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Economic shocks, wealth and welfare

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Abstract

The immediate effects of the Asian crisis on the well-being of Indonesians are examined using the Indonesia Family Life Survey, an on-going longitudinal household survey. There is tremendous diversity in the effect of the shock: for some households, it was devastating; for others it brought new opportunities. A wide array of mechanisms were adopted in response to the crisis. Households combined to more fully exploit benefits of scale economies in consumption. Labor supply increased even as real wages collapsed. Households reduced spending on semi-durables while maintaining expenditures on foods. Rural households used wealth, particularly gold, to smooth consumption.

1. Introduction

Indonesia is in the midst of a major financial, economic, and political crisis. In late 1997, credit markets tightened and the Indonesian rupiah began to weaken. In early 1998 the currency collapsed, falling from Rp 4,000 per US$ to Rp16,000 per US$ in just three days. The rupiah gained ground in the following months but has remained extremely volatile. The decline in the exchange rate in conjunction with substantial reductions of subsidies on food and energy contributed to spiraling prices. The consumer price index is estimated to have increased by around 80% in 1998, while food prices doubled and the price of rice increased by around 120%.

The crisis has not been limited to prices or to the financial sector. Real GDP fell by around 15% in 1998 and real wages declined by some 40% in the formal wage sector. Moreover, a drought associated with El Nino had depressed agricultural output in many parts of the country. The effects of these 'shocks' have probably been compounded by the political upheavals in Indonesia during this period.

The magnitude and unexpected nature of the crisis are particularly stunning when contrasted with the country's recent economic success. During the three decades prior to the crisis, Indonesia enjoyed sustained economic growth, accompanied by an impressive reduction in poverty, significant improvements in the health and human capital of the population, and a shift in the structure of production away from agriculture towards higher paying manufacturing and service sector jobs.

Because the crisis was to a large extent unanticipated, it provides an excellent laboratory for yielding insights into how large negative economic shocks affect individuals and households and how they respond to those shocks. The mechanisms households may employ to 'smooth out' the impacts of such shocks are likely to take many forms. There is a prominent literature on the role played by spending down accumulated household wealth. (See Deaton, 1992, for an insightful review). However, there are many other mechanisms that individuals and households might employ to smooth fluctuations in the marginal utility of consumption. Households may seek to re-allocate resources across time by, for example, borrowing on formal or informal markets (Rosenzweig and Wolpin, 1993; Udry, 1994; Fafchamps, Udry and Czukas, 1998); sharing risk among people within a community (Townsend, 1993; Platteau, 1991) or across communities through public or private transfers (Rosenzweig and Stark, 1986; Cox and Jimenez, 1998). Households may also change the allocation of resources in any period. This might involve the reallocation of the total consumption bundle away from more durable and deferrable expenditure items (Browning and Crossley, 1997); changes in work effort and type of work undertaken by household members (Murruggarra, 1996); the entry and exit of household members (Alamgir, 1980); or changes in location of residence of some or all household members (Rosenzweig, 1988, 1996).

Using panel data that were specially collected to assess the effect of the crisis on the lives of Indonesians, this paper provides new empirical evidence on how households smooth out the effects of unanticipated shocks. We consider several potential mechanisms, placing emphasis on the role of wealth. The study is part of a larger project, the ultimate goal of which is to provide insights into the strategies adopted by households in Indonesia in response to the economic crisis and to evaluate the immediate and medium-term consequences of those strategies for a broad array of welfare indicators.

The next section of this paper provides background on the Indonesian setting we are investigating. It is followed by a description of our main data source, the Indonesia Family Life Surveys (IFLS). We focus on the immediate consequences of the crisis for changes in household consumption levels. There is no question that the crisis was large: on average, household *per capita* consumption declined by around 20% in one year. There is also tremendous diversity in the impact of the crisis with some households becoming better off while many others are much worse off. Section 4 discusses possible smoothing mechanisms that households may employ in order to mitigate the impacts of the crisis. Our main findings are presented in Section 5 which highlights some of the key smoothing mechanisms that appear to have been adopted by Indonesian households. Changes in household size and composition, as well as changes in the allocation of time to work, are an important part of the picture. Special attention is paid to the role that wealth plays in smoothing household *per capita* consumption. We find that both the level of wealth and the form in which wealth is held matter: households that held more wealth in the form of gold were better able to smooth consumption than other, similar households at the onset of the crisis. The paper ends with conclusions.

2. The Indonesian Context

Thirty years ago Indonesia was one of the poorest countries in the world. Until the recent financial crisis, it enjoyed high economic growth rates (4.5% per annum from the mid-sixties until 1998) and by the late 1990s was on the verge of joining the middle income countries. Not surprisingly, employment in the formal wage sector expanded, rising from a quarter to a third of all jobs during the same years while agricultural employment fell (from 55% of total employment in 1986 to 41% by 1997). Economic changes, however, have not been uniform across the country, and if anything economic heterogeneity has increased over time.

Optimism about Indonesia's future was suddenly challenged by the economic crisis and the ensuing changes in the political landscape of the country. As indicated in Figure 1a, the rupiah came under pressure in the last half of 1997 when the exchange rate began showing signs of weakness. After falling by half from around 2,400 per US$ to about 4,800 per US$ by December 1997, the rupiah collapsed in January 1998

when, over the course of just a few days, the exchange rate fell by a factor of four. Although it soon recovered ground, by the middle of 1998 the rupiah had slumped back to the lows of January 1998. Since then, the rupiah has continued to oscillate, albeit at a lower amplitude and frequency. The extremely volatile exchange rate has contributed to considerable uncertainty in financial markets. This uncertainty is reflected in interest rates which quadruped in August 1997 and were subsequently very volatile. The banking sector fell into disarray and several major banks have been taken over by the Indonesian Bank Restructuring Agency. Turmoil in the financial sector has created havoc with both the confidence of investors and with the availability of credit.

Prices of many commodities spiraled upwards during the first three quarters of 1998, as shown in Figure 1b. The rise was particularly sharp for food prices during the first half of the year. In comparison, non-food prices rose less rapidly. Annual inflation is estimated by the *Badan Pusat Statistik* (BPS), the central statistical bureau, to be about 80% for 1998. In part, this reflects the removal of subsidies for several goods --- most notably rice, oil and some fuels. A substantial part of the increase in the CPI reflects the fact that rice accounts for a substantial fraction of the average Indonesian's budget and that its price more than doubled. Since the share spent on rice is greatest for the poorest, inflation likely had a bigger impact on the purchasing power of the poorest. Off-setting that effect, however, is the fact that some of the poorest are rice producers and as the price of food rose, so (net) food producers have benefited from the improvement in their terms of trade.[1]

That the Indonesian crisis, particularly its severity and the speed with which it took hold, were unanticipated is born out in remarks by leaders within and outside of Indonesia. In January of 1998, the IMF described Indonesia's economic situation as "worrisome" (IMF, 1998) and President Soeharto announced measures that he expected to improve economic performance, but nevertheless predicted zero economic growth and inflation of 20% for 1998. In fact, economic growth in 1998 declined by 15% and inflation hit 80%. In July of 1998, James Wolfensohn, president of the World Bank, remarked "we were caught up in the enthusiasm of Indonesia. I am not alone in thinking that 12 months ago, Indonesia was on a very good path." Nor did concern about the crisis seem to much affect the Indonesian public until January of 1998. During January concern about rising food prices touched off buying sprees that resulted in brief shortages of staple goods, and some workers returning to the cities after the *Idul Fitri* holiday in early February found that their jobs had disappeared.

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[1]The hypothesis that net food producers may have been partially protected from the effects of the crisis needs to be tempered since a severe drought immediately preceded the financial crisis and it affected agriculture in many parts of the country - particularly in the east. Country-wide, rice production fell by 4% in 1997 with rice and soybeans being imported. Moreover, unusually severe forest fires raged in parts of Sumatra, Kalimantan, and Sulawesi affecting many aspects of economic life including agriculture and tourism.

Ultimately, the crisis has left few Indonesians untouched. For some, the impacts may have been devastating, but for others the crisis has likely brought new opportunities. Exporters, export producers, and food producers fared far better than those engaged in the production of services and non-tradeables or those on fixed incomes. Indeed, among the community leaders who answered the IFLS Community Survey (described below), some of those in rural areas told us that life in their community improved between 1997 and 1998 as a result of rising rice prices and increased business opportunities. Many others told us that life was much worse, for a variety of reasons. In both urban and rural areas, individuals likely vary in the degree to which they have identified and embraced new opportunities or were able to offset the effects of the economic shocks that they have faced.

Given the complexity and multi-faceted nature of the crisis, it is only with detailed broad-purpose panel data on individuals and households that it is possible to fully explore the nature and extent of behavioral responses by individuals and families to the crisis and, thereby, provide sound micro-level evidence about the combined impacts of the various facets of the crisis and how they have varied across socioeconomic and geographic strata. Moreover, the massive upheavals in the Indonesian economy -- and the diversity of their impact -- provides an unparalleled opportunity to better understand the dynamics of urban and rural factor and product markets in low income settings as well as mechanisms used by families to smooth out the effects of large, unanticipated shocks.

3. Data: Indonesia Family Life Surveys

The Indonesia Family Life Survey (IFLS) is an on-going longitudinal survey of individuals, households, families and communities. The first wave, IFLS1, took place in 1993, when 7,224 households were interviewed. This baseline survey, which was conducted in 321 communities drawn from 13 of Indonesia's 27 provinces, was representative of 83% of the Indonesian population.[2] The second wave, IFLS2, was fielded four years later (between August 1997 and February 1998).[3] Excluding households in which everyone had died (mostly single-person households), over 94% of the IFLS1 households were re-interviewed and 93% of target individuals were reinterviewed (more than 33,000 individuals were interviewed in total). There are 7,600 households in IFLS2. The increase in the number of households

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[2]The sample includes four provinces on Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung), all five of the Javanese provinces (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), and four provinces covering the remaining major island groups (Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi). The IFLS1 sampling scheme balanced the costs of surveying the more remote and sparsely-populated regions of Indonesia against the benefits of capturing the ethnic and socioeconomic diversity of the country.

[3]Most of the interviews were completed by December 1997; the first two months of 1998 were spent tracking down movers who had not already been found. (Frankenberg and Thomas, 2000, describe the survey.)

surveyed, relative to IFLS1, arises because respondents where followed when they split off from their 1993 household and set up their own households.

The IFLS household data are accompanied by an extensive survey of the 321 communities in which the respondents live and of the markets, health facilities, and schools to which they have access. These contextual data provide information on the availability, quality, and prices associated with various institutions and types of infrastructure, as well as on the prices of food and other goods.

Fieldwork for IFLS2 was drawing to a close when the Indonesian rupiah collapsed in early 1998. The survey was uniquely well-positioned to serve as a baseline for follow-ups that will trace out the impact of the crisis on the lives of Indonesians. Since there is very little solid empirical evidence regarding the immediate consequences of a major shock on the well-being and behaviors of individuals and households, we decided to conduct a re-survey a year after IFLS2: IFLS2+ was fielded in late 1998.

Given the turnaround time, it was impossible to re-field the entire IFLS. Instead, we conducted interviews in 25% of the enumeration areas, which were chosen to span the full socio-economic spectrum represented by IFLS. About 2,000 households are included in IFLS2+ and interviews were conducted with over 10,000 respondents. With the social, political and economic turmoil in Indonesia in 1998, the issue of attrition warranted special concern. Re-interviews were completed with 98.5% of those households that were in the target sample and interviewed in 1997; the re-contact rate among individuals was over 95%.[4]

In all waves of IFLS, respondents provide detailed information on a broad array of demographic, social and economic topics. These include household structure, household consumption, individual earnings and labor supply, assets and wealth. All of these modules will be used extensively in this paper.

At the beginning of each follow-up interview, basic socio-demographic characteristics of each household member is collected using a pre-printed roster that lists all household members from prior waves. The current location of respondents who have moved away is noted and new entrants are added to the roster.

Household expenditure in the IFLS is collected in a "short form" type of consumption module that takes about 30 to 40 minutes to administer. Questions are asked about a series of commodity categories; for each item, the respondent is asked first about money expenditures and then about the imputed value of consumption out of own production or provided in kind. The reference period for the recall varies depending on the good. Expenditures are reported for the previous week for 37 food items/groups of items (such as rice; cassava, tapioca, dried cassava; tofu, tempe, etc.). For those people who produce their own food, the respondent is asked to value the amount consumed in the previous week. There are 19 non-food items. A reference period of the previous month is used for some (electricity, water, fuel; recurrent

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[4]See Thomas, Smith and Frankenberg (2000) for a discussion of attrition and Frankenberg, Thomas and Beegle (1999) for a fuller description of IFLS2+.

transport expenses; domestic services), while for others the reference period is a year (clothing, medical costs, education). It is difficult to obtain good measures of housing expenses in these sorts of surveys. We record rental costs (for those who are renting) and ask the respondent for an estimated rental equivalent (for those who are owner-occupiers/live rent free). Because expenditure items are aggregates, quantities are not asked; instead the respondent is asked for the price paid the last time a set of specific items were purchased.

Wealth may play an important role in determining how successfully households are able to smooth consumption. IFLS contains information on the value of assets that are associated with family businesses and, in a separate module, the value of all non-business assets owned by the household. These are divided into 10 categories which include property; savings, stocks and loans; jewelry; household semi-durables; and household durables. An unusual aspect of the wealth data in the IFLS is that individuals are asked about the value of each asset group owned by the household, the fraction the respondent owns, and the fraction his or her spouse owns. It is, therefore, possible to measure wealth at the individual level.

To gauge the severity of the economic crisis and the various mechanisms households have used to smooth its most severe impacts, this paper will focus on those individuals and households that were interviewed in 1997 and re-interviewed in 1998 as part of IFLS2/2+. Prior to presenting the empirical results, the next section describes some of the mechanisms that may be important in the Indonesian context.

4. Consumption smoothing mechanisms

Households in Indonesia were confronted with an arguably unanticipated price shock which resulted in a large shock to real income. This paper highlights some of the mechanisms that households adopted to mitigate the immediate effect of the shock on well-being. Emphasis is placed on the role accumulated savings plays in reducing fluctuations in *per capita* expenditure. We also consider other mechanisms for smoothing well-being including re-allocating the time and consumption budget and shifts in living arrangements.

The literature on motives for wealth accumulation and savings is immense and has not reached a consensus.[5] The starting point for much of this literature is the *life-cycle model* (or "life cycle hypothesis") which emphasizes the role that savings (and dis-savings) play in dealing with timing issues surrounding non-coincidence in income and consumption. According to this theory, individuals or households seek to 'smooth' consumption in order to keep the marginal utility of consumption constant across periods, which implies they will tend to save when income is high and dis-save when income is low.

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[5]For an excellent survey, see Browning and Lusardi (1996).

Declining marginal utility of consumption within any period also implies that households will want to smooth out the impact of an economic shock so that the associated consumption decline is not concentrated in a single or relatively few time periods. Their ability to do so, however, may be constrained by circumstances of the household or the markets with which they interact. Additional resources are required to finance current consumption at levels above the now 'shock' depleted levels of current income.

In the absence of liquidity constraints, households will presumably borrow resources when times are bad and pay back these loans when times improve. During the crisis in Indonesia, liquidity constraints were probably binding. The crisis was exacerbated by the weakness of financial and political institutions. There was a spectacular collapse of the banking system with many of the largest banks becoming insolvent and being taken over by the public sector. Evidence in IFLS indicates the formal credit market substantially shrank: relative to 1997, fewer households borrowed from the formal sector and the amounts borrowed were substantially smaller in 1998.[6] Households did turn to informal credit markets although the amounts borrowed tended to be relatively small. The IFLS2 and IFLS2+ data are not well suited to a detailed exploration of credit markets and the crisis and so we will ignore those markets in this paper.

There are, however, several less formal mechanisms through which resources can be transferred across time including borrowing from family, friends or through a network at the village or community level. These kinds of networks have been the focus of much of the consumption smoothing literature in development (see, for example, Townsend, 1993; Platteau, 1991).[7] We put community-level smoothing to the side in this paper and draw attention, instead, to the role that household-specific smoothing strategies have played in responding to the crisis in Indonesia.

Four such mechanisms are considered in detail: spending down accumulated savings (wealth); re-allocation of time to work or leisure; shifts in living arrangements; and re-allocation of the budget away from goods like semi-durables. We discuss each in turn.

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[6]For example, nearly one in ten households reported borrowing from the formal credit sector during the twelve months prior to the 1997 interview but fewer than one in twenty did so in the 1998 interview. Amounts borrowed also declined. Among those who did borrow, the median amount was 45% lower in 1998, relative to 1997. One in four loans were for more than Rp 4 million in 1997 but loans of this magnitude accounted for only one in twenty in 1998.

[7]Many of the informal networks in developing countries extend across community boundaries. Transfers across (possibly related) households living in different communities experiencing different magnitude of shocks is an often cited dimension of smoothing behavior. IFLS contains information on transfers among non-resident kin. Preliminary explorations suggest they were not a principal smoothing mechanism used during this crisis. While the incidence of loans from friends and families during the prior 12 months increased from 24% of households in 1997 to 32% in 1998, the magnitude of these transfers fell by 40%. These kinds of transfers are not discussed further in this paper; see Frankenberg and Thomas, (2000). Similarly, governments programs might also serve to smooth the effects of fluctuations in income. The majority of social safety net programs in Indonesia were instituted around or after the fielding of IFLS2+ and so are not reflected in the data used here.

Spending down wealth

Given that the crisis was largely unanticipated in terms of its timing, magnitude and longevity, the life cycle model suggests that households should use their accumulated savings, or wealth, to help finance their current consumption at the onset of the crisis. Ownership of assets should, therefore, serve to smooth fluctuations in *per capita* expenditure.

In addition to ownership, there are several dimensions in which assets can be usefully differentiated. Not all assets are equally liquid. Holding more assets that are relatively liquid should facilitate consumption smoothing. Many households in Indonesia own assets that are associated with a business activity; land is the most common such asset and is used for farming. These assets are typically not liquid and, as the economy collapsed, their prices fell dramatically. The income generated by some of these productive assets, such as land or livestock, became more important as the crisis unfolded. The sale of such assets has powerful implications for future consumption and choices regarding the acquisition and disposal of these assets will depend critically on expectations about future prices and preferences regarding inter-temporal substitution. Of course, not all business assets provided protection from the effect of the crisis through income generation: some business activities were all but wiped out by the crisis (construction, low-skill services, for example).

Among non-business assets, housing, land and durables are the least liquid; like business assets, their prices tended to fall at the onset of the crisis. Financial assets, including cash and stocks, lie at the other end of the liquidity spectrum. As the crisis unfolded, and inflation spiralled, the values of these assets also declined substantially. Real interest rates on savings accounts turned negative and by mid 1998, the Jakarta Stock Exchange had lost 75% of its pre-crisis value.

Many Indonesian households store some of their wealth in the form of gold (usually as jewelry). There is a very active market in gold, with at least one trader operating in virtually every community across the archipelago. Gold is bought and sold according to its weight, with the price set at the prevailing world price. As the rupiah collapsed, the price of gold rocketed and so, in contrast with financial assets and illiquid assets, wealth held in the form of gold increased in value at the onset of the crisis. Given that the market for gold is very active, it is reasonable to think of jewelry as being a relatively liquid asset which, in combination with its capital appreciation, suggests it should be an important tool for smoothing consumption during the crisis. The empirical analyses below will explore the effect of wealth, taken as a whole, on fluctuations in *per capita* expenditure (PCE) and also examine the role that different assets have played in mitigating the impact of the crisis.

Re-allocation of leisure across time

Consumption smoothing models are typically expressed in a single aggregate per period. However, households and individuals may have preferences over many dimensions of the total consumption bundle. Leisure is one such dimension. Since real wages declined at the onset of the crisis, one would expect substitution away from time at work so leisure would increase and work hours fall. While there will presumably be a countervailing income effect which would encourage additional work effort, there is no reason to expect the income effects would offset substitution effects in this context.

Leisure and expenditure consumption differ in another important dimension. If borrowing against the future is difficult, credit constrained households may have to absorb a tremendous decline in consumption in this period. Households may borrow future leisure hours from themselves and actually choose to increase current work hours at the onset of the crisis in order to lessen the impact of reduced earnings on consumption expenditures.

More generally, labor market activity of family members may play a similar role especially given that the self-employed have considerable flexibility in choosing hours of work and are better able to exploit new opportunities. Even if jobs in the formal wage sector are difficult to find because of the crisis, opportunities may exist for expanded work effort in family businesses and farms. The extent to which family labor supply responded to the crisis will be explored.

Changes in household living arrangements

A related aspect of household choice which is typically neglected in consumption smoothing models involves the number of members in the household. In an extended family context such as Indonesia, the optimal number of households per extended family presumably involves a tradeoff between taking advantage of economies of scale in consumption and the utility derived from individual or sub-family privacy. The crisis may have disturbed the prevailing equilibrium if inter-temporal smoothing across these two dimensions are not equivalent. We hypothesize that privacy may be more substitutable over time and that households attempt to minimize the impacts on consumption compared to privacy. If so, households should tend to recombine and become larger during the crisis.

Indeed, one important mechanism through which non co-resident kin may spread the impact of the crisis is through reallocation of different types of members of extended families across different households. For example, those family members who are net consumers may relocate to relatives living in places where consumption costs are low while those who are earners may move to help out in family businesses.

Reallocation of spending on semi-durables across time

Time allocation and location choice are not the only components of the consumption bundle that might be responsive to income shocks. Some parts of the consumption bundle (such as food) may be

poorly substitutable over time while others such as durables, semi-durable purchases and household investments are likely to be more readily substituted over time and hence postponeable. For example, postponement of expenditures on semi-durables such as clothing is not likely to have as large an effect on life-time utility as postponing spending on staples. For some items, it is not obvious that there will be any longer-run effect on utility, at least for the majority of the population; delaying preventive health care investments is a good example. For many, such delay will be of little consequence; for some, however, the costs may be very large.

All consumption smoothing models rely on an implicit or explicit assumption about household expectations. We believe that the nature and magnitude of the Indonesian crisis, as described above, makes it plausible that this crisis was largely unanticipated. A more difficult question involves household expectations in the midst of the crisis in 1998. For example, household behavior would be quite different if they expected the crisis to worsen considerably in the future. In that case, households may desire to save even in 1998 to lessen the impact in the future. As further waves of IFLS are added to the database, these dynamic issues will be addressed.

5. Results

This section summarizes our principal research findings about the ability of Indonesian households to mitigate the impact of the crisis on their welfare during the first year of the economic crisis. The section is organized as follows. We begin with a discussion of the measurement of household welfare and note that household consumption and household welfare are not one in the same thing. In line with the vast majority of the literature, we then lay out the basic facts in terms of *per capita* household consumption and discuss the magnitude and distribution of the crisis by this metric.

The following sub-section develops measures of the community-specific "shock" that households faced which are later used to provide insights into the mechanisms households have used to smooth welfare during this shock. We focus on two mechanisms that appear to have played a role in the Indonesian crisis. We first describe changes in household size and composition between the 1997 and 1998 interviews; these reflect changes in living arrangements and migration of individual household members. Second, we present evidence on changes in labor supply -- including sector of work and hours of work -- of household members.

This study emphasizes the role played by wealth, which is discussed in the rest of the section. We begin with a description of wealth ownership and note that the crisis is associated with declines in the values of some assets but *increases* in the values of others. We proceed to examine how the level of wealth and its distribution among asset groups is related to reduced fluctuations in PCE. We also assess whether other

household characteristics -- particularly household structure and levels of human capital -- are associated with greater smoothing of consumption.

5.1 Changes in household consumption

How large were the changes in household welfare that accompanied the economic crisis in Indonesia during 1998? Which types of households experienced the largest declines? Because IFLS2 was fielded almost entirely before prices spiraled upwards in early 1998 (Figure 1b), and IFLS2+ was fielded about a year later, these data are uniquely well-suited to provide insights into the immediate impact of the crisis and the extent to which households have mitigated the effects on the well-being of their members.

It is standard in this literature, to equate household *per capita* consumption (PCE) with the welfare of individuals within the household. Mean levels of PCE in 1997 and 1998 are reported in the first row of Table 1 along with the mean percentage change in PCE at the household level. The average household reduced real *per capita* consumption by almost 25% in one year.[8] This is a stunning decline that is of the same magnitude as the crisis in Russia, in the 1980s, and the first year of the Great Depression. (Throughout the paper, all values are converted to 1997 rupiah.[9])

Two strong assumptions underlie the interpretation of PCE as indicative of the well-being of households with different size and composition. First, economies of scale are ignored. Second, children and

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[8]In this paper, consumption includes market expenditures and the imputed value of own production on foods and non-foods. Expenditures on durables are excluded.

[9]Calculation of price indices is far from straightforward. See, for example, Levinson, Berry and Friedman (1999) and Thomas et al (2000) for a discussion in the context of the Indonesian crisis and Deaton and Tarozzi (2000) who examine the general issue in the Indian context. All 1993 values are inflated to 1997 prices using the price series for each province published by the *Badan Pusat Statistik, (BPS),* the Indonesian central bureau of statistics. Those prices are collected in the capital city of each provinces and the prices reported for the province capital are attributed to all households living in that province. (See Ravallion and Bidani, 1993.) Price deflators for 1998 values are based on data collected in the IFLS community surveys which are conducted in each of the EAs included in the original frame. These community surveys collect information on 10 prices of standardized commodities from up to 3 local stores and markets in each community; in addition, prices for 39 items are asked of the *Ibu PKK* (leader of the local women's group) and knowledgeable informants at up to 3 *posyandus* (health posts) in each community. Using those prices, in combination with the household-level expenditure data, we have calculated EA-specific (Laspeyres) price indices for the IFLS communities for 1997 and 1998. That price series is used to deflate all 1998 values in this paper. An alternative approach would be to use the price series for capital cities of each province provided by BPS. Our series has two key advantages. First, in our data, there is evidence for considerable price heterogeneity within provinces and that rural prices have increased slightly more than urban prices during this period. Second, as shown in Figure 1, relative prices have changed substantially during this time with food prices increasing faster than other prices. Food shares tend to be higher for poorer households and so there is an advantage in using a deflator that is sensitive to the fact that the poorest likely faced a bigger real shock by adopting a deflator that varies across the distribution of initial PCE. We go a long way to achieving that goal by using an EA-specific price series -- over 50% of the variation in ℓnPCE in IFLS is across communities. Overall, province differences in the IFLS price series mimics the BPS series although estimates of the level of inflation are slightly higher in IFLS.

adults are treated as equals in the household budget. While there are many proposals of weights that might be attributed to different demographic groups, there is no consensus in the literature (Deaton and Muellbauer, 1980; Lazear and Michael, 1988). To confirm our results are not driven by the assumption that a child and adult are equivalent, the second row of Table 2 reports per adult equivalent household consumption in 1997 and 1998 where we have assumed each child costs half an adult. The percentage change in per adult equivalent consumption is identical to the change in PCE.[10] We conclude that the change in PCE does a good job of reflecting the changes in real resources available to individuals; it will serve as our main consumption-based indicator of well-being. The role of changes in household size and composition will be taken up again below.

The distribution of the decline in PCE is reported in Figure 2 which presents non-parametric estimates of the percentage change in real household PCE between 1997 and 1998 across the distribution of prior PCE.   To avoid biases due to correlated measurement error that will arise from regressing $\ell nPCE_{1998}$-$\ell nPCE_{1997}$ on $\ell nPCE_{1997}$, we use, on the x-axis, 1993 levels of $\ell nPCE$ (measured in IFLS1) to rank households by their baseline levels of consumption.[11]

The striking fact that emerges from the figure is the diversity of changes in PCE across households with the initially better off household reducing their PCE by much larger percentage amounts. For example, taking all households (in the upper left panel), the fall in consumption was 30% or more in the upper quartile of 1993 $\ell nPCE$ but approximately 15% or less in the bottom quartile.

The right hand panel of Figure 2 separates households by whether they live in urban or rural areas (in 1997). This distinction turns out to be critical in understanding the impact of the crisis. Two salient patterns are produced by this distinction. First, for households within the bottom and top quartile of the 1993 PCE distribution, percentage changes in PCE run between 5 to 15 percentage points more negative in urban areas compared with households living in rural locations.[12] Second, among rural households within the lower and upper quartiles of the PCE distribution, proportionate consumption declines are largely

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[10]We have also experimented with more complicated equivalence scales. Assigning a weight of unity to prime males, 0.8 to prime age females and to older adults and a weight of 0.5 to children, the percentage change in per adult equivalent expenditure is 24%.

[11]The non-parametric estimates presented in this paper are based on locally weighted, smoothed scatterplots (LOWESS) using a tricube weighting function. These are nearest-neighbor type estimators (Cleveland, 1979; Cleveland, Devlin and Grosse, 1988). The estimates in Figure 2 are calculated with 20% of the sample in each band.

[12]The result that rural areas were not hit as hard by the crisis as urban areas is born out in the data from community leaders of each of the IFLS communities. In 1998 these leaders were asked how life for residents in their community has changed in the past 12 months. About half the respondents in both sectors responded that life was somewhat worse. 18% of urban leaders said that life was much worse but no rural leaders said that life was much worse. In fact, one quarter of rural leaders said that life was better.

independent of baseline levels of PCE. In the urban sector, in contrast, we find a more uniform pattern of a larger consumption decline among households with higher PCE at baseline.

To be sure, for many households, the crisis in Indonesia was devastating. However, for some, it surely brought new opportunities. For example, net food producers (particularly rice producers) benefitted from the increase in the relative price of food; similarly, those who produced for the export sector saw substantial increases in the relative price of their output when the rupiah collapsed. In fact, about one-third of households report higher levels of PCE in 1998, relative to 1997. While at least some of these apparent increases in PCE likely reflect measurement error in expenditure (or random fluctuations in consumption), there are at least three reasons why we think the evidence suggests that some households were better off in 1998 than in 1997.

First, a regression of change in ℓnPCE on household and community characteristics indicates that households in food-producing communities tended to fare better during the crisis as did households with more members who entered the labor market between 1997 and 1998. (See Thomas et al, 2000.) Second, in 1998, all adult respondents were asked whether their lives had improved or worsened during the previous twelve months (using a 5-point scale). One in six reported their lives had improved whereas about 40% said they were worse off in 1998. Third, we have aggregated these individual responses to the household level and estimated an ordered probit relating reported change in well-being (using the same 5 point scale) to levels of PCE, household size and location. Holding PCE in 1993 and 1997 constant, higher levels of PCE in 1998 are associated with a significantly higher probability the household is reported as being better off in 1998; *ceteris paribus,* higher PCE in 1997 is associated with lower levels of household welfare in 1998. Thus, at the household level, changes in PCE between 1997 and 1998 are significant predictors of changes in perceptions of household well-being, with all of these measures being collected independently of each other. Holding constant household size in 1993 and 1997, an increase in the number of household members in 1998 is associated with an increase in the probability a household reports itself as being better off. This may be because the addition of members to a household is viewed as welfare-improving or because households that absorbed additional members were better able to respond to the crisis by, for example, exploiting new opportunities.

Returning to Table 1, in the third row, we see that total household consumption declined by considerably less than *per capita* consumption, particularly in rural areas. This suggests that individuals and households have responded to the crisis by shifting living arrangements between 1997 and 1998. This is reflected in changes in household size which, as shown in row 4, increased by 7% during this time. Changes in household size are discussed in more detail below. For now, it is sufficient to note that studies which focus exclusively on PCE are ignoring a potentially important smoothing mechanism.

PCE is separated into components in the next four rows. On average, *per capita* food consumption was reduced by 9% whereas expenditures on non-foods took a much bigger cut and were reduced by about a third. Part of this difference can be explained by the fact that food prices rose more rapidly than other prices although that is probably not the full story. It is likely that households smooth welfare by re-allocating the budget away from spending on goods that can be deferred at little immediate cost to welfare; semi-durables such as clothing and household furniture are natural candidates since delay of expenditure on these items is unlikely to affect utility as much as, say, reducing spending on basic foods. Of course, as the period over which spending is delayed lengthens, the welfare costs of deferring expenditure rise and so the extent to which this smoothing mechanism is adopted likely depends on expectations about future income. (See, Browning and Crossley, 1997; Thomas et al, 2000.) In Indonesia, households substantially reduced *per capita* expenditures on "deferrable" items, including clothing, furniture and spending on ceremonies, which declined by over one-third. They also reduced investments in human capital (that is health and education spending) by around 40%, which may have rather different implications for longer-run welfare. The evidence in Indonesia suggests that households do smooth welfare through re-allocating the budget, which means that the link between changes in PCE and welfare of households is not direct; this is important to keep in mind when interpreting the evidence on household smoothing behavior below.

5.2 Measurement of economic shocks

Prior to assessing the extent to which Indonesian households were able to smooth the effects of the economic shocks associated with the crisis, it is useful to construct a measure of the size of the shock faced by different households which is independent of their own smoothing behavior. Using household level data alone, it would not be possible to distinguish between a household that faced no economic disruption during the crisis and one that was able to completely smooth the impact of the shock that they did confront.

We have explored several approaches to measuring the magnitude of the shock. The first issue to address concerns the level of geographic aggregation. This calls for balancing at least two competing concerns: on the one hand, the geographic unit should be small enough so that the estimated shock reflects the nature of the local economy; on the other hand, the greater the number of estimates of the shock within a local economy, the smaller the measurement error. If labor markets clear immediately, then all shocks would be national as migration of labor would smooth out spatial variation in relative demand. Given its geography (an archipelago of 13,000 islands) and its level of development and infrastructure, it seems unlikely that the Indonesian labor market is perfect. We will present some evidence on this score below. With this in mind, we have chosen to measure economic shocks at the level of *kecamatan* (which, roughly

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speaking, is analogous to a county in the United States). The analyses are based on data from 85 *kecamatans*, 49 of which are in urban areas.[13]

The next question involves how to best characterize shocks at the local economy level. There are several alternatives that we have explored, each with some advantages and disadvantages. A natural starting point is the real change in the local wage. Whereas inflation in 1998 was around 80%, nominal wages in the market sector increased by around 40%. Evidence based on IFLS demonstrates that inferences about the impact of the crisis based on market sector wages alone misses an important part of the picture. Specifically, there was a dramatic downward shift in real wages in the market sector of some 40% in both the rural and urban sectors and a similar decline in real hourly earnings from self-employment in the urban sector. However, hourly earnings of the rural self-employed declined by much less -- 15%-20% -- which likely reflects the increased returns to food production during the crisis. (Smith et al, 2002.) Our estimates of shocks will, therefore, be based on hourly earnings of market workers and the self-employed taken in combination.

This raises serious issues regarding measurement since estimation of hourly earnings from self-employment is fraught with difficulties.[14] Compared with market sector earnings, self-employment income is often very volatile; disentangling profits from returns to capital is very difficult; it is not clear how to allocate earnings to individuals in family business with multiple members working in the activity. Moreover,

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[13]There are three obvious alternatives. First, we could exploit the cluster-design of IFLS and use an EA to define the local economy. This is unsatisfactory for two reasons. First, EAs are very small (akin to a census block) and the local economy surely casts a wider net. Second, we would exclude a substantial fraction of our households who had moved within the vicinity of the EA between 1993 and 1998 but were no longer living with the EA. Systematically excluding these movers from the calculation of the local economy shock will result in biased estimates of the shock if movers and stayers are not drawn from the same underlying distribution of unobserved characteristics. Moreover, from a practical point of view, it is very difficult to determine whether a household is living within an EA. This issue can be side-stepped by defining the local economy in terms of the lowest level of administrative boundary defined in Indonesia: *desa* or *kelurahan* (village or neighborhood). (There are over 60,000 *desas* in Indonesia.) The costs of this approach are two-fold. As with EAs, we exclude households that have moved locally (but across a *desa* border). And second, several of the 90 EAs in IFLS2/2+ are located in close proximity to one another and likely shared common shocks (10 EAs are drawn from 4 *kecamatans*). The third potential level of geographic aggregation is the *kabupaten,* the level above the *kecamatan*. Inspection of the magnitudes of estimated shocks at the *kecamatan* level suggested that there is heterogeneity within *kabupatens* and so we prefer not to aggregate to this level. A key distinction is whether a community is rural or urban. We treat those kecamatans that contain both rural and urban areas as two separate markets. The calculation of shocks is based only on those households that lived in the same *kecamatan* in 1997 and 1998. (This includes people who had moved from their original EA between 1993 and 1997.)

[14]It is well-known that collection of income from self-employment in a survey setting is extremely difficult -- especially, perhaps, in a low-income and substantially agricultural setting like Indonesia. Difficulties arise because of the need to calculate costs and net those out to compute profit, because incomes tend to be volatile over time and often contain an important seasonality component. The panel feature of IFLS may provide some assistance. To the extent that the difficulties in measurement for a particular individual do not change between 1997 and 1998, these concerns will be somewhat mitigated; inferences based on changes in self-employment incomes over the period may not be as seriously contaminated as inferences about levels in incomes.

even if one can estimate earnings, the estimation of hours of work in self-employed activities is well-known to be very hard. Given these difficulties and the fact that self-employment activities increased in importance between 1997 and 1998 (which implies that measurement error is not likely to be differenced out), we expect estimates of the shock based on hourly earnings to be contaminated by substantial measurement error. In addition, our tests of smoothing revolved around changes in PCE which is measured at the household level and it is not obvious how to aggregate individual hourly earnings so that they are comparable without incorporating a model of family labor supply.

This suggests the first of two alternative measures: the community-specific mean change in the logarithm of *per capita* income, PCY. Our second alternative is the average change in ℓnPCE. In contrast with hourly earnings of individuals, these measures have the advantage that they are measured at the same level of aggregation as the outcome in the analyses -- household PCE. Relative to PCE, PCY has two shortcomings. First, it is more likely to be measured with error and subject to contamination due to outliers. Second, it reflects labor supply responses to the crisis.

Figure 3 displays the three measures of community "shock". In an effort to provide insights into the distributional impact of the crisis, we have attributed to each household the shock they faced between 1997 and 1998 and then related those shocks to household PCE (measured in 1993).[15] In the urban sector, the "wage shock" is around -40% whereas the shock measured by PCY and PCE is close to -20%. This gap reflects both the effect of aggregation of individual earnings to the household level and also the existence of substantial increases in labor supply. In the rural areas, the shock is much smaller as is the difference among the three measures of the shock. Whereas the wage shock ranges from -12% to -30%, the shock measured by PCE and PCY lies between -12% and -20%.

Apart from an intercept difference in the urban sector, our estimates of the shocks based on PCE and PCY are remarkably similar and yield the same inferences about the distribution of the shock. Specifically, in both the rural and urban sectors, the shock is largest for those who were best off in 1993. Among urban households, there is a tendency for the magnitude of the *kecamatan*-level shock to increase as 1993 household PCE increases. In rural areas, the middle 50% of households faced essentially the same shock, while those in the bottom quartile of PCE faced a slightly smaller shock.

We will use the community-mean change in ℓnPCE as our measure of the local economy shock. Its main disadvantage is that it may be affected by joint consumption smoothing for the community as a whole in which case we will under-estimate the magnitude of the shock. Since our focus is on the link

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[15]In this figure, PCE in 1993 is used as our metric of a household's original position in the economic hierarchy to mitigate any measurement error biases induced by having 1997 ℓnPCE on both the x and y axes. LOWESS estimates are reported using a 30% bandwidth for income and expenditure and a 35% bandwidth for wages.

between household wealth and smoothing, as long as household-specific wealth holdings and community-specific smoothing behaviors are not related, our results should not be contaminated. Given the complexities associated with measurement of the shock we will, in addition, take a less parametric and arguably more robust approach and allow the community shock -- as well as all community-specific smoothing behaviors -- be captured in a community fixed effect.

5.3 Smoothing mechanisms: Household size and composition

There are many dimensions over which households may 'smooth' consumption in order to mitigate the welfare reducing consequences of a severe economic shock. One often ignored dimension involves changes in household size and composition. In order to share fixed living expenses such as housing and food preparation, households may try to combine into larger units, forgoing at least temporarily the luxury of some privacy. Similarly, those households hit more severely may send some members to live with other households less severely affected by the crisis or to places where the cost of consumption may be lower. Consumption costs may not be the only reason for reshuffling of household members. Spatial variation in the size of economic disruptions may lead some household members to relocate to places where the prospects for generating income are better.

The upper panel of Figure 4 plots the change in household size between 1997 and 1998 in the urban and rural sectors.[16] The figures indicate that, on average, IFLS households became somewhat larger during the economic crisis, an increase that was greater for households with higher levels of 1993 *per capita* consumption. More revealing, however, is the separation of these household size trends by rural and urban residence. In the urban sector, the bottom quarter of households as ranked by their 1993 PCE actually lost household members during the crisis while urban households above median 1993 PCE gained new members. In contrast, across the entire distribution of 1993 PCE, household size was expanding in the rural sector. This expansion was small for the poorest rural households, but reached about half an additional member for the most well-off rural households.

To see why the direction of household size changes may have differed between the urban and rural sector, we have examined changes in relative hourly earnings (or wages for shorthand) in the two sectors. We have calculated the wage at each percentile in the urban wage distribution in 1997 and again in 1998; we treat the difference as the change in wage for a person at that percentile in the skill distribution in the

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[16]It is possible that the estimates in the figure slightly overstate the increase in household size since larger households were somewhat easier to find and therefore less likely to attrit in IFLS2+. Given the very low attrition rate (<1.5% of households), we do not think this is a serious concern. LOWESS estimates are presented with a 35% bandwidth in each case.

urban sector in 1997. The same exercise was repeated for rural workers. In order to directly compare urban and rural workers, we have located the sector-specific percentiles in the distribution for the whole country. For example, an urban male at the 10th percentile of the urban wage distribution earns the same real wage as a rural male at the 45th percentile of the rural wage distribution. Intuitively, we assume those two workers have the same level of skill and we compare the change in wages they experienced between 1997 and 1998. The percent difference in the decline in urban wages relative to the decline in rural wages is displayed in Figure 5. It presents our (smoothed) estimates of the urban-rural differential in the decline in hourly earnings during the year of the shock across the 1997 wage distribution. The estimates are reported separately for males and females.

The patterns are remarkably systematic. Among the least skilled men, there was about a 15% decrease in urban wages relative to the drop in rural wages. This greater relative wage deterioration in urban markets monotonically declines as we move up the wage (skill) distribution until there is a roughly equal reduction of male urban and rural wages at the highest wage (skill) levels.

These between sector relative wage changes map neatly into the household size changes documented in the upper panel of Figure 4. The Indonesian economic crisis hit unskilled labor markets harder in urban areas than in rural settings. Some low skill workers in poor urban households exited the urban sector to find work in the rural sector. While doing so, many of them apparently joined middle income or higher income households in rural areas

Additional insight can be obtained on how changes in household membership are operating by examining the characteristics of those who enter or leave the household. To do so, we separated household members by gender and into four age groups-0-14, 14-25, 25-54, and 55+. These changes in household size and composition are subdivided by quartiles of PCE in Table 2.

Relative to changes in the urban sector, increases in household size are larger in the rural sector particularly in the bottom and top quartiles of PCE. The rural-urban differential is sharpest among older rural women. In the bottom quartile of 1993 PCE urban households, the most striking pattern is that male and female children under age 14 apparently left their original household. These young children may have been accompanied by their mothers since there was also a decrease in women ages 25-54. No similar trends exist among rural households in the bottom quartile of PCE. In the top quartile of PCE in both the rural and urban sectors, there was a large increase in the number of men in the prime age worker category (ages 15-54) and a slightly smaller increase in the number of women in this age range.

The evidence indicates that dependents tended to have exited urban households that were poorest (measured by PCE in 1993) and moved to lower-cost rural areas. At the same time, households that were better off in 1993 have been net recipients of working age adults which likely reflects the fact that these

households were better able to exploit new opportunities to generate income as the crisis unfolded, possibly because the households had land or other forms of capital.

5.4 Smoothing mechanisms: Labor supply and number of workers

In addition to the exit or entry of additional people into the household, a household may attempt to adjust to the crisis by altering the labor supply decisions of its members. On the demand side, some workers especially in the formal wage sector may have lost their jobs and are no longer working. Other family members may have increased their work effort by helping out in family businesses.

There are several aspects of total family labor supply that we examine in this paper -- the number of workers in the family and the hours of work. Table 3 lists changes between 1997 and 1998 in the number of workers in each household in the rural and urban sector. While there was a greater increase in household membership among rural households, there was actually a greater increase in number of workers in urban areas. This indicates that the increase in number of workers in urban households was not simply at the extensive margin -- i.e. adding new members -- but also resulted from additional work by members already there.   The increase in numbers of workers was concentrated in the wage sector in urban areas and in the family business in rural areas.

The last three rows of Table 3 focus on hours of work. The total number of hours worked by all household members increased substantially in both the rural and urban areas: the average household spent an additional 25 hours at work per week after the onset of the crisis. The per worker increase in hours worked was about 10 hours per week. It turns out that these additional hours represent the combination of a reduction in the extent of part time work and, for some full-time workers, a large increase in hours spent working, particularly among the self-employed.

Table 3 indicates that one important adjustment mechanism to the economic crisis was a sharp increase in hours worked. The lower panel of Figure 4 presents more detail about the nature of that adjustment by relating the percent change in total household hours worked by each household with 1993 ℓnPCE. There was a very large increase of over twenty percent in total household hours worked in the rural sector. These increases were roughly independent of 1993 PCE in urban areas, but were roughly U shaped in rural areas. The large increase in work effort in response to the crisis is one reason why changes in ℓnPCY are higher than *per cent* changes in wages in Figure 3.

The data presented in this section highlights two important adjustments households made in the face of this crisis. First, households consolidated and became larger, presumably to economize on fixed consumption costs. The composition of households also changed, especially in urban areas, so that members

who were primarily consumers (such as young children and their mothers) left while earners moved in. The second adjustment was a significant increase in total work effort by the household.

5.5 Smoothing mechanisms: Wealth

For those households that own assets prior to an economic shock, their wealth may serve as a buffer to soften the potential blow to their consumption. As central as the total value of assets is likely to be, portfolio composition may also be important since the more liquid an asset, the more readily it may be converted to resources to finance consumption. Many economic and financial crises, including the Indonesian case, have been accompanied by substantial swings in the relative prices of assets. The associated capital gains and losses are also likely to result in consumption and savings adjustments by households. We explore each of these mechanisms below.

Distribution of ownership of wealth

IFLS pays considerable attention to the collection of information on wealth. The rates of ownership in 1997 and 1998 are reported in Table 4. Values of wealth in 1997 and 1998 are reported in Table 5 in thousands of 1997 Rp. Because the distribution is extremely right skewed, the value at the median, bottom and top quartile and bottom and top decile are reported in the table.

Essentially all Indonesian households owned some wealth in both 1997 and 1998. The total value of business and non-business wealth of the median urban household is about Rp 10 million and the median rural household owns about Rp 6 million in such assets. (This is equivalent to about a year and a half of consumption for the median household.) In both sectors, the median for total assets has remained remarkably stable through the crisis. In fact, in the rural sector, the distribution of wealth has remained reasonably constant below the median but has stretched out substantially above the median. The reverse is true in urban areas, where the right hand tail of the wealth distribution has been substantially curtailed and the left tail has expanded.

These differences are primarily a reflection of the fact that business wealth has tended to increase (or at least fall less than non-business wealth) between 1997 and 1998. In the rural sector, four out of five households own wealth that is associated with a business (typically farming) whereas two out of three urban households own a business that involves some assets. As noted above, self-employment activities -- particularly those revolving around the production of food -- became relatively more attractive as the price of rice and other crops spiraled up. Households apparently responded by building up their family businesses. Excluding business wealth, household wealth has declined throughout the distribution among rural households and it has declined for all households above the median in the urban sector.

Excluding business wealth, the dominant assets owned by households are their home and land. Over ninety percent of rural and seventy percent of urban households own their own home with almost no change in ownership during the crisis. The value of houses declined between 1997 and 1998. Commercial property values, particularly in the largest urban centers, plummeted as construction contracts were canceled and many developers went out of business. The collapse of the banking system -- and lack of credit -- took its toll on the home property market. Arable land, on the other hand, likely became more valuable although the absence of credit likely muted activity in this market.

Turning to more liquid assets, about one-quarter of rural households and 40% of urban households keep some of their wealth in the form of cash, bonds or stocks. A higher fraction of households store wealth in the form of gold (as jewelry), particularly in rural areas. This likely reflects the fact that financial services are much less accessible in rural areas, relative to urban areas, whereas there is an active market in gold throughout Indonesia. Moreover, whereas aggregate ownership rates for all other assets have remained remarkably stable, ownership of jewelry has declined dramatically between 1997 and 1998 -- falling by more than 30% in rural areas and slightly less than that in urban areas. In fact, not only is jewelry more common than financial assets among rural households, but these households store a larger fraction of their wealth in the form of gold rather than in financial instruments. The same is true of most urban households.

The distribution of changes in wealth between 1997 and 1998 is reported in Table 6 (in thousands of 1997 Rps). The table reflects the combined effects of changes in prices of assets and changes in asset holdings. The first main point that emerges from the table is the tremendous amount of change in asset values between 1997 and 1998. For some assets, real values declined because of the crisis. Housing prices, for example, did not keep up with the 80% inflation rate of 1998. Financial wealth collapsed as real interest rates became negative in early 1998, as the stock market collapsed and as a large number of banks -- including several of the largest in the country -- closed their doors because they could not meet their obligation while their customers were clamoring outside for their savings. In contrast, the value of certain types of businesses likely increased -- and certainly the returns to food production increased -- with arable land presumably also increasing in value. The starkest contrast, however, lies in jewelry. The price of gold is set in world terms and so the four-fold decline in the value of the rupiah resulted in a four to five fold increase in the value of gold -- far outstripping the inflation rate. Those households in Indonesia that had stored their wealth in gold fared far better than those who had entrusted banks with their savings.

As noted above, increases in the value of wealth are primarily a reflection of the increase in the value of business wealth, particularly in the rural sector. The decline in housing prices in the urban sector took an especially large toll although there does appear to be a fairly active market in both the housing and land markets as some households report increases in values of these assets. Financial losses are substantial

with a small number of household increasing their holding of financial instruments (presumably because of sales of other assets). Since the price of jewelry increased substantially, the declines in their value reflect sales of the asset which appear to have also been substantial. Note that these numbers likely understate the value of sales. Consider, for example, the decline in jewelry wealth at the 25%ile which is Rp 73,000 (among rural households) and around Rp 200,000 (among urban households). Assume, for simplicity, that a household reported jewelry worth Rp 73,000 in 1997 in the rural sector (and Rp 200,000 in the urban sector) and sold all the jewelry in the second quarter of 1998. The household reported no jewelry in 1998. The difference is recorded in Table 6. However, by the time the jewelry was sold, the rupiah had collapsed and so the gold price had increased some four fold. The value of jewelry reported in 1997 would have been some four times its reported value (Rp 292,000 in the rural sector and Rp 800,000 in the urban sector) and so the value of the sale is understated. While we do not know when the jewelry was sold, given the speed with which the crisis hit Indonesia, it is reasonable to suppose that the majority of sales were after the collapse of the rupiah in early 1998. (To put the change in the value of jewelry into some perspective, it is equivalent to about 4 months of food consumption in the average rural household and 9 months in the average urban household.)

Asset markets

The evidence above presents a picture of wealth ownership that is far more equitable in Indonesia than in any developed country. Home ownership is very high, businesses are common and the majority of households own some form of liquid wealth. Since the banking system all but collapsed in Indonesia in early 1998, if this wealth is going to serve to smooth consumption, there must also be an active market for the assets. We do not know details about sales and purchases of assets in IFLS. However, Table 7 presents evidence that speaks to this issue. For each asset group, the table records the percentage of households that owned the asset in both years, that sold all their assets, new owners and the percentage that did not own in either year. These percentages are recorded for households in each quartile of the PCE distribution (measured in 1997).

There is some evidence that business assets were sold, particularly in the urban sector, and that a substantial fraction of households started new businesses between 1997 and 1998. Of households that did not own any business assets in 1997, about 60% of rural and 40% of urban households had acquired some business assets by 1998. There also appears to be a very active land market with the poorest households most likely to enter that market, presumably by buying low price tracts of land. It is likely that most of these acquisitions were intended for the production of food although it is worth noting that households were not entering both the land and business asset market at the same time. For example, of those who entered

the land market, only 15% also entered the business asset market. A similar fraction of the new business asset owners were new land owners. Relative to these markets, the housing market is comparatively thin.

Whereas households at the top of the PCE distribution are more likely to own financial assets, jewelry ownership is only modestly linked to PCE although (median) values are positively associated with PCE in both cases. A very large fraction of households that owned financial assets in 1997 had exited the market by 1998 and a roughly equal fraction entered the market. (There was a slight increase in ownership of financial assets in the rural sector and net decline in the urban sector.)

There is clear evidence of an active jewelry market with a substantial fraction of households selling their gold, possibly to finance consumption. Specifically, over half the households in the rural sector and close to one-third of urban households who owned jewelry in 1997 had sold all their holdings by 1998. There are considerably fewer households who entered the jewelry market during this time, which should not be surprising given it had become relatively expensive. The fraction of households who sold their holdings is approximately constant across the distribution of PCE as is the fraction of new entrants indicating that gold transactions involved households at all levels of consumption.

It is not only the IFLS household data that clearly points to an active jewelry market in both rural and urban Indonesia and a more limited role of financial services in rural Indonesia. The importance of gold as a savings method is confirmed in the anthropological literature on family economics. The acquisition of gold, usually in the form of jewelry, is seen as an investment and has long been an important way to save money in Indonesia. Women, in particular, buy gold earrings, rings, and bracelets with savings from their household budget, their wages, or from *arisan* winnings (Papanek and Schwede, 1988; Gondowarsito, 1990; Wolf, 1991; Adioetomo et al., 1997). Such gold jewelry, typically 18 or 22 carat, is priced by weight, and can be quickly resold for cash in times when the household needs money (Wolf, 1991). Stores that buy and sell gold are common, as are more informal traders and brokers, many of whom are women (Papanek and Schwede, 1988; Sullivan, 1994).

Further confirmation is provided in the IFLS community surveys which asked community leaders to identify the ways that community residents save money. Gold was mentioned as a form of savings in both rural and urban areas, while financial instruments such as CDs and stocks were much more commonly identified by urban informants. In rural areas, opportunities to buy and sell gold are more available than opportunities to save money through formal credit institutions. The IFLS community survey queried community leaders in each IFLS community about whether they could identify a private bank or any of six government credit institutions. Those who could were asked to estimate the distance to the credit institution from the community center. The median distance to a government credit institution was 6 kilometers in rural areas, but only 1 kilometer in urban areas. The difference is much more stark for private banks. While 75%

of urban informants could identify a private bank used by community members, only 40% of rural informants could do so. In those communities where a bank could be identified, the banks were an average of 2.5 kilometers from urban communities, but 13.4 kilometers from rural communities.

5.6 Regression models of characteristics associated with smoothing PCE

In this section, we summarize regression results which seek to identify the characteristics of Indonesian households associated with greater smoothing of *per capita* consumption. The dependent variable in each case is the change in ℓnPCE between 1997 and 1998, ΔℓnPCE, measured at the household level in IFLS2 and IFLS2+ and converted to 1997 Rupiah. The economic shock in the local (*kecamatan)* economy is measured by ΔℓnPCE averaged over all households who lived in the *kecamatan* in both 1997 and 1998.[17] Tests of smoothing behavior are based on the interaction between our measure of the local economy shock and household characteristics that are likely to be associated with reducing fluctuations in ℓnPCE. In each case, if the characteristic is associated with greater smoothing of PCE, the interaction will be negative.[18]

Regressions are reported separately for rural and urban households. Two models are presented for each regression. The first includes all households. The second excludes those households that have changed household size in order to check that our results are not driven by changes in household size and composition. Similarity of results in each pair will indicate that the array of demographic controls included in each regression does a good job of capturing the differences in smoothing behaviors across these groups of households. In all models that include interactions with the local economy shock, we present estimates with and without *kecamatan* fixed effects. The fixed effects estimates sweep out the main effects of spatial variation in the magnitude of the shock as well as all other changes in the local economy including changes in prices. The table reports only the coefficients of main interest.

As a starting point, the specifications in Panel A provide an estimate of the magnitude of the effect of the community shock on household PCE. In both the rural and urban sector, we cannot reject the

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[17]Households that moved out of a kecamatan between 1997 and 1998 are assumed to have faced the shock in their 1997 location. Households that did not live in a kecamatan that included an IFLS EA were assigned the average shock for their province and sector of residence in 1997. The regressions include a control for these households, for whom the shock may be measured with greater error. Estimates of the local economy shock faced by a particular households do not include that household in the calculation.

[18]The regression models control the number of males and the number of females in the household in 1997, stratified into four age groups (children, young adults, prime age adults, older adults) as well as controls for a change in the number of people in each of these eight groups between 1997 and 1998. These controls provide a flexible mechanism for incorporating equivalence scales into the analysis. The regressions also control age and education of the household head in 1997 (specified as a spline) and gender of the household head; month of interview in 1997 and in 1998 is included to control any time effects not captured by prices; province controls are also included in models that do not contain *kecamatan* fixed effects.

hypothesis that this effect is unity. This may be interpreted as indicating that our measure of the local economy shock has the same impact on all households; it is also consistent with the measure reflecting the local shock after all community-level smoothing has taken place.

The rest of Table 8 focusses on the extent to which household-specific smoothing is associated with three sets of characteristics: household wealth, household size and the level of human capital, all of which are measured in 1997. In general, since wealth and human capital are positively correlated, the inclusion of both characteristics in the regressions provides an opportunity to isolate a wealth effect from an information or background effect.

We begin with levels of human capital, measured by the education of the household head. A better educated person may be more able to exploit new opportunities that arise in times of upheaval -- as in Indonesia in the late 1990s -- and the better educated may be better able to make ends meet in bad times.

The better educated do appear to be more able to smooth fluctuations in PCE. The effects are large and significant in the rural sector; they are smaller and only marginally significant in urban areas. Relative to households whose head has no education, those with heads who have more than primary schooling (in the urban sector) and those with any education (in the rural sector) have smaller fluctuations in ℓnPCE for any given local economy shock. When *kecamatan* effects are included in the model, the coefficient estimates are smaller but the standard errors are considerably larger and so the effects are no longer statistically significant. A significant amount of variation in education is across *kecamatan*s limiting our statistical ability to draw strong conclusions about schooling effects when the models include local economy fixed effects. There is also a suggestion that part of the additional smoothing observed for higher human capital households may take place through changes in household size. When we restrict attention to households with no change in size, the effect of the household head's education is slightly greater.

The second set of smoothing mechanisms we investigate highlights the role of household size. We noted above that there have been significant changes in household size and composition between 1997 and 1998 and those changes may serve as a cushion to smooth consumption. Empirical support for that hypothesis is limited to the urban sector, where the interaction between household size and the local economy shock is negative and significant.

We have also explored whether there are important household composition effects. The analyses yielded one consistent pattern: urban households with more older women appear to be especially able to smooth PCE. This effect is considerably muted in magnitude among those households that do not change

household size (for they would need to swap an older woman for someone else). There are no significant benefits associated with having more household members in rural areas.[19]

We turn next to the effects of wealth (as of 1997). We interpret the direct effects of wealth (in column 2) as indicative of the distributional impact of the crisis, controlling household and community characteristics. There are no direct wealth effects in urban areas, but negative direct effects in rural places. This indicates that, within rural communities, households with more wealth in 1997 experienced larger changes in their consumption levels.

Our results on the link between consumption smoothing and wealth are based on the interaction between wealth and the local economy shock (reported in column 3). There are likely to be two competing effects. On the one hand, assets may be depleted and those resources used to smooth consumption; on the other hand, there may be capital gains (or losses) which will also affect savings and consumption choices. In general, wealth appears to play no role at all in smoothing ℓnPCE in urban households. This is true in aggregate and also when we distinguish components of wealth. In the rural sector, there is a suggestion that as the magnitude of the local economy shock increased, households with more wealth in 1997 were better able to smooth their consumption.

Recall from the discussion above that the impact of the crisis on wealth differed dramatically across assets groups. For some, such as jewelry, the depletion and capital gains effects are reinforcing and we would expect those assets to play a role in smoothing consumption (in which case the interaction between wealth and the local economy shock should be negative). For other assets, such as financial assets and housing, the capital gains and depletion effect operate in different directions yielding no predictions on their role in smoothing consumption. With this in mind, we have re-estimated the models in Table 8 with the same set of covariates and interactions but explicitly distinguish the major asset classes. The results are reported in Table 9.

Mirroring our result on total household wealth, there is no evidence that any components of wealth have a significant impact on consumption smoothing among urban households. Results for those households are not reported. The results for education and household size are unaffected by the separation of wealth into components and so those results are not repeated. Table 9 reports, for rural households, the direct effects of components of wealth along with their interactions with the local economy shock. We have separated business wealth; housing, other wealth and financial wealth; land; and jewelry.

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[19]While we have attempted to explore the link between consumption smoothing and employment status (in 1997) of household members, we have failed to identify a simple pattern. We suspect that we will need to develop more complex structures that take into account both changes in household composition and the probability a particular type of household member will enter the labor force between 1997 and 1998. Those analyses are left for future work.

There is no evidence that rural households with more business wealth in 1997 were better able to smooth fluctuations in PCE at the onset of the crisis. The same inference emerges for those with greater wealth in housing, financial assets or other wealth. Two dimensions of wealth do appear to be associated with smoothing consumption: land and jewelry.

Among households that did not change household size, more land is associated with greater smoothing and it is significant at 10%. Roughly two-thirds of Indonesian households are land owners and there is an active market for land. The link between land ownership and consumption smoothing is not likely to be a reflection of greater income from a family business in agriculture, since we have distinguished business wealth in the regressions and we see no evidence that business wealth (most of which is land and agricultural equipment) is associated with greater smoothing. The fact that land is used to smooth consumption among those households that do not change in size suggests there are complex interactions between changes in wealth and changes in family structure.

The clearest evidence that wealth is associated with consumption smoothing emerges for jewelry. The interaction term is much larger in magnitude than that of land and it is significant at a 5% size of test in three of the models. The magnitude of the estimated effect is slightly larger in models that include *kecamatan* fixed effects (but the standard errors increase and the effect is not significant among households that did not change size. We suspect this primarily reflects lack of power.)

That gold should serve as a mechanism for smoothing consumption is not surprising. First, we have noted that its value more than quadrupled at the onset of the crisis. Second, we noted above that gold is owned by households throughout the income distribution. Third, there is an active market in gold across the Indonesian archipelago. Fourth, there is evidence in IFLS that many households sold gold during the hiatus between the two survey rounds.

A tantalizing fact revolves around the distribution of jewelry within households. The IFLS wealth module asks about the share of each asset group owned by the respondent and the share owned by the respondent's spouse. In IFLS2, among those households that own jewelry, 20% report that it is owned jointly with the spouse. In 75% of the households, the woman owns all the jewelry and males own the jewelry in only 5% of households. Moreover, 85% of the value of jewelry is attributed to women and only 15% to men -- facts that are consistent with the anthropological evidence discussed above. In the context of a collective model of household decision-making, the (exogenous) increase in the price of gold associated with the crisis increased the value of assets owned by a woman and improved her "bargaining" position relative to her husband. Evidence in IFLS2/2+ suggests that jewelry sold between 1997 and 1998 was more often under the control of women since the fraction of households in which men and women jointly own jewelry increased by 25% (from 20% to 25%). This suggests that preferences for consumption smoothing

may not be the same among all household members and, therefore, that within household dynamics in decision-making may be extremely complex. These issues will be explored in detail in future work.

6. Conclusions

1998 marked a dramatic and unexpected reversal of economic fortunes in Indonesia. After 30 years of sustained growth, the economy shrank by about 15% in one year. Using data that were specially collected to measure the immediate effects of the economic and financial crisis, we have shown that there is considerable diversity in the magnitude of the economic shock, as measured by changes in household PCE. For some, the crisis has been devastating; for others it has brought new opportunities.

Rural and urban households in Indonesia have adopted a wide array of mechanisms to mitigate the deleterious impact of the shock -- and to exploit the new opportunities that have emerged since the onset of the crisis. Households and families have re-organized living arrangements with dependents tending to move to lower-cost locations and working age family members joining households that are able to absorb additional workers. There is also evidence that in spite of the collapse of hourly earnings, labor supply has increased. On net, individuals have entered the labor force and many of those who were working prior to the crisis have increased their hours of work. Changes in the allocations of time of household members has been accompanied by re-arrangement of other dimensions of the budget. There is evidence that households have cut back spending on "deferable" items (such as clothing, household furniture and similar semi-durables) while maintaining real expenditures on foods.

The role of wealth in strategies adopted to smooth consumption has played a central role in this paper. In contrast with developed countries, the vast majority of Indonesian households store some wealth in the form of assets. As the rupiah collapsed and inflation spiralled, the value of most assets declined very substantially in value. This capital loss should dampen the impact of wealth on consumption smoothing. Gold stands out as being different. Since the price of gold is set in world terms, its value increased four-fold in early 1998, when the rupiah collapsed. Moreover, a good deal of evidence indicates there is a very active market in gold throughout the Indonesian archipelago. We see clear evidence that rural households used gold to smooth their consumption. There is more limited evidence that rural households with more land were better able to smooth their consumption.

The picture that emerges from the empirical evidence in the IFLS is one of tremendous diversity and great complexity in the response of households to the massive economic and financial crisis in Indonesia. Households appear to adopt multiple strategies to smooth out the impact of the crisis on their current and future welfare.

Over and above these substantive contributions, the paper illustrates the value of designing longitudinal research surveys that measure a broad array of social, economic and demographic circumstances of individuals, households and their communities. The paper also highlights the tremendous value of on-going longitudinal surveys which can be put into the field very rapidly and provide basic scientific evidence that help us understand the effects of major innovations on well-being and behaviors in society.

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Figure 1a: Timing of IFLS & Indonesian exchange rate
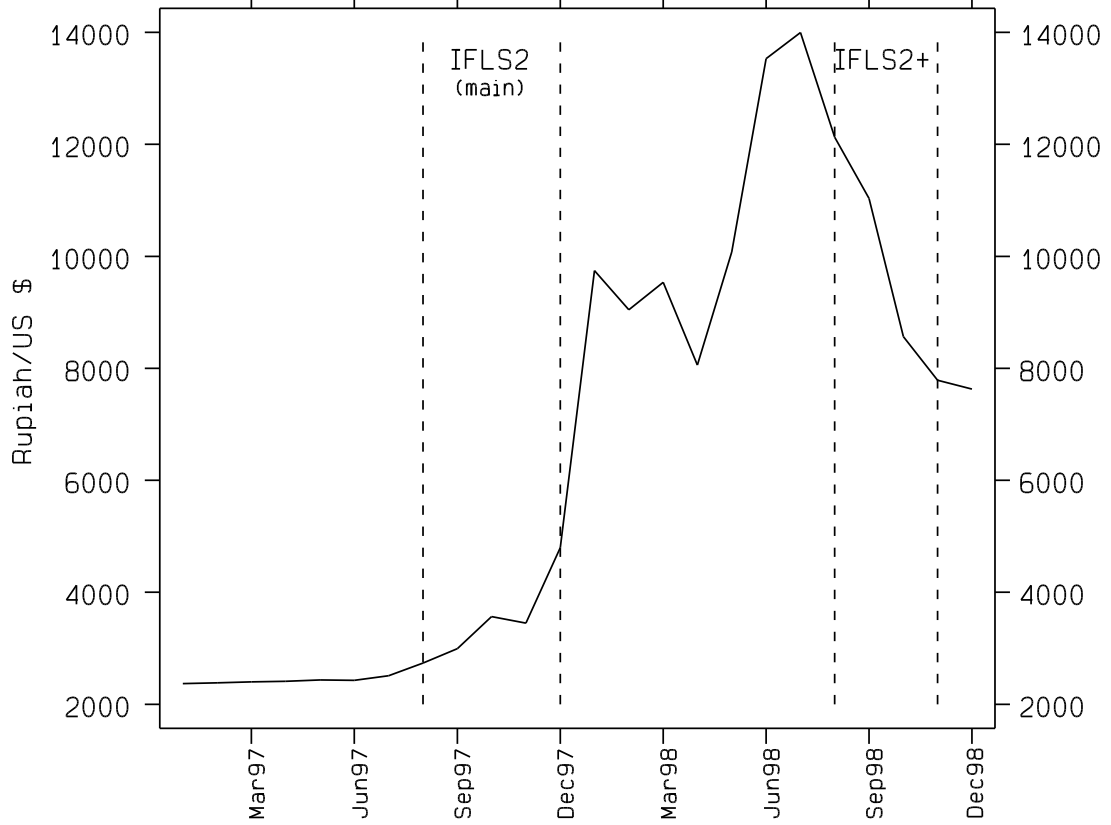
Figure 1b: Rate of growth of prices and wages
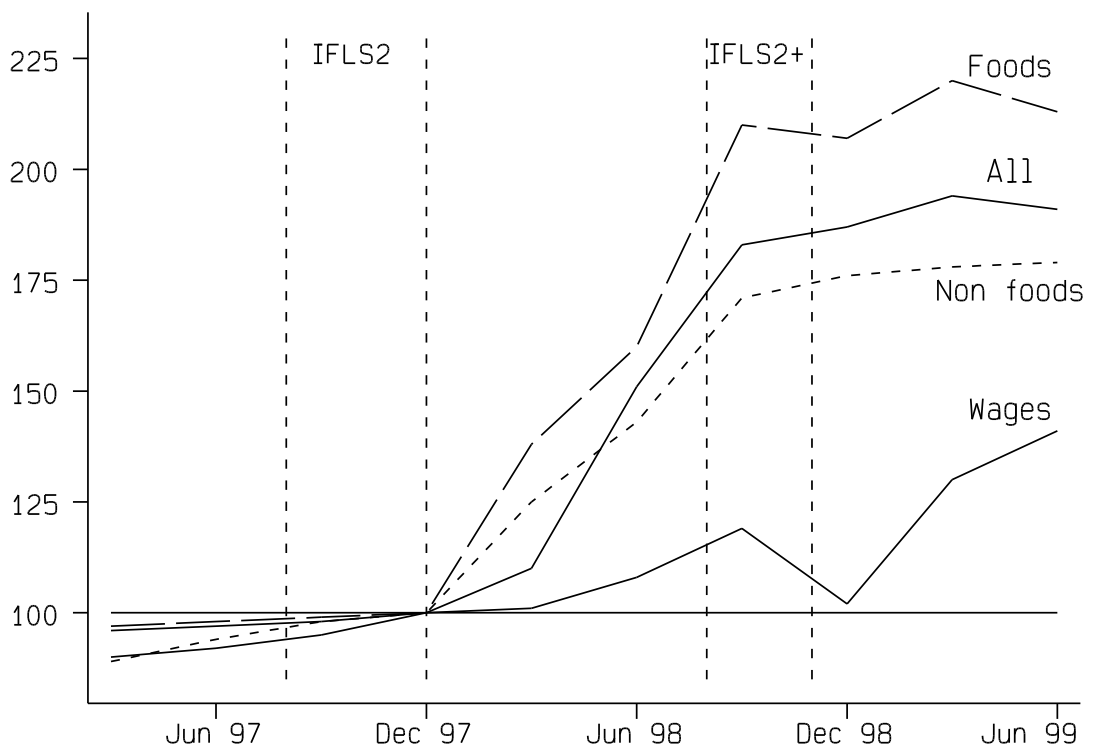
December 1997=100

Figure 2

Relationship between change in HH PCE (1998-1997) and HH PCE in 1993
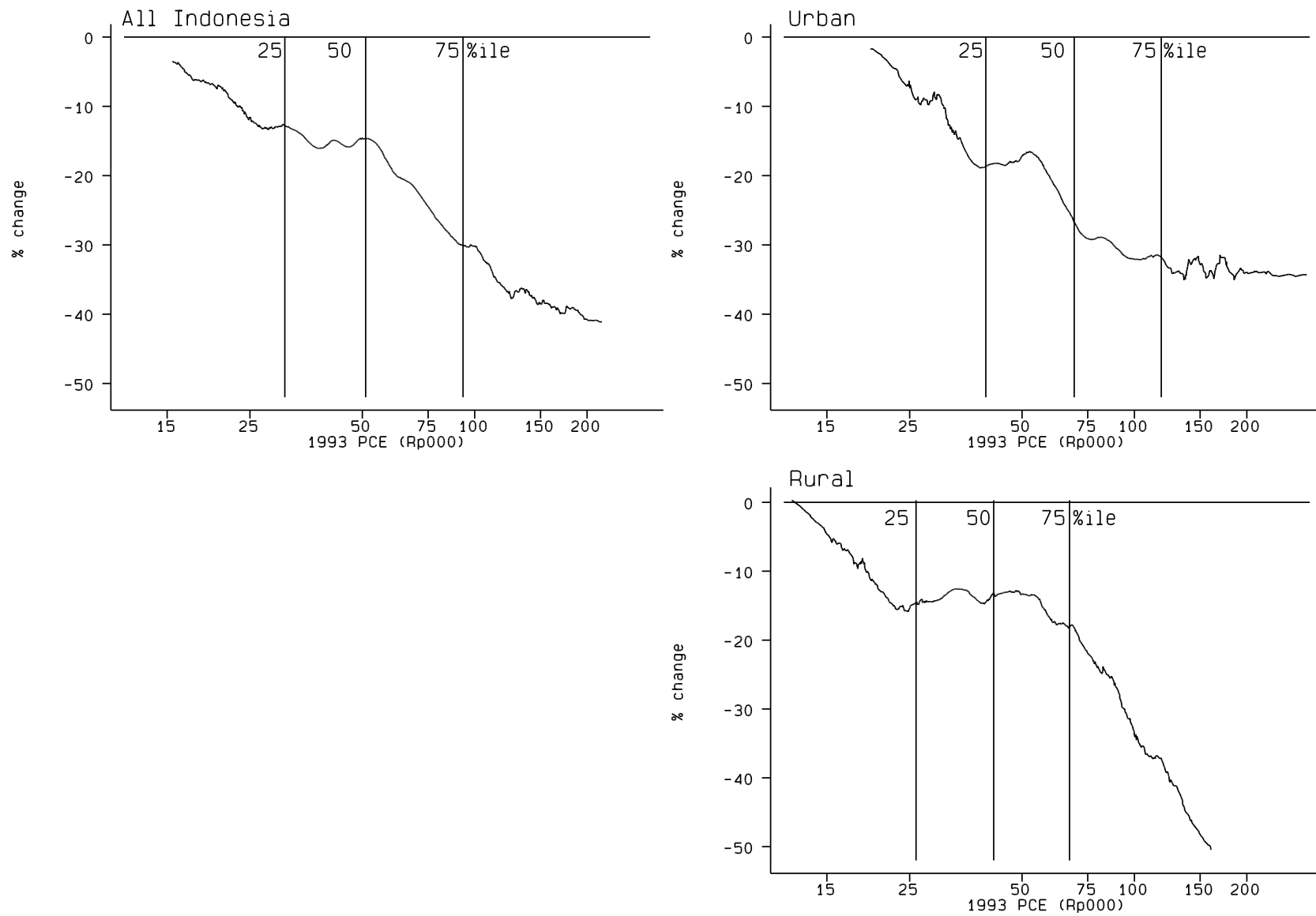
Non parametric estimates

Figure 3
Community shocks and HH PCE in 1993

Urban

25   50   75 %ile

PCE

PCY

Wage

% change

1993 PCE (Rp000)

Rural

25   50   75 %ile

PCY
PCE

Wage

% change

1993 PCE (Rp000)
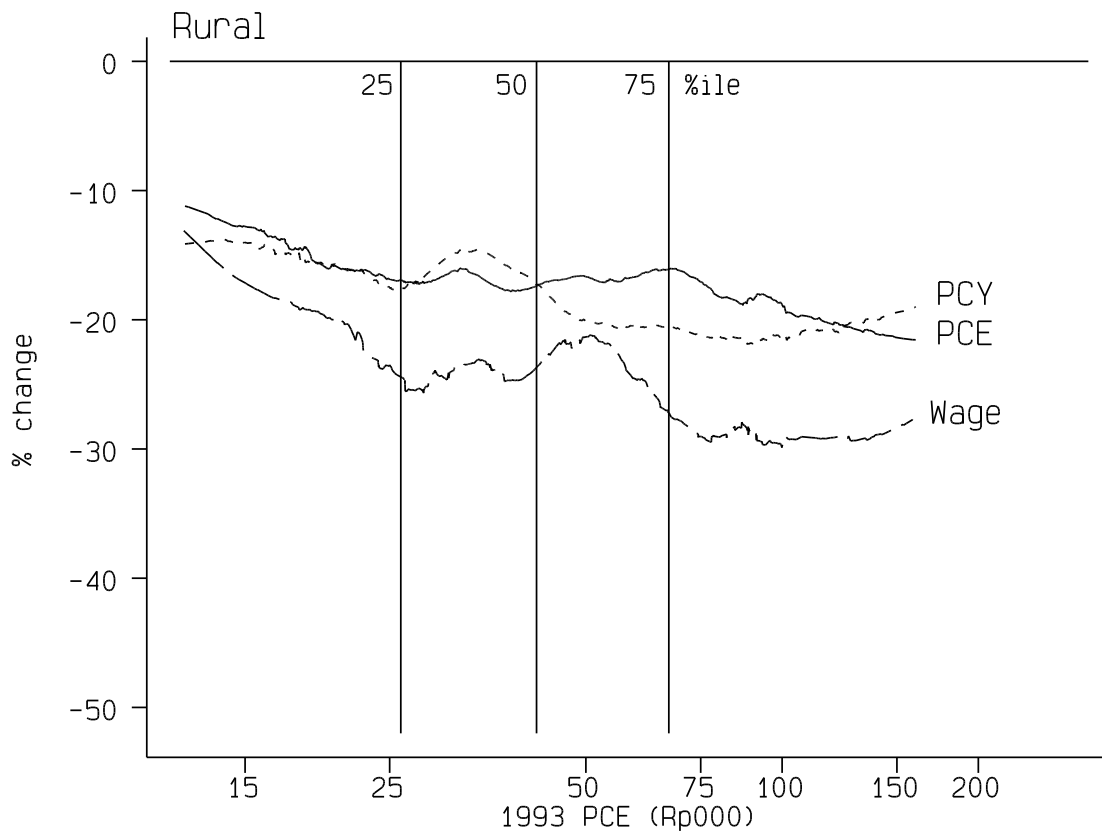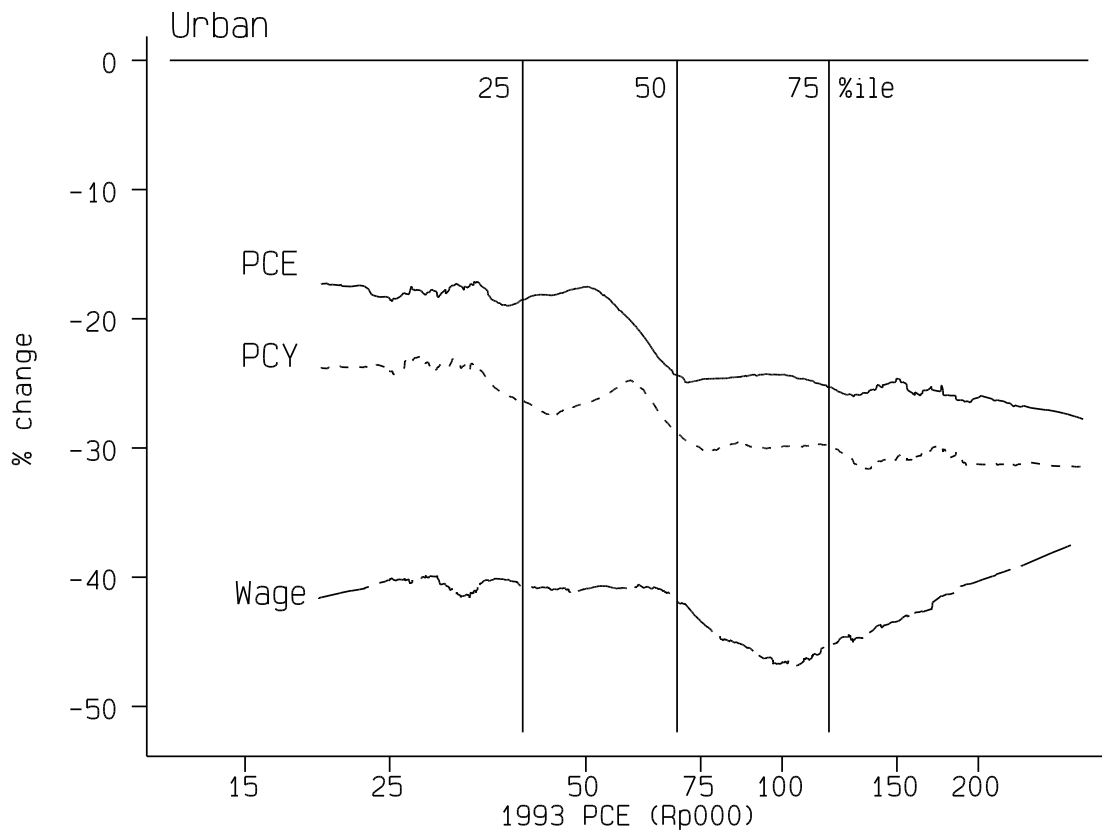
Figure 4

Changes in # HH members, # workers and % change in hours worked

Urban	Rural

A. Change in # HH members & # workers

B. Change in # HH members & # workers

C. % change in hours worked per HH worker

D. % change in hours worked per HH worker
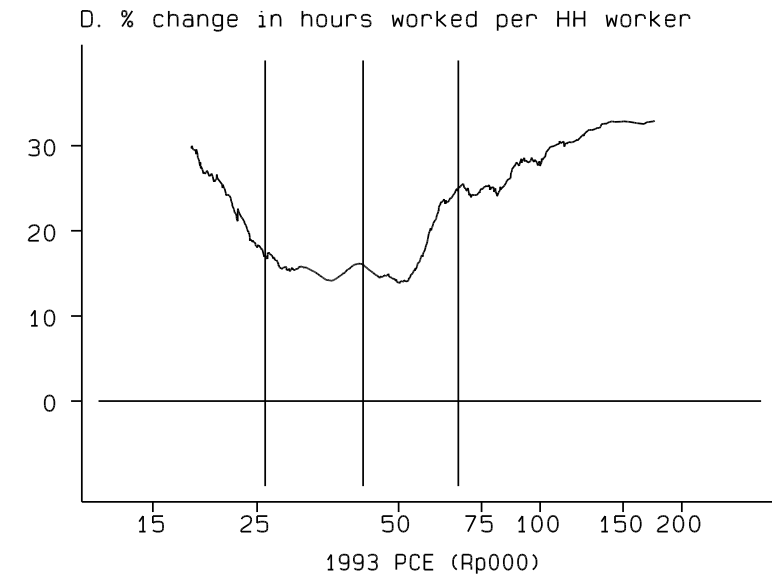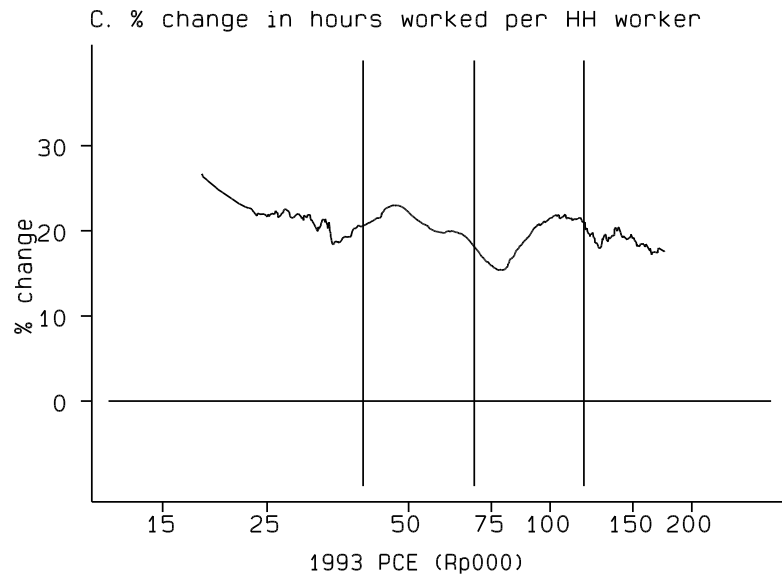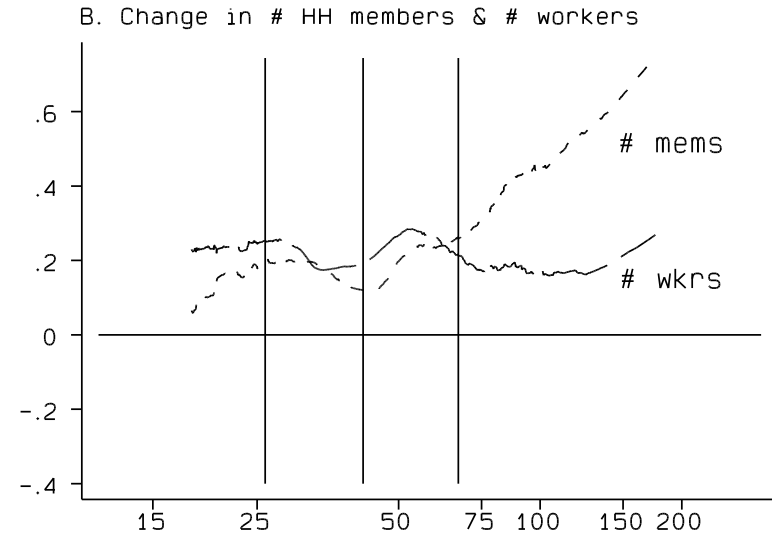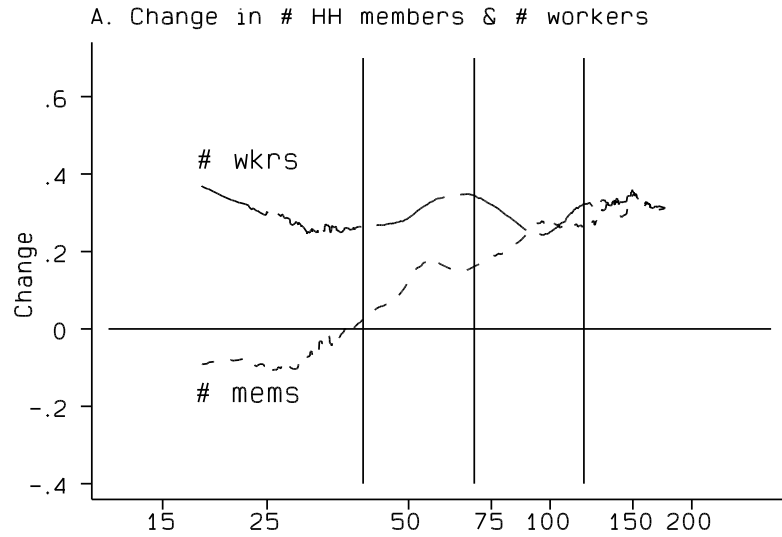
Non parametric estimates

Figure 5

Urban-rural differential in % wage decline
between 1997 and 1998
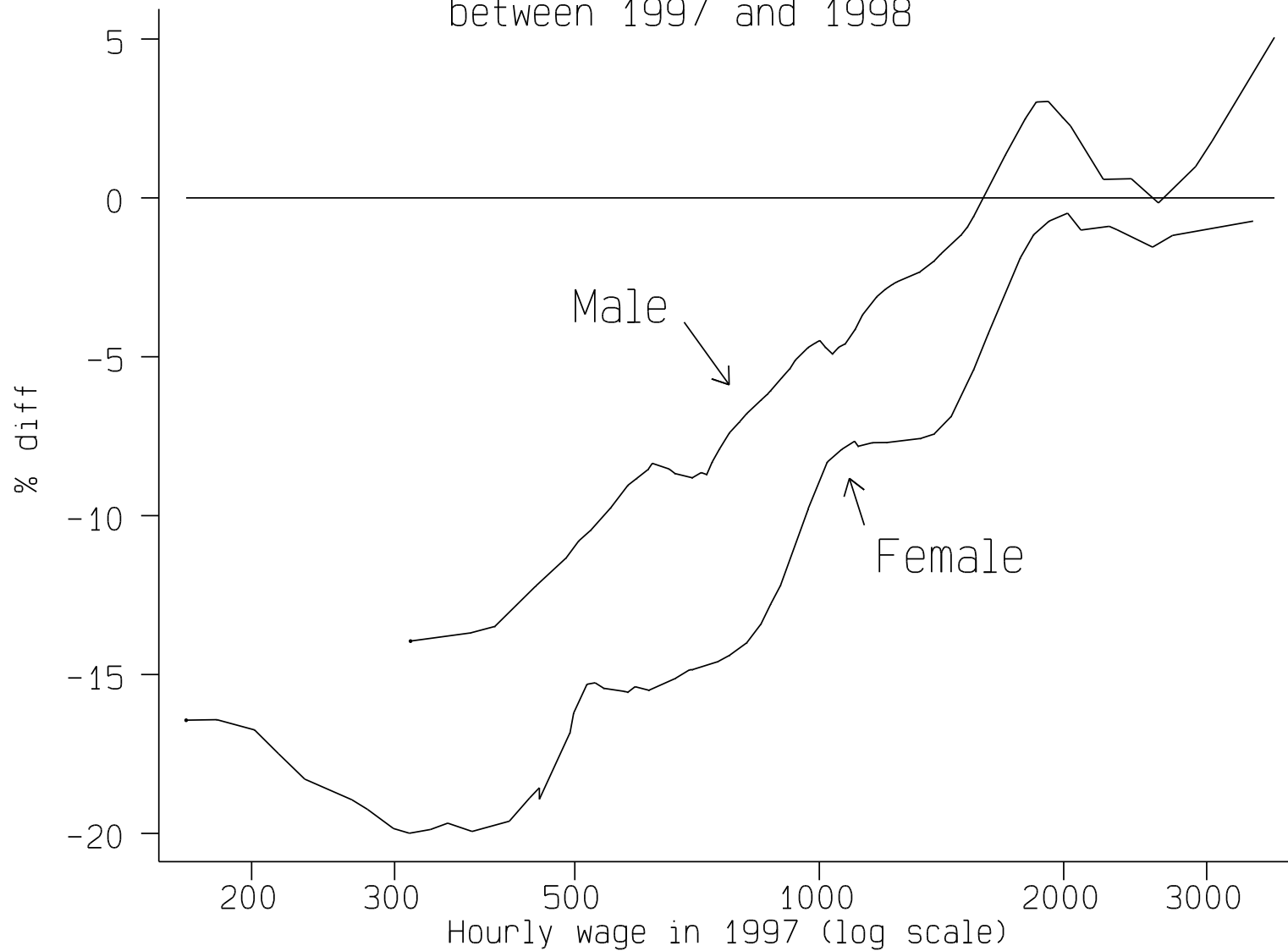
TABLE 1: Household consumption
1997, 1998 and changes for all HHs
Means and (standard errors)

1997 Rp000s	1997	1998	%change
Per capita household consumption	176	117	-23
	[12]	[9]	[2]
Per adult equivalent household consumption	206	133	-24
	[14]	[9]	[2]
Total household consumption	629	491	-16
	[48]	[42]	[1]
Household size	4.33	4.53	7
	[0.05]	[0.04]	[0.8]
Composition of *per capita* household consumption			
Food	79.7	68.9	-9
	[4.9]	[7.4]	[2]
Non foods	95.2	48.4	-34
	[10.2]	[2.2]	[2]
Deferable items	9.1	6.4	-35
(Clothing, furniture and ceremonies)	[0.4]	[0.4]	[3]
Human capital investments	9.0	5.7	-37
(Health and education)	[0.6]	[0.3]	[3]

Note: Consumption measured in thousands of 1997 Rupiah. % change is $\ln X_{1998}$ - $\ln X_{1997}$ for each indicator. Per adult equivalent household consumption assigns a weight of 0.5 to a child, 1.0 to an adult. 1,971 households interviewed in 1997 and 1998 included in sample.

TABLE 2: : Household size and composition by quartile of HH PCE

Size and composition in 1997, 1998 and change between those years; HH PCE measured in 1993

%ile of 1993 PCE:	0-25%ile			26-50%ile			51-75%ile			76-100%ile		
Characteristic	1997	1998	Change	1997	1998	Change	1997	1998	Change	1997	1998	Change
Rural												
% no change in HH size	58.0			58.1			58.4			54.5		
HH size	4.74	4.79	0.05	4.22	4.40	0.18	4.13	4.36	0.23	3.34	3.80	0.46
(std err)	(0.12)	(0.12)	(0.08)	(0.11)	(0.12)	(0.07)	(0.11)	(0.11)	(0.07)	(0.11)	(0.10)	(0.08)
# males age												
0-14	1.01	1.00	-0.01	0.82	0.80	-0.02	0.71	0.70	-0.01	0.50	0.58	0.08
15-24	0.38	0.37	-0.01	0.33	0.41	0.08	0.38	0.45	0.07	0.23	0.32	0.08
25-54	0.71	0.72	0.01	0.67	0.68	0.01	0.64	0.69	0.05	0.56	0.65	0.08
>=55	0.29	0.29	0.00	0.26	0.29	0.03	0.29	0.32	0.03	0.23	0.25	0.01
# females age												
0-14	0.87	0.89	0.02	0.75	0.75	0.00	0.70	0.70	0.00	0.56	0.63	0.06
15-24	0.37	0.38	0.00	0.32	0.34	0.02	0.36	0.42	0.05	0.32	0.36	0.05
25-54	0.81	0.80	-0.01	0.78	0.78	-0.01	0.79	0.79	0.00	0.66	0.72	0.06
>=55	0.29	0.33	0.04	0.29	0.36	0.07	0.26	0.30	0.03	0.27	0.31	0.04
Urban												
% no change in HH size	55.8			57.8			57.8			51.3		
HH size	5.03	4.92	-0.11	4.84	5.01	0.17	4.53	4.76	0.22	4.03	4.37	0.35
(std err)	(0.15)	(0.14)	(0.10)	(0.14)	(0.14)	(0.09)	(0.15)	(0.13)	(0.10)	(0.14)	(0.13)	(0.10)
# males age												
0-14	0.77	0.75	-0.02	0.79	0.80	0.01	0.72	0.76	0.04	0.50	0.53	0.03
15-24	0.48	0.44	-0.04	0.52	0.57	0.05	0.51	0.57	0.06	0.48	0.54	0.06
25-54	0.79	0.77	-0.02	0.77	0.85	0.08	0.90	0.93	0.03	0.82	0.91	0.09
>=55	0.26	0.30	0.04	0.20	0.19	0.00	0.19	0.18	-0.01	0.22	0.26	0.05
# females age												
0-14	0.86	0.79	-0.08	0.83	0.79	-0.04	0.59	0.60	0.01	0.48	0.50	0.02
15-24	0.55	0.58	0.03	0.48	0.53	0.05	0.42	0.44	0.02	0.43	0.47	0.04
25-54	0.97	0.92	-0.05	0.89	0.92	0.03	0.93	1.00	0.07	0.83	0.89	0.07
>=55	0.35	0.38	0.03	0.35	0.36	0.00	0.27	0.26	0.00	0.28	0.29	0.01

TABLE 3: Household labor supply
1997, 1998 and changes for rural and urban HHs
Means and (standard errors)

Characteristic	Rural			Urban		
	1997	1998	Change	1997	1998	Change
# workers in HH	1.77	1.98	0.21	1.69	1.99	0.30
	(0.031)	(0.032)	(0.030)	(0.039)	(0.042)	(0.036)
# market sector wkrs in HH	0.48	0.54	0.06	0.97	1.23	0.26
	(0.021)	(0.023)	(0.021)	(0.032)	(0.037)	(0.031)
# self-emp wkrs in HH	0.89	0.96	0.07	0.62	0.72	0.10
	(0.022)	(0.021)	(0.021)	(0.026)	(0.026)	(0.024)
# family wkrs in HH	0.40	0.67	0.27	0.10	0.20	0.10
	(0.020)	(0.025)	(0.024)	(0.011)	(0.018)	(0.017)
# hrs worked/week (HH total)	60.18	86.20	26.02	70.49	98.93	28.44
	(1.438)	(1.618)	(1.670)	(2.069)	(2.313)	(2.142)
# hrs worked per worker	35.10	45.11	10.01	41.84	50.93	9.09
	(0.634)	(0.781)	(0.949)	(0.734)	(0.770)	(0.937)
# hrs worked per HH member	16.60	21.38	4.78	17.08	22.16	5.08
	(0.463)	(0.404)	(0.489)	(0.570)	(0.603)	(0.565)

Table 4
Household wealth: ownership rates

	Rural		Urban	
	1997	1998	1997	1998
Per cent of HHS that own:				
Any business or non-business wealth	99.6	99.9	99.8	99.6
Business wealth	82.9	87.8	62.5	68.9
Non-business wealth	99.5	99.8	99.6	99.4
Housing wealth	91.7	92.1	71.7	74.8
Land wealth	74.5	79.9	70.6	74.1
Financial wealth	21.8	24.4	41.6	37.2
Jewelry	50.9	34.5	63.5	50.8
Other wealth	96.3	98.7	97.7	98.5

Table 5
Distribution of household wealth: 1997 and 1998 (in 1997 Rp000s)

| | | Percentile of wealth distribution | | | | |
		10	25	50	75	90
Rural						
Net household + business wealth	1997	797	2,395	6,048	13,091	25,410
	1998	626	2,349	6,296	15,008	30,630
Business wealth	1997	-40	0	715	4,004	10,025
	1998	-25	10	1,900	7,093	19,035
Housing wealth	1997	8	500	2,000	5,000	10,000
	1998	4	508	1,473	3,657	8,439
Land wealth	1997	0	0	120	1,660	5,500
	1998	0	11	105	1,071	3,681
Financial wealth	1997	0	0	0	0	200
	1998	0	0	0	0	277
Jewelry	1997	0	0	8	150	464
	1998	0	0	0	49	326
Urban						
Net household + business wealth	1997	427	2,655	10,104	31,800	94,564
	1998	717	3,104	10,039	29,204	72,691
Business wealth	1997	-625	0	0	650	7,000
	1998	-608	0	0	1,085	11,180
Housing wealth	1997	0	0	3,000	15,000	50,000
	1998	0	0	3,590	13,331	34,479
Land wealth	1997	0	0	150	5,000	25,000
	1998	0	0	171	4,316	17,233
Financial wealth	1997	0	0	0	200	2,000
	1998	0	0	0	107	1,752
Jewelry	1997	0	0	90	500	1,000
	1998	0	0	4	283	1,066

Combine Table 4 and 5 by inserting % own. Drop Table 6.

Table 6: Distribution of change in household wealth: 1998-1997 (in 1997 Rp000s)

Percentile of change in wealth distribution	10	25	50	75	90
Rural					
Net household + business wealth	-8,933	-2,568	57	3,776.0	14,016
Business wealth	-3,025	-320	150	3,425.0	12,719
Housing wealth	-4,336	-1,478	-187	543	2,614
Land wealth	-3,478	-746	0	128	1,218
Financial wealth	-98	0	0	0	111
Jewelry	-251	-73	0	0	119
Urban					
Net household + business wealth	-35,623	-7,917	-316	5,016	21,272
Business wealth	-3,300	-297	0	872	7,513
Housing wealth	-21,451	-4,379	0	973	8,875
Land wealth	-9,681	-1,344	0	373	5,746
Financial wealth	-962	-40	0	0	565
Jewelry	-600	-200	0	58	566

Table 7: Changes in ownership of wealth and median value of wealth owned
By quartile of PCE in 1997

%ile of PCE:	Rural					Urban			
	0-25	26-50	51-75	76-100		0-25	26-50	51-75	76-100
Business wealth									
% HHs own in both years	80	79	79	73		54	53	52	46
Sell all	6	4	5	7		12	8	13	11
New owners	8	9	11	13		16	16	18	19
Not own either year	6	8	5	7		19	22	16	23
Value in Rp000 -1997	1128	1881	1709	1923		52	81	550	460
-1998	2085	3045	2675	3250		45	140	293	1290
Non business wealth									
% HHs own in both years	100	99	99	100		99	100	100	98
Sell all	0	1	0	0		1	0	0	0
New owners	0	1	1	0		0	0	0	1
Not own either year	0	0	0	0		0	0	0	0
Value in Rp000 -1997	2034	2978	4100	7170		3727	8254	14165	24500
-1998	1528	2387	2938	5359		4117	6799	12451	19968
Housing									
% HHs own in both years	92	91	89	84		76	68	64	62
Sell all	2	2	4	2		4	4	3	6
New owners	2	3	3	3		6	8	8	9
Not own either year	4	4	4	10		14	20	26	23
Value in Rp000 -1997	1000	2000	2000	4000		3000	8000	15000	20000
-1998	1011	1473	1777	2810		3343	5969	9113	18520
Land									
% HHs own in both years	54	59	67	70		56	59	65	65
Sell all	13	13	12	8		8	9	10	11
New owners	23	19	13	14		16	13	15	9
Not own either year	9	9	8	8		20	19	10	16
Value in Rp000 -1997	290	518	550	1530		150	1530	3000	6900
-1998	163	259	253	826		162	533	2765	7082
Financial									
% HHs own in both years	5	6	11	22		11	18	31	40
Sell all	10	8	11	15		11	21	15	19
New owners	10	13	13	17		12	11	14	11
Not own either year	74	73	65	47		65	49	40	31
Value in Rp000 -1997	47	100	148	375		125	200	400	1000
-1998	52	63	174	396		119	327	603	593
Jewelry									
% HHs own in both years	17	20	27	38		33	41	40	47
Sell all	23	26	28	26		22	20	28	23
New owners	9	10	9	9		11	10	11	9
Not own either year	51	45	36	27		34	29	21	20
Value in Rp000 -1997	81	125	150	220		150	283	400	500
-1998	74	109	135	261		148	191	373	500

Notes: Value is median value conditional on owning wealth in that year in 1997 Rp000s.

Table 8: Changes in HH ℓnPCE, community shocks and consumption smoothing mechanisms
Urban and rural sectors

Estimator	Sample	Community shock (1)	Wealth (2)	Shock*Wealth (3)	Shock* (1) education of HH head primary (4)	>primary (5)	Shock* #HH members excl older women (6)	Shock* # older women (7)
URBAN SECTOR								
Panel A								
OLS	All HHs	0.783						
		(5.65)						
OLS	| No Δ HHsize	0.722						
		(4.28)						
Panel B								
OLS	All HHs	1.782	0.000	0.002	-0.322	-0.372	-0.125	-0.501
		(5.01)	(0.07)	(0.62)	(1.56)	(1.79)	(2.23)	(3.20)
OLS	| No Δ HHsize	1.914	-0.001	-0.003	-0.232	-0.565	-0.143	-0.218
		(4.96)	(1.25)	(0.92)	(0.86)	(1.96)	(2.59)	(1.38)
FE	All HHs		0.000	0.003	-0.134	-0.144	-0.130	-0.452
			(0.77)	(1.39)	(0.35)	(0.32)	(2.42)	(2.11)
FE	| No Δ HHsize		-0.001	-0.002	-0.178	-0.489	-0.146	-0.309
			(0.99)	(0.73)	(0.37)	(0.93)	(2.15)	(1.20)
RURAL SECTOR								
Panel A								
OLS	All HHs	1.073						
		(7.63)						
OLS	| No Δ HHsize	1.191						
		(7.05)						
Panel B								
OLS	All HHs	1.794	-0.003	-0.007	-0.328	-0.843	-0.080	-0.328
		(6.52)	(3.30)	(1.50)	(2.06)	(2.50)	(1.17)	(1.16)
OLS	| No Δ HHsize	1.975	-0.002	-0.003	-0.443	-0.856	-0.097	-0.428
		(5.08)	(2.01)	(0.60)	(2.37)	(1.78)	(0.92)	(1.21)
FE	All HHs		-0.004	-0.009	-0.251	-0.626	-0.082	-0.328
			(2.58)	(1.55)	(1.09)	(1.67)	(1.53)	(1.45)
FE	| No Δ HHsize		-0.004	-0.007	-0.251	-0.516	-0.091	-0.336
			(2.05)	(0.99)	(0.84)	(1.00)	(1.11)	(1.11)

Notes: Community shock is measured by mean ΔℓnPCE of all sampled households living in the vicinity of an IFLS enumeration area in 1997 and 1998 (excluding index household). "Shock" is then applied to all households living in that kecamatan in 1997. Households living in a kecamatan that does not include an IFLS enumeration area are given the sector-specific province-level shock. Models include controls for education of HH head (indicators for each level), spline for age of HH head, indicator variable for whether head was male (all measured in 1997), household composition in 1997 (number of people, by gender, in each of four age groups (0-14, 15-24, 25-54 and $\geq$55), change in number of people in each of those groups between 1997 and 1998, month of interview in 1997 and in 1998, province of residence in 1997, whether the HH was living in same kecamatan in 1993, 1997 and 1998 (and thus used in calculation of shock). t statistics in parentheses are robust to heteroskedasticity and intra-kecamatan correlations. FE include kecamatan fixed effects. 864 urban households (503 with no change in HH size) and 1107 rural households (658 with no change in HH size) included in regressions.

Table 9: Changes in HH ℓnPCE, community shocks and composition of wealth
Rural sector

Est-imator	Sample	Community shock (1)	Direct effect of wealth				Wealth*shock interaction			
			Business (2)	House etc. (3)	Land (4)	Jewelry (5)	Business (6)	House etc. (7)	Land (8)	Jewelry (9)
MODEL :Combined										
OLS	All HHs	1.873	-0.001	-0.001	-0.008	-0.100	-0.004	0.016	-0.012	-0.653
		(6.11)	(0.44)	(0.30)	(2.32)	(1.77)	(0.51)	(0.71)	(1.34)	(2.58)
OLS	|No Δ HHsize	2.086	0.002	-0.003	-0.009	-0.137	0.011	-0.001	-0.015	-0.642
		(4.95)	(0.58)	(0.47)	(2.26)	(2.18)	(0.58)	(0.03)	(1.60)	(2.00)
FE	All HHs		-0.002	-0.001	-0.009	-0.112	-0.009	0.018	-0.012	-0.723
			(0.71)	(0.20)	(1.96)	(1.41)	(0.91)	(0.77)	(0.99)	(2.17)
FE	|No Δ HHsize		0.002	-0.006	-0.013	-0.163	0.009	-0.016	-0.022	-0.675
			(0.59)	(0.86)	(2.40)	(1.52)	(0.64)	(0.48)	(1.63)	(1.53)

Notes: See Table 8.