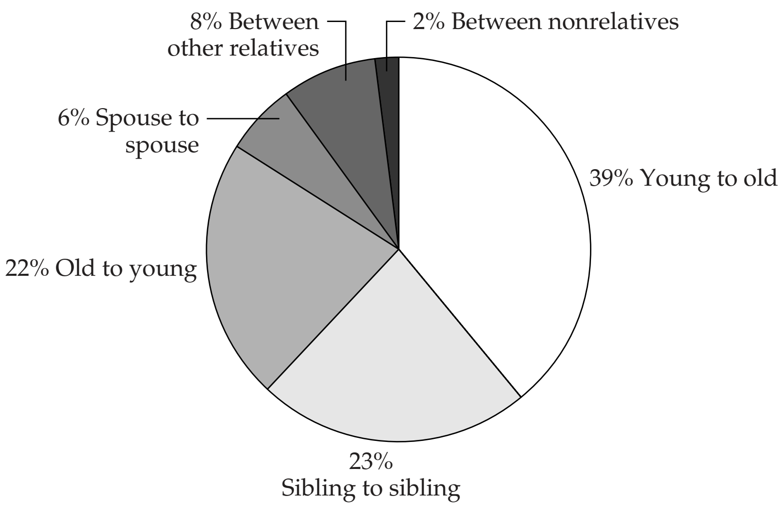
Another innovation in the 1998 survey was the inclusion of questions about how gifts were used—whether for general consumption or for some investment-related purpose, such as schooling, investments in a farm or family business, or payment toward a house. A similar question was asked about borrowing, though the choices were different. One of these, to "buy food before harvest" clearly designated consumption, so it was lumped with "general consumption" to classify consumption loans. Several other choices, such as "working capital," "basic investment," "build or buy house," and "schooling," clearly represented investment and are classified here as such. The response "buy consumer durables" is also classified as investment.[16]

Figure 16.2. Flows of Informal Lending, 1998



Source: Author's calculations using VLSS.

Figure 16.3. Generational Directions of Private Transfers, 1998



Source: Author's calculations using VLSS.

Still others—for example, to "repay a loan" or to "relend"—were harder to classify, so they were ignored in constructing the breakdown of loans by purpose.

Gifts and loans are used differently. Nearly 75 percent of gifts—but fewer than 10 percent of loans—are spent for consumption (table 16.9). One might argue that the distinction between gifts and loans is little more than

Table 16.9. Uses of Gifts versus Loans, 1998
(percent)

Use	*Gifts*	*Loans*
Consumption	71.6	9.3
Investment	28.4	90.7
Total	100.0	100.0

Source: Author's calculations from the 1998 VLSS.

semantics—a gift, for example, could be reciprocated or a loan made below market interest. But the evidence suggests that there is more to the difference between loans and gifts than just labeling. They are used for different things and flow between different pairs of households.

INTRAHOUSEHOLD TRANSFERS AND CORESIDENCE. The ideal study would track transfers between everyone, not just people from different households, but this would require elaborate measurements dealing with individual consumption and contributions to incomes of family farms and businesses that are beyond the scope of the VLSSs. Nonetheless, it is possible to learn something about intrahousehold transfers from the data. After all, the fact that a household contains persons who are not doing market work is prima facie evidence that some sort of transfer is occurring within the household. Rough estimates of the intrahousehold transfers can be calculated conditional on simplifying assumptions. The purpose is not to pinpoint exact intrahousehold transfers, which is not possible—instead, it is to demonstrate that intrahousehold transfers can, under plausible assumptions, far exceed interhousehold transfers. The calculations are based on 1993 data, but using 1998 data would not alter the conclusions.

Imagine that total household income is divided for equal consumption among those doing market work and other persons. A market worker is someone reported to be economically active as a wage earner or participant in the family farm or business. Because most income (about five-sixths on average) comes from work, market workers implicitly transfer money to persons not engaged in market work. Assume for simplicity that all consumption is private, so there are no complications from nonexcludability or economies of scale. Finally, count children ages 0 to 4 years as 0.4 of an adult and children ages 5 to 14 years as 0.5 of an adult. (See Deaton [1997, p. 259] for a discussion of these equivalence scales.)

These assumptions imply an average intrahousehold transfer of 187 TDY. Most of it, 102 TDY, goes to children age 14 or younger, but that still leaves a substantial 85 TDY being transferred between adults. These crude calculations show that *intra*household transfers are potentially much larger than *inter*household transfers. Even counting only transfers to adults, this crude estimate of intrahousehold transfers is about double that of interhousehold transfers.[17]

Another, and in some ways complementary, intrahousehold transfer is the value of shared living arrangements for parents. These are difficult to measure in the VLSSs because it is hard to identify the persons responsible for making mortgage or rent payments. But the proportion of households headed by adult children living with nonworking parents, in-laws, or grandparents gives a rough idea of how widespread these shared living arrangements might be—and 8 percent of the households in the 1993 VLSS fit this description.

Still another form of transfer that occurs within the household is the exchange of time-intensive, in-kind services between household members. The VLSS contains information about time each individual spends in housework: preparing meals, washing clothes, cleaning house, and the like. With some assumptions about how such services are produced and shared, it can be inferred how large these implicit, time-intensive intrahousehold transfers are. For example, suppose such services are excludable, and suppose too that the same equivalence scales apply to consumption of these services as apply to other forms of consumption. Assume also that adults are more efficient at producing services than children are, and, for convenience, assume that these productivity differentials are the same as the consumption equivalence scales. Finally, suppose, again for simplicity, that there are no economies of scale in household production. (To illustrate, if a grandmother spends two hours cooking for herself and three other adults, those other adults each receive one-half hour of in-kind time transfers from her.) When this method is applied to the 1993 VLSS, using the information about housework generates an average of 14 hours of time transfers per household per week. If this time is exchanged for the consumption provided by household members who work, then net intrahousehold transfers would be much lower than the figures cited above.

Discussions of intrahousehold transfers are necessarily speculative because they are based on assumptions about unobservables such as household-sharing rules. They are intended only to illustrate the potential for intrahousehold transfers to exceed interhousehold transfers. A full accounting of transfers between all individuals is beyond the scope of this chapter.

Panel Evidence

Cross-sections leave several questions unanswered because they provide only a snapshot of private transfer patterns and reveal nothing about a household's experience over time. Does receiving transfers now make it more likely that they will be received later? Does transfer behavior respond to changes in the household's socioeconomic status? A panel is needed to address questions such as these.

Panel evidence suggests some hysteresis in private transfer patterns, but many households also changed from recipients to givers, and vice versa, between surveys. Furthermore, changes in private transfers do indeed appear responsive to changes in household characteristics, such as pretransfer income, demographic changes, and life-course events. Transfer inflows rise upon retirement and widowhood, for example, and are positively associated with increases in health expenditures. The next sections provide more detail about these and other patterns.

INCOME CHANGES. A leading issue in the literature on private transfers is how responsive they are to changes in household income. Indeed, such responsiveness is the key to the problem of crowding out, in which, for example, the introduction of public transfers would tend to supplant private transfers. Income responsiveness is critical, too, for determining whether private transfers insure households against income shortfalls or redistribute income to the less fortunate.

Most empirical evidence on the income effects of private transfers is based on cross-sections. But cross-sectional evidence is of limited use for measuring the responsiveness of transfers to income, because contrasting transfer receipts for high- versus low-income households is not the same as looking at changes in transfers for the same household that was once well off but is now poor.

Settling the issue of crowding out is beyond the scope of this simple descriptive analysis. Still, the descriptions that follow are illuminating in several respects. They show, for example, that there is enormous heterogeneity in private transfer responses. Furthermore, events such as retirement seem to matter a lot for transfer changes, but others, such as marriage of a son or daughter, do not appear to matter much at all.

The first step is to explore how transfer status changes between surveys. Ninety percent of the households in the 1993 survey were reinterviewed in 1998. Most of those not reinterviewed had moved; many others were dropped deliberately. Only a small number were refusals.[18] Eliminating the few others with missing information leaves a panel of 4,269 households.

How many of the households that were recipients in 1993 changed into givers by 1998? How many remained recipients? Table 16.10 provides answers to questions such as these. Many households changed transfer status

Table 16.10. Transitions in Transfers between 1993 and 1998

	Transfer status, 1998			
Transfer status, 1993	*Net giver*	*Other*	*Net recipient*	*Total*
Net giver	155	317	99	571
	27.2	55.5	17.3	100.0
Other	391	1,933	480	2,804
	13.9	68.9	17.1	100.0
Net recipient	98	372	424	894
	11.0	41.6	47.4	100.0
Total	644	2,622	1,003	4,269
	15.1	61.4	23.5	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 16.11. Increases versus Decreases in Real Private Transfers Per Capita by Windfalls versus Shortfalls in Pre–Private Transfer Income Per Capita

	Percentage of households whose excess of receipts over gifts			
Subsample	*Increased*	*Decreased*	*Stayed the same*	*Total*
Households whose real pre–private transfer income				
Increased $N = 2{,}703$ (64% of sample)	25.8	28.8	45.4	100.0
Decreased $N = 1{,}518$ (36% of sample)	32.5	22.7	44.8	100.0
Decreased more than 50% $N = 587$ (14% of sample)	35.9	24.7	39.4	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

between surveys. Nonetheless, the data do indicate some inertia in transfer status. For example, only 11 percent of the net recipients in the 1993 survey became net givers in 1998, which is less than the unconditional 1998 figure of 15 percent (table 16.10). Nearly half of net recipients in 1993 remained so in 1998, even though the unconditional 1998 figure is less than one-fourth. Households that did not change their transfer status between surveys, and thus are located on the diagonal of table 16.10, represent 59 percent of the sample.

What variables are correlated with changes in transfers? One way to address this question is to look at changes in some of the variables that were already examined in the cross-sections to see how they are related to changes in transfers. For example, changes in transfers for households that experienced shortfalls can be compared with windfalls in pre–private transfer income. These calculations are provided in table 16.11.

The first two rows of table 16.11 split the sample by whether household income rose or fell between surveys. Income is measured before private transfers.[19] It is also measured on a per capita basis, as are transfers.[20] Both income and transfers are adjusted for inflation. For each survey, transfers are calculated as receipts minus gifts, or net transfer inflows. These inflows are positive or negative depending on whether receipts or gifts are larger. Changes in private transfers are:

$$\begin{aligned}\Delta T = {} & (\text{receipts 1998 VLSS} - \text{gifts 1998 VLSS}) \\ & - (\text{receipts 1993 VLSS} - \text{gifts 1993 VLSS})\end{aligned}$$

which is the difference in net transfer inflows between survey years.

Pre–private transfer income and net inflows of private transfers tend to move in opposite directions. Households with income shortfalls are more likely to experience increased transfer inflows. For example, 32.5 percent of households whose pre–private transfer income fell had increases in net transfer inflows between surveys, compared with 25.8 percent for households whose pre–private transfer income rose. Households that had particularly severe shortfalls in pre–private transfer income—decreases of 50 percent or more—were even more likely to have had a boost in transfer inflows. Nearly 36 percent of these households had increases in transfer inflows, compared with only 26 percent among households whose pre–private transfer, per capita incomes increased between surveys.[21]

However, although table 16.11 indicates that pretransfer income and private transfer inflows tend to move in opposite directions, there are many households for which the two move in the same direction. For example, 22.66 percent of the households experiencing shortfalls in pre–private transfer income also experienced shortfalls in net transfer inflows between surveys.

Table 16.12 repeats the same calculations as table 16.11, but only for those households whose 1993 pretransfer incomes were less than the median, to see if the responsiveness of private transfers was more pronounced for households whose incomes were already low. The results, presented in table 16.12, support this idea. For example, 45.5 percent of low-income households whose incomes fell more than 50 percent had increases in net transfer inflows, compared with 25.5 percent of low-income households whose incomes increased.

How large are these changes in transfers? The variation is enormous. For example, consider households that had income shortfalls. Define a household's transfer derivative as $\Delta T/\Delta I$, where ΔI denotes the household's change in per capita, pre–private transfer income. A transfer derivative of –1 means the entire shortfall was offset by increased private transfers. A

Table 16.12. Increases versus Decreases in Private Transfers Per Capita by Windfalls versus Shortfalls in Pre–Private Transfer Income Per Capita, Restricted Sample: Households with Below-Median Per Capita Income in 1993

	Percentage of households whose excess of receipts over gifts			
Subsample	*Increased*	*Decreased*	*Stayed the same*	*Total*
Households whose pre–private transfer income				
Increased ($N = 1{,}677$)	25.5	27.8	46.7	100.0
Decreased ($N = 434$)	33.9	21.2	44.9	100.0
Decreased more than 50% ($N = 132$)	45.5	25.0	29.5	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

Table 16.13. Changes in Private Transfers Per Capita for Households That Have Shortfalls in Their Pre–Private Transfer Income Per Capita

	Percentage of households that are			
Category	*Insured*	*Destabilized*	*Neither*	*Total*
All households with shortfall ($N = 1{,}518$)	14.9	9.3	75.8	100.0
Poor households with shortfall ($N = 434$)	23.7	10.8	65.4	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

positive transfer derivative indicates that income changes are exacerbated by changes in private transfers. The values of the transfer derivatives at the 10th and 90th percentiles were –0.75 and 0.29, respectively—an exceedingly wide range.

Apply the following, admittedly arbitrary rule for identifying protection against income shortfalls. Classify as insured a household whose increases in transfers offset one-third or more of its income shortfall—that is, one with a transfer derivative of –0.33 or lower. At the other end of the spectrum, designate households with transfer derivatives larger than 0.33 as destabilized, because they simultaneously experience a reduction in both income and transfers. By these definitions, about 15 percent of the households were insured, and about 9 percent destabilized, by private transfers (table 16.13). The calculations were repeated for households with less than the median 1993 pretransfer income. For this subsample, nearly 24 percent were insured and nearly 11 percent destabilized.

ECONOMIC AND DEMOGRAPHIC EVENTS. How are significant events—such as retirement, the loss of earners, the birth of children, and so on—related to private transfers? One way to explore this issue is to contrast the percentages of households experiencing increases versus decreases in per capita private transfers for various subsamples (table 16.14). The first row of table 16.14 provides figures for the entire sample, as a benchmark; these are then contrasted with the other rows, which pertain to select subsamples.

Calculations for the first six subsamples in table 16.14 explore the role of private transfers as old-age support. They suggest that life events such as retirement and widowhood increase inflows of private transfers. For example, consider the second row, which gives the percentages of households whose private transfers increased, decreased, and remained unchanged for households whose head retired between surveys.[22] Nearly 41 percent of them had an increase in private transfer inflows, compared with only 28 percent for the whole sample. Conversely, only 19.7 percent of them had a decrease in

Table 16.14. Increases versus Decreases in Per Capita Private Transfers, by Economic and Demographic Events

	Percentage of households whose private transfers			
Category	*Increased*	*Decreased*	*Stayed the same*	*Total*
Entire sample ($N = 4{,}221$)	28.2	26.6	45.2	100.0
Subsample				
Household head retired ($N = 315$)	41.0	19.7	39.4	100.0
Nonhead retired ($N = 198$)	36.4	25.3	38.4	100.0
Widowed after 1993 ($N = 97$)	33.0	28.9	38.1	100.0
Elderly person died ($N = 336$)	27.1	30.4	42.6	100.0
Son(s) left home ($N = 746$)	31.2	29.6	39.1	100.0
Daughter(s) left home ($N = 816$)	31.5	27.3	41.2	100.0
Loss of earner ($N = 1{,}476$)	31.3	25.1	43.6	100.0
Gain of earner ($N = 1{,}400$)	25.6	27.7	46.6	100.0
Son(s) married ($N = 672$)	29.2	25.3	45.5	100.0
Daughter(s) married ($N = 662$)	29.5	25.8	44.7	100.0
New child or children ($N = 854$)	25.1	23.9	51.1	100.0

Note: Rows may not total to 100% due to errors introduced by rounding.

Source: Author's calculations from the 1993 and 1998 VLSSs.

net inflows, compared with 26.6 percent for the entire sample. The third row in table 16.14 shows similar though slightly less dramatic results for the retirement of non–heads of household. Widowhood is also associated with increases in private transfers. The death of an elderly person between surveys is associated with decreases in private transfer inflows, further evidence that private transfers resemble old-age support.

A child leaving home has a less pronounced association with private transfers. The subsample with one or more sons leaving home between surveys had a larger than average percentage with increases in private transfer inflows. This subsample, however, also had a larger than average percentage with *decreases* in private transfer inflows. This finding is consistent with the idea that some sons are sources of increased receipts for parents and others are targets of increased gifts. The same pattern holds for daughters who left home (table 16.14).

Changes in private transfers are not just restricted to economic and demographic changes associated with the aging of households. Losing an earner, regardless of his or her age, is associated with higher percentages of households with increases in net private transfer inflows. Conversely, gaining an earner is associated with lower percentages with increases in net private transfer inflows.

The arrival of children is associated with mixed results for changes in private transfers. The sample with new children had a slightly smaller percentage with increases in transfer inflows, but a slightly smaller percentage with decreases in transfer inflows, too.

Marriage appears to have little effect on changes in transfers. Compared with the entire sample, the percentages of households whose transfers increased, decreased, and remained unchanged differ little for households whose children married between surveys. This is not to say, however, that marriage has little impact on total transfers. There are one-time expenditures and gifts that are related to the marriage ceremony, but these are not counted in the transfers variable. They are recorded in separate sections of the survey.[23]

Information from these sections in the 1998 survey was used to approximate wedding-related expenditures and gifts—"approximate" in the sense that the VLSS lumps together funeral-related gifts with wedding gifts. The value of these one-time gifts is substantial. Among households that had one or more sons marrying between surveys, the average wedding expense, expressed as a fraction of their average total expenditures, was 8.1 percent. This number is all the more striking because the base includes not only households with sons who married in the previous year but also households with sons who married within the five years between surveys. In contrast, the wedding expenditure and gift data refer only to the previous 12 months.

Part of the expense is defrayed by the receipt of gifts. Those same households received wedding-related (but also possibly funeral-related [see above]) gifts equal to 4.4 percent of their total income. The comparable figures for households having at least one daughter marry are 5.7 percent (expenses) and 4.3 percent (gifts).

Changes in private transfers are strongly related to changes in health expenditures. Consider the sample of households that increased the fraction of total spending on health by 5 or more percentage points between surveys (those marked "Health expenditures up" in table 16.15). Forty percent of these households had increases in net transfer inflows. The causality likely goes both ways—illness could prompt increases in private transfers, which in turn could help finance increased health expenditures. Similarly, a reduction in spending for health is associated with reductions in private transfers.

Table 16.15. Increases versus Decreases in Per Capita Private Transfers, by Health-Related Events

	Percentage of households whose private transfers			
Category	*Increased*	*Decreased*	*Stayed the same*	*Total*
Entire sample ($N = 4{,}221$)	28.2	26.6	45.2	100.0
Subsample				
Health expenditures up ($N = 604$)	40.6	22.2	37.3	100.0
Health expenditures down ($N = 882$)	24.5	29.9	45.6	100.0
Subtracted ill ($N = 1{,}888$)	27.5	27.4	45.0	100.0
Added ill ($N = 2{,}791$)	27.9	27.0	45.1	100.0
Only subtracted ill ($N = 815$)	27.6	25.9	46.5	100.0
Only added ill ($N = 1{,}718$)	28.1	26.0	45.9	100.0

Note: Rows may not total to 100% due to errors introduced by rounding.
Source: Author's calculations from the 1993 and 1998 VLSSs.

But changes in illness per se appear to have little impact on changes in transfers (final four rows, table 16.15). The proportions of households experiencing increases versus decreases in transfers between surveys differed little among subsamples with changes in the number of people who were ill. Like other life events, the effects of illness and other health-related events on private transfers merit further, separate study; the relationship between the two is likely to be complex. For example, becoming ill could raise someone's marginal utility of income if the illness is treatable, but reduce it if it is not.

A SIMPLE REGRESSION. What are the partial correlations between the variables discussed in tables 16.12–16.15? Are they statistically significant? To get a sense of this, changes in net transfers received are regressed on the economic and life-course variables from tables 16.14 and 16.15. But the goal is still descriptive, and it is important to note that the intention is not to attempt to estimate a causal model. For example, recall that health care expenditures are likely to be caused by private transfers as well as vice versa. The same could be true of several of the other right-hand-side variables in table 16.16.

Table 16.16 conveys two messages. The first is that the regression results mostly reinforce what was shown in the cross-tabulations. For example,

Table 16.16. Regression of Differences in Log Net Transfer Receipts Per Capita on Economic and Demographic Events

Indicator	*Estimated coefficient*	*Estimated t value*	*Variable mean*
Explanatory variable			
Δ in per capita log income	−0.192	−5.82	0.33
Loss of earner	0.314	2.78	0.35
Gain of earner	−0.290	−3.22	0.33
Household head retired	0.661	4.13	0.07
Nonhead retired	0.361	1.83	0.05
Widowed after 1993	−0.070	−0.18	0.03
Elderly person died	−0.035	−0.20	0.08
Household head died	0.280	0.68	0.03
Child left home	−0.043	−0.30	0.31
Child married	−0.046	−0.34	0.21
New child or children	−0.026	−0.24	0.20
Health expenditures up	0.564	4.66	0.14
Health expenditures down	−0.253	−2.42	0.21
Added ill person	−0.106	−1.18	0.66
Subtracted ill person	0.060	0.07	0.45
Number of observations	4,221		
Dependent variable mean	0.06		
R^2	0.03		
F statistic	8.843		

Source: Author's calculations from the 1993 and 1998 VLSSs.

income increases are associated with reductions in private transfers. Second, it appears that economic events bear a more significant relationship to transfers than life-course events per se. For instance, situations such as losing an earner or suffering an income decline are both significantly related to changes in transfers, whereas widowhood is not. Of course, to move beyond merely describing correlations would require attention to problems of endogeneity, something that is beyond the scope of this chapter.

Private Transfers, Regional Boundaries, and Economic Growth

Vietnam experienced tremendous economic growth during the 1990s, but some places, such as cities in the south, grew much faster than others, such as rural areas in the northern mountains. Uneven growth increased divergence between the living standards of the better-off and the poor. Is it possible that private interhousehold transfers helped to narrow the widening gap? For this to happen, private transfers would have to cross regional boundaries. This section investigates regional patterns of private transfers and contrasts transfer behavior in Vietnam's fastest-growing areas, the so-called "growth poles," with transfer behavior in the rest of the country.

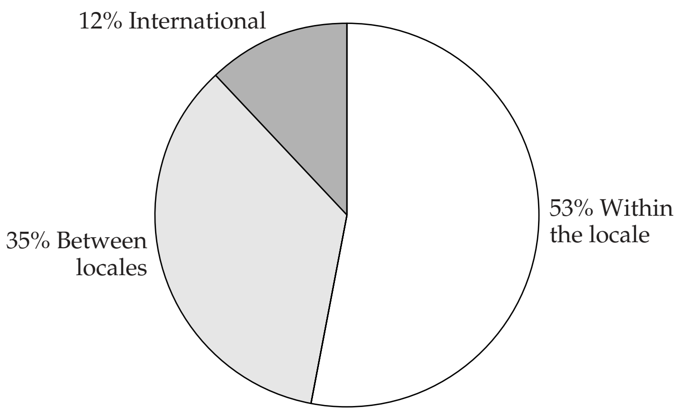
Although much money is being transferred between locales, most of it stays within the vicinity. In addition, economic growth is associated with more transfer activity, not less.

PRIVATE TRANSFERS AND REGIONAL BOUNDARIES. For this section, Vietnam has been divided into 13 locales, using the VLSS regional definitions and distinctions between urban and rural areas. The 1993 VLSS divided the country into seven regions: the Northern Uplands, the Red River Delta (which includes the Hanoi-Haiphong corridor), the North Central Coast, the Central Coast (which includes Danang), the Central Highlands, the Southeast (which includes Ho Chi Minh City), and the Mekong Delta. Only the Central Highlands region is completely rural. For the other regions, urban and rural locales are counted separately, generating 13 separate locales in all (that is, six urban and seven rural).

Respondents report where transfer receipts came from and where gifts went, so it is possible to identify transfers within and between locales. In addition, some transfers came from outside Vietnam and, in a few cases, were sent outside Vietnam.

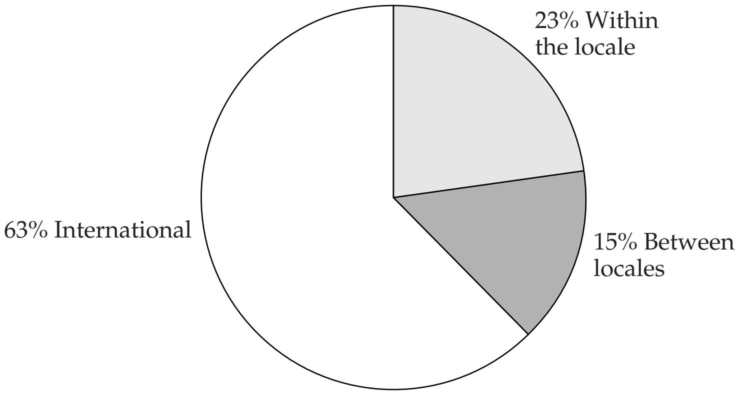
Fifty-three percent of the transfers in 1993 were between households in the same locale (figure 16.4). Thirty-five percent crossed locale boundaries, and the remaining 12 percent crossed international boundaries. Figure 16.4 is constructed from transfer events, with no adjustment for the amount of money transferred. Figure 16.5 is based on the monetary value of transfers, provides quite a different picture of regional patterns, and shows that the largest transfers occur internationally. The breakdown of the money value of transfers in figure 16.5 departs markedly from figure 16.4. International transfers are more than 10 times larger than domestic ones. Thus, although only 12 percent of all transfers are international, they represent 63 percent of the money transferred.

Figure 16.4. Regional Incidence of Private Transfers, 1993



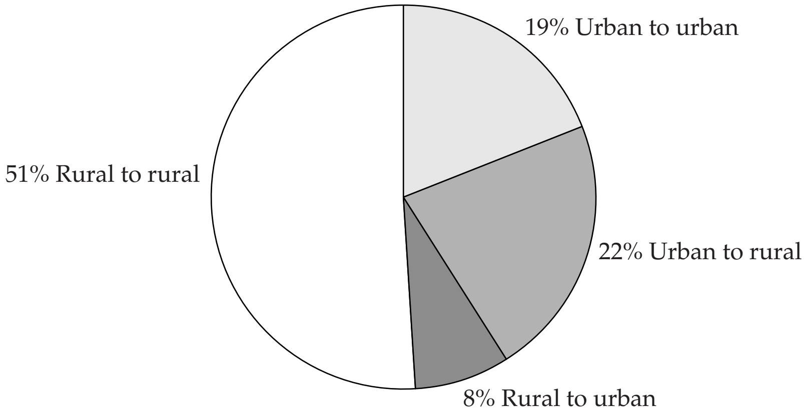
Source: Author's calculations using VLSS.

Figure 16.5. Regional Value of Private Transfers, 1993



Source: Author's calculations using VLSS.

Figure 16.6. Urban-Rural Incidence of Private Transfers, 1993



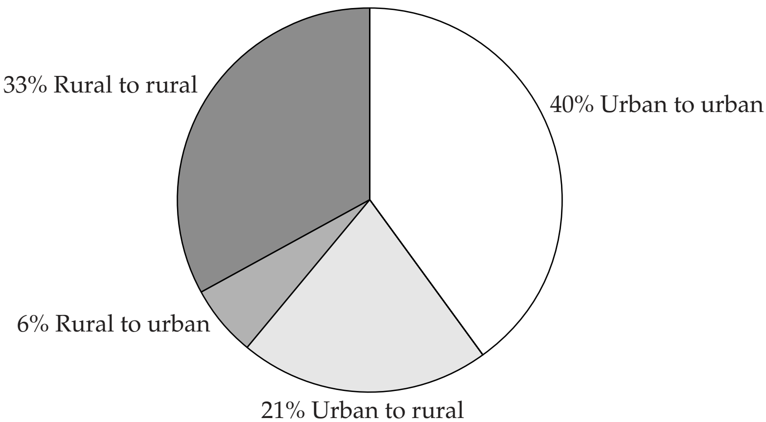
Source: Author's calculations using VLSS.

In contrast, there is not much difference in average domestic transfers that occur within versus between locales.[24] The ratio of within-locale to between-locale transfers is about 3:2, whether measured in terms of events or money.

URBAN-RURAL TRANSFER FLOWS. Another way to characterize the geographic patterns of transfers is by urban-rural status. Most transfers do not cross urban-rural boundaries. The ones that do are mostly urban to rural transfers. For example, figure 16.6 is based on domestic transfer events, and it shows that 70 percent of all transfers were either rural to rural (51 percent) or urban to urban (19 percent). Among transfers that cross urban-rural boundaries, about three transfers flow from the city to the countryside for every one flowing in the opposite direction. Figure 16.7 repeats these calculations but tracks the money value of transfers instead of events. The numbers are different because more money is transferred among the urban households, who are better off on average. But the conclusions are the same—a little more than 70 percent of the money transferred does not cross urban-rural boundaries.

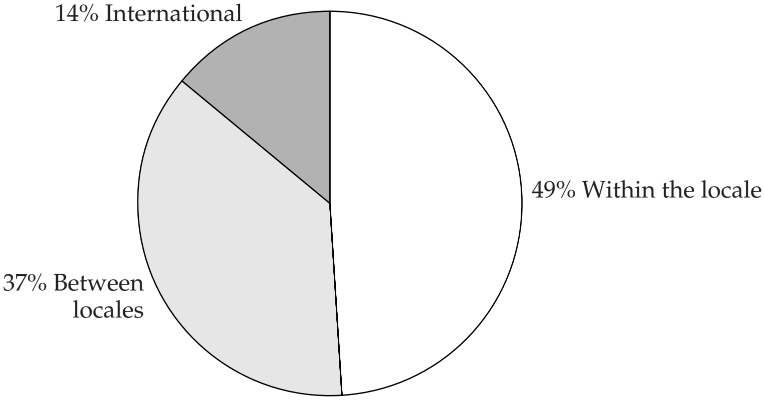
THE 1998 VIETNAM LIVING STANDARDS SURVEY. The same figures were constructed using data from the 1998 VLSS (figures 16.8 through 16.11).[25] The

Figure 16.7. Urban-Rural Value of Private Transfers, 1993



Source: Author's calculations using VLSS.

Figure 16.8. Regional Incidence of Private Transfers, 1998

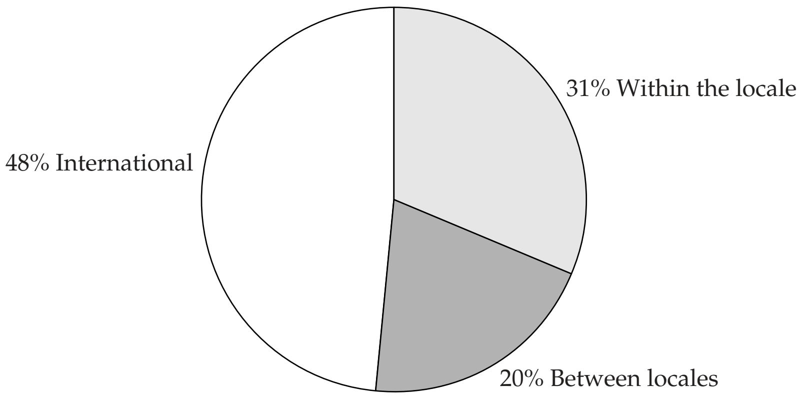


Source: Author's calculations using VLSS.

regional patterns in private transfers are similar to those in 1993, except for the somewhat diminished importance of the money value of international transfers in 1998 (figure 16.9). Most domestic transfers still occur within rather than between locales, and the ratio of domestic transfers within versus between locales is still 3:2. And, as in 1993, about 70 percent of transfers do not cross urban-rural boundaries.

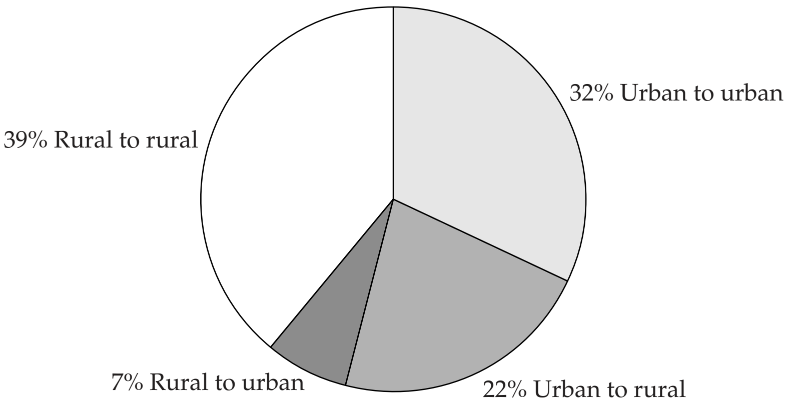
GROWTH POLES. Industrialized urban areas grew the fastest between surveys. These places—mainly the Hanoi-Haiphong corridor, Danang, and Ho Chi Minh City—attracted a disproportionate share of public investment

Figure 16.9. Regional Value of Private Transfers, 1998



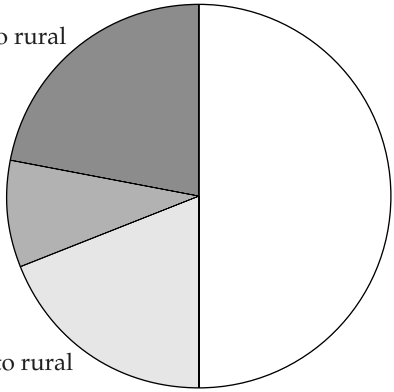
Source: Author's calculations using VLSS.

Figure 16.10. Urban-Rural Incidence of Private Transfers, 1998



Source: Author's calculations using VLSS.

Figure 16.11. Urban-Rural Value of Private Transfers, 1998



Source: Author's calculations using VLSS.

Table 16.17. Households Involved in Private Transfers in 1993, by Growth-Pole Status

	Growth-pole households		*Non-growth-pole households*	
Category	*Number*	*Percent*	*Number*	*Percent*
Households involved in private transfers that	319	56.1	1,361	32.3
Only gave	87	15.3	500	11.9
Only received	183	32.2	710	16.9
Both gave and received	49	8.6	151	3.6
Neither gave nor received transfers	250	43.9	2,848	67.7
Total	569	100.0	4,209	100.0

Source: Author's calculations from the 1993 VLSS.

(World Bank 2000b). How does private transfer activity in these growth poles compare with that of the rest of the country?

The sample of households was split into those residing in growth poles and those not. The growth-pole households exhibited much more transfer activity in both surveys. More growth-pole households were involved in transfers, as givers, recipients, or both (tables 16.17 and 16.18). Furthermore, the panel evidence in table 16.19 indicates that, while a large percentage (40 percent) of growth-pole households experienced a decline in net transfer receipts between surveys, over one-third of them had increases in net

Table 16.18. Households Involved in Private Transfers in 1998, by Growth-Pole Status

Category	*Growth-pole households*		*Non-growth-pole households*	
	Number	*Percent*	*Number*	*Percent*
Households involved in private transfers that	544	54.5	1,843	37.3
Only gave	146	14.7	667	13.5
Only received	316	31.7	935	18.9
Both gave and received	81	8.2	242	4.9
Neither gave nor received transfers	455	45.5	3,098	62.7
Total	999	100.0	4,941	100.0

Source: Author's calculations from 1998 VLSS.

Table 16.19. Increases versus Decreases in Private Transfers Per Capita, by Growth-Pole versus Non-Growth-Pole Residence

Subsample	*Percentage of households whose excess of receipts over gifts*			
	Increased	*Decreased*	*Stayed the same*	*Total*
Households in growth-pole areas ($N = 451$)	33.9	40.1	25.9	100.0
Households in non-growth-pole areas ($N = 3{,}770$)	27.5	25.0	47.5	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

transfer receipts. Growth-pole households are clearly more active in private transfers.

Part of the reason for the higher transfer activity in growth-pole areas could have to do with income inequality. Inequality, as measured by the coefficient of variation of log income, is higher in growth-pole areas than in non-growth-pole areas (table 16.20). This is true for both survey years, and it is also true whether income is measured before or after private transfers. If transfers help equalize incomes within these areas, as the numbers in table 16.20 suggest they do, then more inequality in income before transfers means more scope for income redistribution through private transfers, and hence more of them.

Table 16.20. Income Inequality: Growth-Pole versus Non-Growth-Pole Households, 1993 and 1998

Coefficient of variation in household log income	*Growth-pole households*	*Non-growth-pole households*
Income measure		
1993 income before transfers	0.28	0.19
1993 income after transfers	0.24	0.18
1998 income before transfers	0.24	0.20
1998 income after transfers	0.20	0.18

Source: Author's calculations from the 1993 and 1998 VLSSs.

Typhoon Linda

In early November 1997, the southernmost provinces of the Mekong Delta were hit with a devastating typhoon, the worst it had seen since 1904. Typhoon Linda resulted in the death of more than 600 people and destroyed thousands of homes and one-half million hectares of rice fields. Hardest hit were the provinces of Ca Mau, Kien Giang, Bac Lieu, and Soc Trang. How did private transfers respond?

This question is difficult to answer because of the structure of the VLSS. Respondents had a 12-month reference period for income and private transfers, making it difficult to pinpoint the storm's impact. In fact, the documentation cites the long time frame as an advantage, which would "help to even out the impact of this natural disaster" (World Bank 2000a, p. 37). Still, this is a warning that survey results might have been affected for households interviewed not long after the typhoon.

Because of the ambiguity introduced by the time frame, it is difficult to gauge Typhoon Linda's effect on private transfer behavior. With this caveat in mind, the information from the community questionnaire was used, along with information about the path of the storm to identify the communes affected.[26] The panel analysis of the impact of events on private transfers was replicated, and these households were compared with the rest of the sample (table 16.21).

For the 340 panel households affected by the typhoon, evidence of private transfer effects is mixed. Compared with the rest of the sample, a slightly smaller percentage of these households had a reduction in net transfer receipts, but a slightly smaller percentage had an increase, too.

Consistent with the documentation's assertions, however, timing of the interview appears to matter for gauging the typhoon's effects. For the subsample of affected households interviewed between December 1997 and March 1998, there does appear to be a boost in transfer inflows. A much larger than average percentage of them had increases in net transfer inflows between surveys, and a lower than average percentage had reductions in net transfer inflows. But this result must be interpreted with caution, because

Table 16.21. Increases versus Decreases in Private Transfers Per Capita, by Typhoon-Prone versus Non-Typhoon-Prone

	Percentage of households whose excess of receipts over gifts			
Subsample	*Increased*	*Decreased*	*Stayed the same*	*Total*
Households in typhoon areas ($N = 340$)	25.59	22.35	52.06	100.0
Earlier interview ($N = 67$)	34.33	17.91	47.76	100.0
Later interview ($N = 273$)	23.44	23.44	53.11	100.0
Households in non-typhoon-prone areas ($N = 2{,}885$)	26.38	24.61	49.01	100.0

Source: Author's calculations from the 1993 and 1998 VLSSs.

this subsample contains only 67 households. In addition, the Tet holiday was celebrated on January 28, 1998. Even with a 12-month time frame, interviews conducted around this time could contain distorted responses because of holiday-related increases in expenditures and perhaps transfers as well.

Conclusion

Typhoon Linda is just one of several issues addressed in this chapter that merits its own individual study and raises several questions for future research. Were households with links to non-typhoon-prone provinces better able to maintain their consumption in the face of declining incomes? How did the storm affect transfers over and above its impact on income? For instance, did it matter that incomes were affected by an unexpected storm instead of some other reason? Were risks well diversified, or did some typhoon victims find it necessary to provide support to nearby relatives or neighbors who were affected even more adversely? Just as many questions could be posed concerning the association of private transfers with health expenditures, retirement, and several of the other patterns uncovered by the simple descriptive analyses in this chapter.

Of all the patterns that warrant further investigation, one of the most pressing is Vietnam's striking age patterns of private transfers. Unlike nearly all industrial countries—and many developing countries too—Vietnam's private transfers tend to flow from young to old, rather than the other way around. But one hallmark of a developed economy is its preponderance of transfers from older to younger people. Will Vietnam's age pattern of private transfers eventually reverse itself? If so, how will its elderly be provisioned in the new regime? If not, how will Vietnam's progress in education continue? Why Vietnam's age patterns in private transfers are the way they are, how they might be reversed, and what the likely consequences of such a reversal would be, are all critical research and policy questions for its future.

Finally, it is worth keeping in mind that, with respect to Vietnam's private interhousehold transfers and loans, the "glass is half empty" in the sense that, in any given year, half of all households are not involved with private transfers or loans. This suggests strongly that there are likely many households that have no relatives or friends they can rely upon for money in times of need. The reach of private transfer networks in Vietnam is only partial, and their existence by no means obviates the potential for effective public income redistribution. Accordingly, readers are encouraged to consult this volume's analysis of the effectiveness of Vietnam's public safety nets by van de Walle (chapter 6) and the related study by Minot and Baulch (chapter 7) on Vietnam's spatial distribution of poverty and the prospects for geographic targeting of social safety nets.

Appendix 16A Panel Response Rate

Of the 4,800 households in the 1993 VLSS, 495 of them, or just over 10 percent, were not reinterviewed in 1998. Of these 495, 96 households were not interviewed because three communes had to be dropped from the Red River Delta as a result of the oversampling in 1998. (The extra 1,200 households included in 1998 were not representative of the population, but were chosen disproportionately from cities and other areas, especially the Central Highlands, to facilitate disaggregated analyses.) (World Bank 2000a, pp. 27–28).

Of the 495 households, 281 were not reinterviewed because they moved away. Nineteen were missed because they were temporarily away from the commune, and 12 refused to be reinterviewed. One household was not reinterviewed because it dissolved because of death. Sixteen other households of the 495 were not reinterviewed for some other reason. Forty-six households were not reinterviewed for reasons unknown.

A summary of the reasons households in the 1993 VLSS were not followed up in 1998 is provided below:

Reason for attrition in the VLSS Panel	*Number*
Deliberately dropped from the sampling frame	96
Moved away	281
Temporarily away	19
Refused	12
Death	1
Miscellaneous reasons	36
Unknown reason	46
Reason not recorded	4
Total	495

Notes

This chapter has been prepared as part of the World Bank–funded project "Economic Growth and Household Welfare—Policy Lessons from Vietnam," directed by co-principal investigators David Dollar and Paul Glewwe. The author thanks Paul Glewwe for comments on earlier drafts and Emanuela Galasso for help with the 1998 Vietnam Living Standards Survey data. The support of the World Bank's research committee is gratefully acknowledged.

1. The 1992–93 survey spanned a full year, starting in October 1992; the 1997–98 survey began in December 1997 and also lasted a year. For brevity's sake, reference is made to the surveys as the 1993 VLSS and 1998 VLSS, respectively.

2. The best-known panel study for the United States (Altonji, Hayashi, and Kotlikoff 1997) uses only a cross-section of private transfer information. McGarry (2000) uses panel data on private transfers to test for parental altruism in the United States. Aside from Rosenzweig's study (1988) of private transfers in India, there are few other panel studies of private transfers for developing countries.

3. For an early discussion of this view, see, for example, Sussman (1953).

4. There are three other kinds of private transfers that are not counted in the survey questions but are available in the VLSSs: interhousehold loans, gifts related to ceremonies such as weddings or funerals, and inheritances. This chapter first focuses on the narrower definition (as defined by the two questions) for two reasons: to use measures that are consistent across the two VLSSs and use measures containing information about generational directions of transfers.

Loan information is incomplete in the 1993 VLSS, which has the flow of loans received but not loans given. This problem was remedied in the 1998 VLSS, so the discussion of loans is deferred until later in this chapter. Furthermore, the modules containing other forms of transfers, such as ceremonial gifts, do not provide the sources of gifts received or destinations of gifts given. Because the concern here is with the generational directions of transfers and developing a consistent definition of transfers over time for the panel analysis, a more restrictive definition of transfers has been used, and discussion of additional kinds of transfers has been deferred to a later part of this chapter. Applying the more inclusive definition of transfers, as analyzed in Cox, Fetzer, and Jimenez (1998), results in a much higher proportion of households involved in private transfers, though the patterns of these more inclusive transfers are similar to the narrower definition considered here. These more inclusive transfers are discussed briefly in a later section.

5. This result could have to do with the way public transfers are measured in the 1993 VLSS—similar calculations in this chapter for the 1998 VLSS, which has a better measure of public transfers, indicate little difference in how private and public transfers are targeted to the poor.

6. The reason for this apparent anomaly, where outflows and inflows of transfers do not balance, is because of transfers received from outside Vietnam, discussed later in this chapter.

7. Furthermore, a simple t statistic for testing the difference in means would be biased downward, because it would not take into account the (presumed) positive covariance between donor and recipient incomes. This simple t value (8.07) rejects the null hypothesis of equality of means at any popular level, which strongly suggests that private transfers do indeed, on average, flow from higher- to lower-income households. Note that the difference in means measures only differences between domestic givers and recipients. Taking into account the incomes of givers from abroad would likely strengthen this result.

8. Minority status is defined as in van de Walle and Gunewardena (2001): Ethnic groups that are neither Kinh nor Chinese are defined as minorities.

9. A temporarily absent household member is defined as follows: the person is considered by the survey respondent to be a household member, and the person is reported to have been away from the household for 3 or more of the previous 12 months.

10. It would have been just as easy to concentrate only on either transfers received or transfers given alone to calculate generational directions. Aggregating information from both sides of the transaction is not double counting, but instead is averaging the two sources of transfer information—gifts and receipts.

11. These percentages—92 and 98 percent, respectively—are based on calculations from the VLSS. The remaining 8 percent of transfers from young to old were given to grandparents, and the remaining 2 percent of transfers from old to young were given to grandchildren, nieces, and nephews.

12. In addition to urban households, rural households in the Central Coast, Central Highlands, and Southeast were oversampled.

13. See chapter 6 of this volume, by Dominique van de Walle, for a comprehensive analysis of Vietnam's public safety net. Her measure of public transfers includes a few more categories than are used in this chapter, such as educational scholarships, but these are miniscule compared with the largest public transfer, the social insurance fund. Thus, the value of aggregate public transfers used in this chapter is nearly identical to the one used by van de Walle.

14. Changing the cutoff to the lowest quartile does little to alter this conclusion, and the same goes for changing the cutoff to the poorest 15 percent of households. In each case, public transfers appear slightly better targeted than private gifts plus loans.

15. Labeling a source of credit "informal" is arbitrary to some extent. Here, informality is defined conservatively by including only relatives, friends, and neighbors. Obviously, credit cooperatives, moneylenders, and the like could be counted as informal sources, as well.

16. Sometimes purchases of durables are treated as consumption (that is, the United States National Income and Product Accounts) and sometimes as investment (the United States Flow of Funds Accounts). The latter is closer to the economic concept of investment—the act of paying now and enjoying later—as in buying a radio or bicycle that generates service over many years.

17. The disparity between intra- and interhousehold transfers in Vietnam appears a good deal smaller, though, than the one reported for rural Pakistan by Kochar (2000), who finds that the predominant form of transfer from young to old occurs in the form of coresidence rather than cash transfers between households.

18. For more detail on panel attrition, see appendix 16A.

19. Pre–private transfer income is defined as income from all sources except private transfers received. A further possible adjustment, which was not made here, would be to add private transfers given to pre–private transfer income. It is not clear whether this is the proper pretransfer income measure, however, because gifts might be financed out of household wealth rather than income.

20. Household size is adjusted for equivalence scales: Children ages 0 to 4 years count for 0.4 of an adult, and children ages 5 to 14 years count for 0.5 of an adult.

21. The estimated correlation between changes in per capita, pre–private transfer income and changes in per capita, private transfers is negative (though small) and significant at any popular level ($\hat{r} = -0.106$; estimated t value, -6.93). To take

account of the effects of outliers, a hyperbolic sine transformation was applied for each variable. The hyperbolic sine function, $h(z) = \ln(z + \sqrt{z^2 + 1})$, is similar to a logarithm, except that it can be applied to negative values.

22. Retirement is defined as being economically active in the 1993 VLSS but not in the 1998 VLSS, for someone age 50 or older in the 1993 VLSS.

23. These expenditures and gifts were not included as part of interhousehold transfers for several reasons. First, unlike the transfer measures described in this chapter, there is no information about the sources of transfers received or the destinations of transfers given. For example, the recipients of expenditures for the wedding ceremony are a diffuse group that includes wedding guests. Second, the kinds of transfers directly connected with life events such as weddings, funerals, or holidays are likely to be behaviorally quite different from other kinds of transfers. For instance, wedding expenditures might include a substantial signaling component, intended to demonstrate family cohesiveness or intentions to provide future resources, or both. This kind of behavior lies outside the realm of more conventional theories about private transfers, and as such deserves a completely separate analysis, which is beyond the scope of this chapter.

24. The average within-locale transfer was 570 TDY; the average between-locale transfer was 532 TDY. In contrast, the average international transfer was 6,056 TDY.

25. Sample weights were used for constructing the 1998 VLSS figures.

26. About a dozen communes outside the Mekong Delta region also reported typhoon damage, and these were assumed to have been affected by storms other than Typhoon Linda. The 1993 commune identification numbers for the communes affected by Typhoon Linda were numbers 92, 98, 99, 101, 105, 106, 112, 113, 117–120, and 150.

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Vietnam is an economic success story. It transformed itself from a country in the 1980s that was one of the world's poorest to a country in the 1990s with one of the world's highest growth rates. With the adoption of new, market-oriented policies in the late 1980s, Vietnam averaged an economic growth rate of 8 percent per year from 1990 to 2000. This economic growth was accompanied by a large reduction in poverty (from 58 percent in 1993 to 37 percent in 1998), which included dramatic increases in school enrollment and a rapid decrease in child malnutrition.

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