About the Paper

Sekhar Bonu, Indu Bhushan, and David H. Peters write that despite posting more than 8% annual GDP growth in the past few years, the catastrophic health payments have not changed significantly in India. Around 39.5 million people fell below the poverty line in India due to out-of-pocket health payments in 2004–2005. Policies to reduce poverty in India need to include measures to reduce catastrophic out-of-pocket health payments.

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FOREWORD

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ABSTRACT

This study investigates the incidence, intensity, and correlates of catastrophic health payments in India. The paper confirms the continuing high incidence of catastrophic health payments and increase in poverty headcount and poverty gap due to health payments. Despite India's remarkable economic growth, catastrophic health spending remains a major cause of poverty. Using bivariate analysis and Heckman sample selection and multinomial logistic regression for multivariate regression analysis, the paper finds that health payments were 4.6% of total household expenditure and 9.7% of household nonfood expenditure. Poverty headcount increased from 27.5% to 31.0% due to health payments, which translates to 39.5 million people falling below the poverty line due to health payments. It is important for India to develop effective risk pooling arrangements for health care.

I. INTRODUCTION

Despite buoyant economic growth in the past decade, India continues to have the world's largest population—approximately 350 million or 35% of the population—living below $1-a-day income (World Bank 2006, Asian Development Bank 2007). Poor health, high health care expenses, high-interest private debt, and large social and customary expenses constitute 85% of the reasons for household's declining into poverty (Narayan et al. 2000, Krishna 2004). In the last few years, a number of studies have explored the incidence and intensity of catastrophic out-of-pocket (OOP) health payments in Asia (Peters et al. 2002, Xu et al. 2003, Wagstaff and van Doorslaer 2003, O' Donnell et al. 2005, van Doorslaer et al. 2005, van Doorslaer et al. 2006 and 2007). These studies have demonstrated widespread incidence of catastrophe and impoverishment from health payments all across South Asia.

Studies have identified that too much reliance on OOP health payments at the time of care, in a health care financing context dominated by private expenditures combined with weak public health systems, and almost negligible health insurance are largely responsible for high prevalence of catastrophic health payments in South Asia (Peters et al. 2002; Xu et al. 2003; Wagstaff and van Doorslaer 2003; O' Donnell et al. 2005; van Doorslaer et al. 2005, 2006, and 2007). The Equity in Asia-Pacific Health Systems (EQUITAP) project in particular has generated a very useful body of evidence on catastrophic payments for health care, among others, for India (see O' Donnell et al. 2005; van Doorslaer et al. 2005, 2006, and 2007; Garg and Karan 2005). However, much of this evidence on India has been generated from the National Sample Survey for the year 1999–2000.

Meanwhile, as India has had buoyant economic growth rates, and the Indian economy has been undergoing major structural changes (World Bank 2006), there is growing concern that India's economic growth is aggravating relative income inequalities (Asian Development Bank 2007). The challenges for poverty eradication in India remain formidable. Eradicating poverty in India needs inclusive economic growth and measures to prevent people, both below and above the poverty line, from getting impoverished due to catastrophic events.

This study uses the 61st round of the National Sample Survey (NSS) data from 2004 to 2005 to investigate and update the evidence on incidence, intensity, and correlates of catastrophic health care payments in India. In addition, the study investigates the correlates of households that fall below the poverty line due to health payments. Given the rapidly changing economic context and concerns over increasing relative inequalities in India, the study, along with evidence generated from the EQUITAP project, should provide robust empirical basis for policy and program initiatives to mitigate the impoverishing effects of health payments in India.

II. DATA AND METHODS

A. Study Setting and Data

The 61st round of the NSS conducted from July 2004 to June 2005 is the seventh quinquennial series of consumer expenditure surveys. The NSS followed a stratified multi-stage design (National Sample Survey Organization 2006). The sample covers most of India, consisting of 124,644 households spread over 7,999 villages and 4,602 urban blocks. The sample survey used both uniform recall period (30-day reference recall for all items) and mixed recall period (30-day reference recall for all except five infrequently purchased nonfood items, namely, clothing, footwear, durable goods, education and institutional medical expenses). This study used data from the uniform recall period.

Health payments were derived from expenditures on institutional care, noninstitutional care, and therapeutic appliances. Both health expenditures on institutional (code 410 to 414) and therapeutic appliances (code 620 and 621) were collected using the 1-month recall period. Data on noninstitutional expenditures (codes 420 to 424) were collected using a 1-month recall period. The institutional (in-patient) health payments include expenditures on medicines, diagnostics, doctor's fees, hospital and nursing home charges, and other medical expenses. The non-institutional (out-patient) health payments include expenditures on medicine, diagnostics, doctor's fees, family planning, and other medical expenses. The expenditures on therapeutic appliances include hearing and orthopedic equipment and other medical equipment.

B. Dependent Variables

1. Poverty Headcount

We measure the fraction of people living below the poverty line before health payments (H_{pre}) and the fraction of people living below the poverty line after health payments (H_{post}). The difference between postpayment headcount ratio and prepayment headcount ratio gives the poverty impact (PI^H) in terms of poverty headcount of health payments (World Bank 2002a, World Bank 2000b, Wagstaff and van Doorslaer 2003). The poverty line is not changed but the fraction of people living below the poverty line is recalculated after removing per capita health payments from per capita expenditures as shown below:

Poverty impact (PI^H)= H_{post} - H_{pre} where $H_{pre}=\frac{1}{n}\sum_1^n p_{i(pre)}$ and n is the sample size, and P_i=1 if per capital household expenditure is less than the poverty line and "0" if it is otherwise.

2. Poverty Payment Gap

To assess the intensity of poverty, we assess the poverty gap. Poverty gap (G) is the average shortfall of consumption below poverty line, and is estimated as follows: $G=\frac{1}{n}\sum_1^n p_i(PL-x_1)$ where n is the sample size, PL is the poverty line, P_i=1 if xi<PL and is zero otherwise (World Bank 2002a and 2000b, Wagstaff and van Doorslaer 2003).

3. Incidence of Catastrophic Health Payments

Incidence of catastrophic health payments is the fraction of households whose health payments as a proportion of household consumption expenditure exceed a particular threshold of overall household expenditure or household nonfood expenditure. Consistent with the literature on catastrophic health payments, (Berki 1986; Merlis 2002; Xu et al. 2003; Wagstaff and van Doorslaer 2003; O' Donnell et al. 2005; van Doorslaer et al. 2005, 2006, and 2007; Wyszewianski 1986a), the study uses two different cutoff points to define catastrophic health payments.

(i) *Catastrophe-1:* Health payments over 10% of overall household consumption expenditure

(ii) *Catastrophe-2:* Health payments over 40% of nonfood consumption expenditure

C. Independent Variables

The independent variables are modeled based on literature on social, cultural, political, and administrative aspects specific to India and health expenditure (Bonu et al. 2005, Kawabata et al. 2002, Berki 1986, Xu et al. 2003, Su et al. 2006, O' Donnell et al. 2005). States in India have an important role in the provision of health services. Over the past decades, the states have evolved different grades of governance and public service provision. Religion- and social group-based differences in access to health services have been previously recorded (Bonu et al. 2005). For multivariate analysis, we use log of monthly household consumption expenditure.

D. Statistical Methods

We first ran univariate analysis to assess the distribution of the sample (Table 1). Bivariate analysis was done to find the association of various independent variables. Three different models were used for regression analysis of seven outcome variables as follows:

(i) Heckman sample selection linear regression for (A) log of household health payments; (B) health payments proportion of total household expenditures; and (C) health payments proportion of household nonfood expenditures.

(ii) Heckman sample selection probit mode for (D) correlates of Catastrophe-1; and (E) correlates of Catastrophe-2.

(iii) Multinomial logit model for (F) correlates of household above the poverty line that remain above the poverty line despite health payments compared to households above the poverty line that had no health payments (reference group); and (G) correlates of households above the poverty line that fell below the poverty line due to health payments compared to households above the poverty line that had no health payments (reference group).

Heckman sample selection model was used since the number of households that had no health payments was significant (38% of the households had no health care payments). Heckman selection model is based on the notion that some of the independent variables that determine decisions to seek health care and health payments are different from the independent factors that are associated with scale of health payments (Diehr et al. 1999, World Bank 2002c, Baum 2006).

Table 1
Distribution of the Sample and Bivariate Analysis

		Bivariate Analysis				
			Monthly Household Health Payment as Percent of Household:			
Independent Variables	Sample Distribution	Monthly Household Health Payment	Monthly Total Expenditure	Monthly Nonfood Expenditure	Incidence of Catastrophe-1	Incidence of Catastrophe-2
Overall	**100.0**	**196**	**4.6**	**9.7**	**13.1**	**5.1**
Residence						
Urban	27.5	238	4.2	7.9	11.8	3.2
Rural	72.5	181	4.8	10.3	13.6	5.8
State						
Union Territories	0.3	192	3.1	5.7	7.9	1.6
Jammu and Kashmir	0.6	130	2.4	5.8	3.2	0.9
Himachal Pradesh	0.7	231	4.9	10.1	14.9	4.8
Punjab	2.3	282	5.0	9.9	12.2	3.1
Uttarakhand	0.8	172	3.4	7.2	7.2	2.9
Haryana	2.1	300	4.7	9.0	12.5	4.9
Delhi	1.4	121	2.1	3.8	3.8	1.3
Rajasthan	5.0	208	4.1	8.3	11.6	4.8
Uttar Pradesh	14.3	275	6.5	13.6	18.5	7.8
Bihar	6.8	78	2.7	7.2	5.0	1.9
North-East states including Assam	3.5	76	1.9	5.2	3.2	0.8
West Bengal	8.5	208	5.2	11.7	14.9	6.7
Jharkhand	2.3	110	3.2	7.4	8.6	3.5
Orissa	3.8	109	3.9	9.4	10.6	5.5
Chattisgarh	2.1	179	5.1	10.7	16.0	8.6
Madhya Pradesh	5.6	167	5.0	9.5	14.7	5.6
Gujarat	4.9	152	3.9	8.4	11.8	3.9
Maharashtra	9.9	239	5.3	10.0	16.1	5.6
Andhra Pradesh	8.9	166	4.8	9.9	15.3	5.8
Karnataka	5.3	123	3.2	6.8	7.8	2.2
Goa	0.1	160	2.9	5.9	3.7	0.5
Kerala	3.5	432	7.5	14.4	24.8	9.1
Tamil Nadu	7.3	199	3.8	7.7	10.7	3.3
Household Size						
1 to 4	50.5	163	4.6	9.3	13.8	5.3
5 or more than 5	49.6	230	4.6	10.1	12.4	4.8
Consumption Decile						
Poorest	10.0	38	2.5	6.6	6.3	2.4
2	10.0	62	3.1	8.0	8.3	3.0
3	10.0	75	3.4	8.5	9.1	3.1
4	10.0	93	3.8	9.1	10.8	3.9
5	10.0	112	4.2	9.9	12.4	4.8
6	10.0	147	5.1	11.3	16.3	6.1
7	10.0	168	5.2	10.9	15.8	6.1
8	10.0	217	5.7	11.0	16.6	6.7

continued.

TABLE 1. *CONTINUED.*

		Bivariate Analysis				
			Monthly Household Health Payment as Percent of Household:			
Independent Variables	Sample Distribution	Monthly Household Health Payment	Monthly Total Expenditure	Monthly Nonfood Expenditure	Incidence of Catastrophe-1	Incidence of Catastrophe-2
9	10.0	292	5.9	10.6	17.4	6.6
Richest decile	10.0	761	7.3	10.7	18.1	7.9
Household Type (Rural–Agricultural Labor)						
Rural–self-employed nonagriculture	11.3	219	4.8	10.3	13.0	5.5
Rural–agricultural labor	19.4	116	4.6	10.3	13.6	5.8
Rural–other labor	7.8	173	4.9	10.4	14.3	6.0
Rural–self-employed agriculture	25.7	209	4.9	10.7	13.5	5.8
Urban–self-employed	10.3	251	4.3	8.3	12.0	3.4
Urban–regular wage/ salary-earning	11.2	236	3.7	6.8	9.6	2.2
Urban–casual labor	3.2	166	4.6	9.4	13.4	4.4
Others	11.0	219	4.9	9.4	15.1	5.5
Religion						
Hindu	83.4	191	4.6	9.6	13.0	5.0
Islam	11.2	210	4.8	10.5	13.6	5.6
Christian	2.4	265	5.0	9.7	15.5	5.2
Others	3.0	251	5.1	10.0	13.7	4.4
Social Group						
Scheduled tribes	8.8	84	3.2	7.0	8.5	3.4
Schedules castes	19.7	155	4.7	10.1	13.2	5.3
Other backward castes	40.2	206	4.9	10.3	14.1	5.5
Others	31.4	242	4.6	9.4	13.0	4.8
Head - Education						
Illiterate	37.6	148	4.6	10.1	13.2	5.6
Literate but < primary	10.1	189	4.7	10.3	14.0	5.6
Primary	14.4	193	4.9	10.2	13.9	5.8
Middle	15.5	206	4.7	9.8	13.7	4.9
Secondary/Sn. Secondary	14.5	254	4.5	8.8	12.1	4.0
Diploma/Degree	7.9	319	4.2	7.2	11.0	2.8
Age Category of Head of Household						
15 to 29 yrs	16.5	131	4.3	8.9	12.3	5.2
30 to 44 yrs	41.1	169	4.1	8.7	11.2	4.1
45 to 59	25.2	214	4.5	9.5	12.5	4.8
>=60 years	17.2	298	6.3	12.9	19.4	7.6
Institutional Health Payment						
No	98.6	143	4.2	9.1	12.2	4.3
Yes	1.4	3,913	35.1	49.6	78.3	60.4
Noninstitutional Health Payment						
No	38.2	34	0.4	0.5	0.8	0.6
Yes	61.8	297	7.3	15.3	20.7	7.8

The model is a two equation model. First, there is a selection model, $y = v\beta + u_1$. Second, there is a regression model, $z\gamma + u_2 > 0$ where the following hold:

$$u_1 \approx N(0,1)$$
$$u_2 \approx N(0,\sigma)$$
$$corr(u_1, u_2) = \rho \quad (1)$$

When $\rho = 0$ ordinary least square regression provides unbiased estimates; when $\rho \neq 0$ the ordinary least square estimates are biased. The Heckman selection model allows use of information from households that do not seek health care or do not have any health payments to improve the estimates of the parameters of the regression model.

The study also uses multinomial logit regression to test the correlates of households (p_1) above the poverty line that fall below the poverty line due to health payments, and households that despite health payments remain above the poverty line (p_2). Both are compared with households above the poverty line that do not have any health payments (p_3). For the three-category dependent variable, the multinomial logit regression model in this study was expressed with two log-linear functions as follows:

$$log\ (p_1/p_3) = \beta_{10} + \beta_{11}*X_1 + \beta_{12}*X_2 + \ldots + \beta_{1j}*X_r \quad (2)$$

and

$$log\ (p_2/p_3) = \beta_{20} + \beta_{21}*X_1 + \beta_{22}*X_2 + \ldots + \beta_{2j}*X_r \quad (3)$$

where

p_i = *probability of event i* for i =1,2,3,

β_{1j}s and β_{2j}s are parameters with $0 \leq j \leq m$

X_rs are independent variables with $1 \leq r \leq m$

All the estimates and the standard errors were adjusted for the multistage sampling design and clustering at the primary sampling unit, and were weighted at the national level to give results that are unbiased and representative of the population (White 1982). Stata version 8 was used for the analysis (Stata 2002).

III. RESULTS

A. Bivariate Analysis

The weighted sample distribution is given in Table 1. The mean household size is 4.74. During the 1-month recall period, 1.4% of the households reported institutional health payments, while 61.8% reported noninstitutional health payments.

1. Monthly Household Health Payments

The monthly household health payments (including both institutional and noninstitutional) was Rs196, which translates into US$14.5 billion annual private health payments in 2005. The monthly household health payments varied from a low of Rs78 in Bihar to as high as Rs432 in

Kerala. A household from the richest decile spent close to 20 times more than the poorest decile household on health payments. The scheduled tribes (STs) spent one-fourth of the amount that other castes spent on health payments.

2. Proportion of Household Expenditure on Health Payments

Household health payments were 4.6% of the total (including food and nonfood expenditure) household expenditure. The proportion of health payments in total household expenditure varied from 2.5% in the poorest decile to 7.3% in the richest decile, and from 1.9% in the North-East states to 7.5% in Kerala state. Households with institutional health payments spent 35.1% of their household expenditures on health payments, while households with noninstitutional health payments spent 7.3%. The household health payments were 9.7% of the household nonfood expenditure. The proportion of health payment of total and nonfood household expenditure was higher in rural areas, and varied widely at the state level. The health payments were two to three times higher in the richest decile compared to the poorest decile. The proportion of health payments of household expenditure was lowest in households whose head had a diploma or graduate education compared to households whose head was illiterate or had primary education. The health payment proportion was higher in households with older heads of household.

3. Incidence of Catastrophe-1 and Catastrophe-2

The incidence of Catastrophe-1 (proportion of households with health payments more than 10% of the household overall consumption expenditure) was 13.1%, and the incidence of Catastrophe-2 (proportion of households with health payments more than 40% of the household nonfood consumption expenditure) was 5.1%. Both Catastrophe-1 and Catastrophe-2 were higher in rural areas compared to urban areas, in households with less than five household members compared to households with five or more, in richer deciles of households compared to the poorer decile households, and in households with older head of household compared to households with younger head of household. Incidence of Catastrophe-1 and Catastrophe-2 was 79% and 60% in households with institutional health payments, respectively; and 21% and 8% in households with noninstitutional health payments. Catastrophe-1 and Catastrophe-2 were lower in households whose heads had higher education compared to households whose heads had lower education. Both catastrophes were higher in other backward caste groups, and lowest in the scheduled tribes.

Catastrophe-1 and Catastrophe-2 also varied by household employment type and religion (Table 1). Around 8.5% of the people (nearly 26 million) below the poverty line had household monthly health payments more than 10% of the household monthly expenditure, which was higher than 13% in Chattigarh, Kerala, and Uttar Pradesh. Around 14.5% above poverty line had health payments more than 10% of their household expenditure (total 117.5 million).

4. Poverty Headcount, Poverty Gap, and Falling below the Poverty Line

The prepayment poverty headcount was 27.5%, which increased by 3.5 percentage points postpayment to 31%. The postpayment and prepayment headcount difference varied from 0.4 percentage points in Delhi to 5.6 percentage points in Uttar Pradesh (Table 2). The prepayment poverty gap was Rs23.6, which increased to Rs27.5 post-payment. The postpayment and prepayment poverty gap was highest in Uttar Pradesh Uttar Pradesh(Rs6.6). The amount of money inducing Rs4

of additional poverty gap due to health payments is Rs53 billion ($1.3 billion). Figure 1 provides a prepayment and post payment snapshot in rural and urban areas of India with the poverty cut-off line, depicting people above the poverty line regressing below the poverty line due to health payments. Around 39.5 million people above the poverty line regressed below the poverty line due to health payments, which accounted for 4.9% of people above the poverty line (25% came from a single state, Uttar Pradesh) (Table 2).

Table 2
Change in Poverty Head Count Due to Health Payments, Poverty Gap Induced from Health Payments, and Incidence of Catastrophe-1 Below and Above Poverty Line for Different States in India

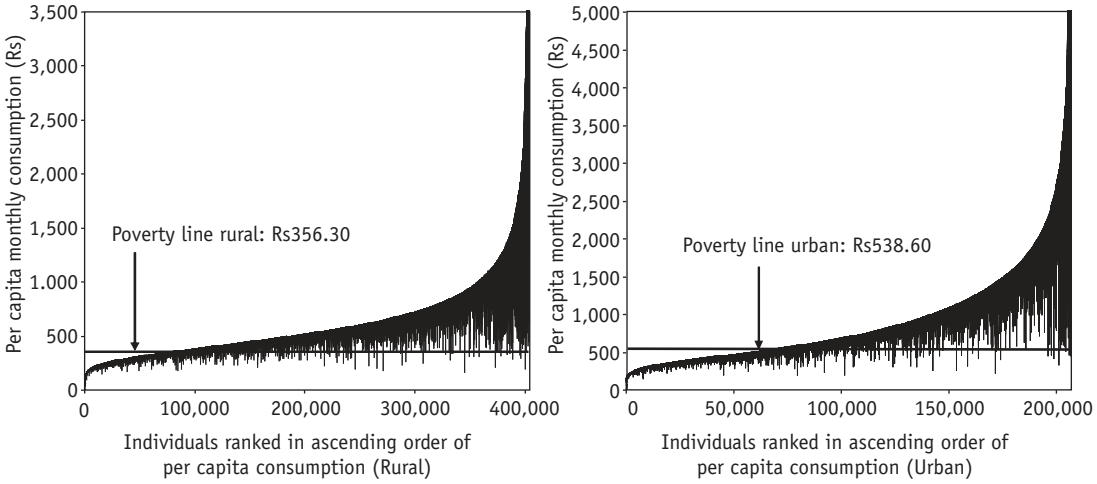
		Poverty Headcount			Poverty Gap Induced by Health Payments			
	Population (2006 estimated; in '000)	Prehealth Payment Headcount (%)	Posthealth Payment Headcount (%)	Difference (% points)	Pre-payment Poverty Gap (Rs)	Postpayment Poverty Gap (Rs)	Difference Rs.	Poverty Gap Induced by Medical Payments (in million Rs)
India	**1,117,733**	**27.5**	**31**	**3.5**	**23.6**	**27.5**	**4**	**52,981**
Andhra Pradesh	81,001	14.8	16.5	1.7	12.2	14	1.8	1,746
Bihar	91,253	42	44.6	2.6	29.2	32.1	3	3,244
Chhattisgarh	22,710	41	46.2	5.2	35.8	42	6.2	1,703
Delhi	16,175	15.7	16.1	0.4	15.1	17.7	2.6	509
Goa	1,506	10.9	12.1	1.2	12.4	14.4	2	36
Gujarat	55,262	17	19.7	2.7	12.2	14.3	2.1	1,404
Haryana	23,460	13.6	16.5	2.9	11.5	13.8	2.3	641
Himachal Pradesh	6,479	9.8	12.3	2.5	6.1	7.5	1.4	106
Jammu and Kashmir	29,452	42	45.4	3.4	33.5	37.2	3.7	1,292
Jharkhand	10,995	5.1	6.1	1	4.3	4.6	0.4	49
Karnataka	56,480	24.3	27.4	3.1	22.5	25.1	2.6	1,760
Kerala	33,357	14.8	18.9	4.1	15	19.5	4.4	1,772
Maharashtra	105,338	30.6	34.2	3.6	38.2	44.1	5.9	7,428
Madhya Pradesh	66,791	38.2	43.2	5	36.2	42.1	5.8	4,669
North East	41,845	18.2	19.4	1.2	11.7	12.6	0.9	450
Orissa	39,021	46.6	50.3	3.7	43.7	48.2	4.4	2,083
Punjab	26,172	8.1	10.5	2.4	4.3	5.8	1.5	477
Rajasthan	62,661	21.4	25.2	3.7	17.6	21.1	3.6	2,693
Tamil Nadu	65,306	22.8	25.1	2.3	18.1	20.5	2.4	1,897
Union Territories	3,221	20.9	22.5	1.5	24.5	27.2	2.7	105
Uttar Pradesh	184,449	32.7	38.3	5.6	25.3	31.9	6.6	14,528
Uttarakhand	9,268	39.7	42.9	3.2	41.1	46.3	5.3	586
West Bengal	85,531	24.7	28.6	3.9	18.1	21.4	3.3	3,370

continued.

Table 2. ***continued.***

	Regressing below Poverty Line		Catastrophe-1 below Poverty Line		Catastrophe-1 above Poverty Line	
	People above Poverty Line Who Fell below Poverty Line due to Health Payment (%)	People above Poverty Line Who Fell below Poverty Line due to Health Payments ('000)	Percentage Affected below Poverty Line (%)	Number of People Affected by Catastrophe-1 below Poverty Line ('000)	Percentage Affected above Poverty Line (%)	Number of People Affected by Catastrophe-1 above Poverty Line ('000)
India	**4.9**	**39,515**	**8.5**	**26,034**	**14.5**	**117,529**
Andhra Pradesh	2	1,397	5.4	641	16.3	11,225
Bihar	4.5	2,398	2.3	880	6.1	3,205
Chhattisgarh	8.7	1,172	13.4	1,248	18.4	2,470
Delhi	0.5	72	7.3	186	2.1	287
Goa	1.3	18	9.1	15	3.4	46
Gujarat	3.3	1,508	5.8	546	11.6	5,316
Haryana	3.3	675	8.2	260	12.6	2,546
Himachal Pradesh	2.7	160	7.7	49	16.3	954
Jammu and Kashmir	5.9	1,002	3.6	440	13.4	2,296
Jharkhand	1.1	112	0.6	3	3	309
Karnataka	4.1	1,734	5.4	747	8.5	3,651
Kerala	4.9	1,379	15.1	745	25.8	7,342
Maharashtra	5.2	3,777	11.5	3,720	17.1	12,500
Madhya Pradesh	8.1	3,337	11.5	2,931	17.1	7,057
North East	1.5	508	1.6	120	3.1	1,054
Orissa	6.9	1,446	6.5	1,185	14.6	3,047
Punjab	2.6	617	5.8	123	12.7	3,058
Rajasthan	4.7	2,335	9.1	1,225	12.8	6,320
Tamil Nadu	2.9	1,476	4.8	718	12.5	6,298
Union Territories	1.9	49	3.8	26	8.8	223
Uttar Pradesh	8.3	10,302	13.1	7,904	20.8	25,872
Uttarakhand	5.3	298	6.1	223	8.8	493
West Bengal	5.2	3,338	8	1,701	16.1	10,361

Figure 1
Rural and Urban Poverty Line, Pre-payment (Medical), and Postpayment Monthly per Capita Consumption Expenditure, India



5. State-level Scatter Plots

There was weak association between OOP health payments as a proportion of total household consumption expenditure and state per capita gross domestic product (GDP) (R-square=0.0314). Figure 2 shows that there was a high inverse correlation between state per capita GDP and percent of people above the poverty line who regressed below the poverty line due to health payments (R-square 0.46). Figure 3 is a scatter plot depicting the incidence of Catastrophe-1 and Catastrophe-2 vis-a-vis people falling below the poverty line as a result of health payments. Figure 3 shows that the correlation of people falling below the poverty line with Catastrophe-2 is relatively stronger than with Catastrophe-1.

Figure 2
Per Capita State GDP vis-à-vis Percent of People Regressing Below Poverty Line Post-payment, and OOP Health Payments as a Proportion of Total Consumption Expenditure

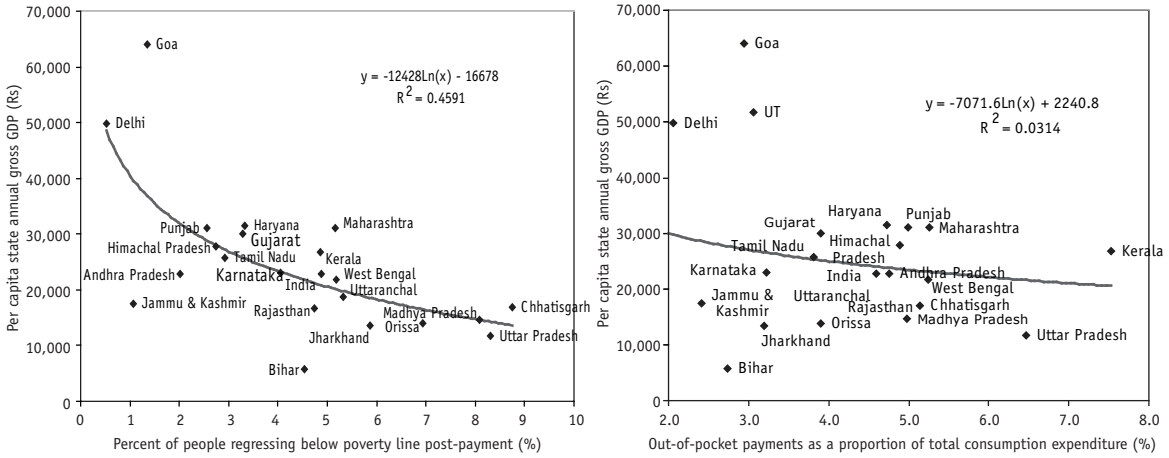
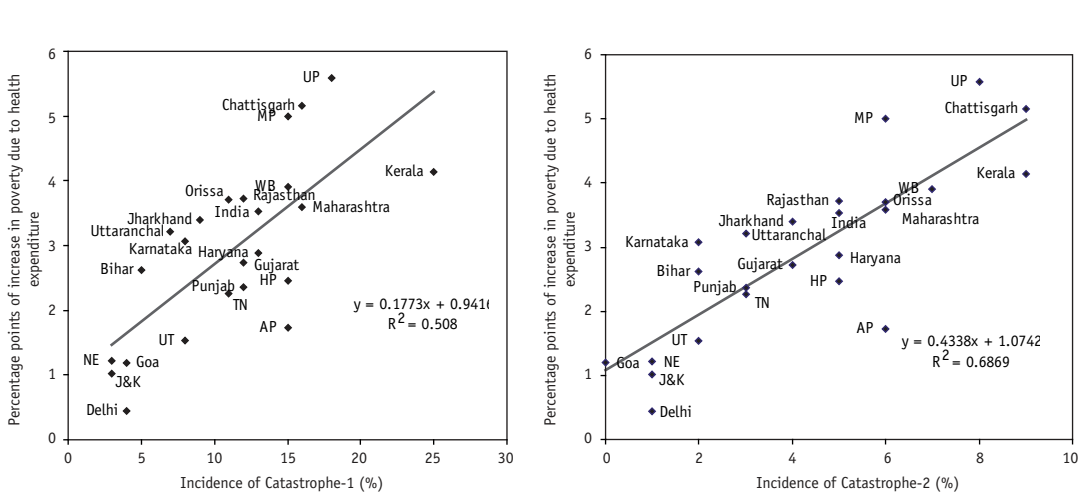


Figure 3
State-wise Incidence of Health Expenditure-Induced Catastrophe-1 and Catastrophe-2 vis-à-vis Increase in People Living below Poverty Line after Adjusting for Health Expenditure



B. Multivariate Analysis

The Wald's test of independence (rho=0) confirms that estimation of outcome equation without taking selection into account would yield inconsistent results (except for Catastrophe-2). Hence Heckman sample selection model is consistent with more reliable estimates.

1. Linear Regression

For health payments and health payments as a proportion of total and nonfood expenditure (Table 3), rural households have less health payments compared to urban households but were more likely to have a higher proportion of their total and nonfood expenditures dedicated to health payments, after controlling for all other factors in the model. Compared to the control state, Uttar Pradesh, most of the states had lower health payments and lower proportion of their household income dedicated to health payments, with few exceptions. Rural agricultural households had higher health payments and higher proportion of nonfood expenditure dedicated to health payments. Compared to upper castes, scheduled castes and other backward castes (OBCs) had higher health payments. Scheduled castes had lower health payments, and OBCs had a higher proportion of total expenditures dedicated to health payments. Health payments and proportion of total expenditure and nonfood expenditure increased with increase in household expenditures. Compared to households with heads having diploma or graduate education, the households with heads having lower levels of education had higher proportion of total and food expenditures dedicated to health payments. Age of household head was significantly associated with higher health payments, higher proportion of health payments compared to total household expenditure, and total nonfood expenditure. Similar findings were observed for institutional health payment and noninstitutional health payment (except that association with health payments as a proportion of nonfood expenditure was not significant for noninstitutional health payment). Household size was negatively associated with all the three outcomes.

Table 3
Multivariate Linear Regression Results of Heckman Selection Model

	(A) Log Monthly Health Payment (ME)		(B) ME as Percent of Total Household Expenditures		(C) ME as Percent of Household Nonfood Expenditure	
	COEF.	SE	COEF.	SE	COEF.	SE
Rural (Urban)	−0.160**	0.042	0.027**	0.002	0.050**	0.003
State (Uttar Pradesh)						
Union Territories	−0.411**	0.064	−0.003	0.002	−0.006**	0.002
Jammu and Kashmir	−0.815**	0.044	−0.014**	0.002	−0.016**	0.004
Himachal Pradesh	−0.129**	0.043	0.000	0.000	0.001	0.001
Punjab	−0.256**	0.037	0.000	0.001	−0.001	0.002
Uttarakhand	−0.426**	0.049	0.000	0.001	0.001	0.002
Haryana	−0.173**	0.045	0.001	0.001	0.003*	0.001
Delhi	−1.042**	0.100	−0.002*	0.001	−0.006**	0.002
Rajasthan	−0.017	0.044	0.000	0.001	0.001	0.001
Bihar	−0.489**	0.036	0.000	0.000	0.000	0.001
North-East states including Assam	−0.793**	0.037	−0.003**	0.001	−0.005*	0.002
West Bengal	−0.197**	0.037	0.000	0.000	0.001	0.001
Jharkhand	−0.253**	0.046	0.001	0.001	0.003	0.001
Orissa	−0.187**	0.038	0.000	0.000	0.003*	0.001
Chattisgarh	0.273**	0.056	0.002	0.001	0.006*	0.002
Madhya Pradesh	0.093*	0.043	−0.002	0.001	−0.002	0.002
Gujarat	0.022	0.046	0.003**	0.001	0.009**	0.002
Maharashtra	0.109**	0.031	0.000	0.001	0.001	0.001
Andhra Pradesh	−0.059	0.035	−0.001**	0.000	−0.001	0.001
Karnataka	−0.163**	0.038	−0.001*	0.000	−0.002	0.002
Goa	−0.218**	0.080	0.004**	0.001	0.007**	0.002
Kerala	0.053	0.033	−0.001	0.000	0.001	0.001
Tamil Nadu	−0.207**	0.036	−0.001**	0.000	−0.004**	0.001
Household Size	−0.057**	0.004	−0.007**	0.000	−0.006**	0.001
Household Type (Rural–Agricultural Labor)						
Rural–self-employed nonagriculture	−0.085**	0.021	0.000	0.000	−0.001	0.001
Rural–other labor	−0.031	0.025	−0.001	0.000	−0.003*	0.001
Rural–self-employed agriculture	−0.091**	0.020	−0.001	0.000	−0.001	0.001
Urban–self-employed	−0.305**	0.047	−0.001	0.001	−0.003	0.002
Urban–regular wage/salary-earning	−0.388**	0.047	−0.001	0.001	−0.004**	0.001
Urban–casual labor	−0.206**	0.053	0.000	0.001	0.000	0.002
Others	0.005	0.028	−0.001	0.000	−0.002	0.001
Social Group (Others)						
Scheduled tribes	−0.063*	0.029	0.001	0.000	0.000	0.001
Scheduled castes	0.057**	0.020	0.000	0.000	0.001	0.001
Other backward castes	0.072**	0.016	0.001*	0.000	0.001	0.001
Log of Monthly Household Expenditure	0.778**	0.018	0.065**	0.002	0.085**	0.003
Head - Education (diploma/graduation)						
Illiterate	0.008	0.031	0.053**	0.003	0.085**	0.005
Literate but < primary	−0.023	0.035	0.051**	0.003	0.085**	0.005
Primary	0.019	0.031	0.049**	0.003	0.080**	0.005
Middle	0.027	0.030	0.043**	0.003	0.071**	0.004
Secondary/ Sn. Secondary	0.043	0.029	0.029**	0.003	0.047**	0.004

continued.

Table 3. ***continued.***

	(A) Log Monthly Health Payment (ME)		(B) ME as Percent of Total Household Expenditures		(C) ME as Percent of Household Nonfood Expenditure	
	COEF.	SE	COEF.	SE	COEF.	SE
Age of Head of Household	0.002**	0.001	0.001**	0.000	0.001**	0.000
Institutional Health Payment (No)	1.810**	0.058	0.014**	0.002	0.030**	0.008
Noninstitutional Health Payment (No)	0.537**	0.090	0.011*	0.005	0.021	0.014
_Constant	−0.950**	0.180	−0.561**	0.018	−0.763**	0.029
Selection						
Rural (Urban)	0.162**	0.019	0.240**	0.015	0.255**	0.015
Size of Household	−0.005	0.003	−0.056**	0.003	−0.030**	0.003
Log of Monthly Household Expenditure	0.601**	0.016	0.594**	0.016	0.474**	0.014
Head - Education						
Illiterate	0.349**	0.029	0.481**	0.026	0.446**	0.024
Literate but < primary	0.368**	0.032	0.461**	0.028	0.443**	0.026
Primary	0.336**	0.029	0.437**	0.025	0.417**	0.024
Middle	0.308**	0.028	0.385**	0.024	0.374**	0.022
Secondary/ Sn. Secondary	0.197**	0.028	0.256**	0.023	0.243**	0.022
Diploma/ Degree	0.005**	0.000	0.005**	0.000	0.005**	0.000
_Constant	−4.997**	0.124	−5.045**	0.130	−4.157**	0.109
/athrho	−0.977	0.036	5.027	0.199	4.422	0.159
/lnsigma	0.170	0.011	−2.191	0.011	−1.638	0.008
rho	−0.752	0.016	1.000	0.000	1.000	0.000
sigma	1.185	0.013	0.112	0.001	0.194	0.002
lambda	−0.891	0.027	0.112	0.001	0.194	0.002
Wald chi2(43)	6,740	=	1,707		1,963	
Prob > chi2	0.000		0.000		0.000	
Wald test of Indep. (rho=0):chi2 Prob>chi2	0.000		0.000		0.000	

P<0.05; ** p<0.01; SE=standard error; na= not applicable
Note: (A) means log monthly health payment; (B) means proportion of health payment of total household expenditure; (C) means proportion of health payment of total nonfood expenditure.

2. Probit for Catastrophe-1 and Catastrophe-2

Rural households were more likely to suffer Catastrophe-2 compared to urban households (Table 4). The chances of both catastrophes were highest in Uttar Pradesh except for Chattisgarh, another relatively poor state in India. Both catastrophes were lower in households with larger size. Rural agricultural labor had higher probability in both catastrophes. Catastrophe-1 was higher in OBCs and SCs compared to upper castes. Catastrophe-2 was higher in households with higher expenditure, but Catastrophe-1 did not show significant relationship with household expenditures. Compared to households with heads possessing diplomas or graduate degrees, households with heads having lower education exhibited higher chances of both catastrophes. Households with older heads of household had higher chances of both catastrophes. Households with institutional and noninstitutional health payments had higher chances also of both catastrophes.

Table 4
Probit Results of Heckman Selection Model for Probit Regression

	(D) Catastrophe-1		(E) Catastrophe-2	
	Coef.	SE	Coef.	SE.
Rural (Urban)	−0.100	0.055	0.212**	0.077
State (Uttar Pradesh)				
Union Territories	−0.405**	0.075	−0.614**	0.120
Jammu and Kashmir	−1.067**	0.103	−1.133**	0.112
Himachal Pradesh	−0.131*	0.052	−0.319**	0.068
Punjab	−0.434**	0.053	−0.699**	0.074
Uttarakhand	−0.527**	0.074	−0.519**	0.110
Haryana	−0.209**	0.057	−0.265**	0.066
Delhi	−0.844**	0.206	−0.537	0.304
Rajasthan	−0.046	0.057	−0.060	0.065
Bihar	−0.642**	0.058	−0.547**	0.074
North-East states including Assam	−0.895**	0.066	−1.008**	0.083
West Bengal	−0.168**	0.043	−0.088	0.053
Jharkhand	−0.202**	0.066	−0.114	0.081
Orissa	−0.192**	0.051	−0.004	0.063
Chattisgarh	0.264**	0.069	0.412**	0.084
Madhya Pradesh	0.089	0.052	0.026	0.061
Gujarat	−0.056	0.066	−0.152	0.081
Maharashtra	0.062	0.040	−0.061	0.050
Andhra Pradesh	−0.015	0.040	−0.099*	0.049
Karnataka	−0.350**	0.052	−0.493**	0.077
Goa	−0.914**	0.163	−1.410**	0.213
Kerala	0.020	0.041	−0.210**	0.054
Tamil Nadu	−0.239**	0.045	−0.333**	0.056
Household Size	−0.084**	0.005	−0.091**	0.007
Household Type (Rural–Agricultural Labor)				
Rural–self-employed nonagriculture	−0.136**	0.030	−0.145**	0.039
Rural–other labor	−0.053	0.035	−0.075	0.044
Rural–self-employed agriculture	−0.131**	0.028	−0.119**	0.037
Urban–self-employed	−0.334**	0.064	−0.274**	0.090
Urban–regular wage/salary-earning	−0.462**	0.064	−0.449**	0.089
Urban–casual labor	−0.231**	0.071	−0.100	0.102
Others	−0.008	0.039	−0.053	0.050
Social Group (Others)				
Scheduled tribes	−0.082*	0.041	−0.101	0.054
Scheduled castes	0.056*	0.027	0.059	0.036
Other backward castes	0.072**	0.022	0.049	0.030
Log of Monthly Household Expenditure	0.063	0.048	0.274**	0.042
Head - Education				
Illiterate	0.173**	0.048	0.453**	0.072
Literate but < primary	0.172**	0.053	0.406**	0.076
Primary	0.176**	0.049	0.446**	0.073
Middle	0.184**	0.047	0.350**	0.071

continued.

Table 4. ***continued.***

	(D) Catastrophe-1		(E) Catastrophe-2	
	Coef.	SE	Coef.	SE.
Secondary/Sn. Secondary	0.100*	0.041	0.243**	0.069
Age of Head of Household	0.004**	0.001	0.003**	0.001
Institutional Health Payment (No)	1.856**	0.098	1.879**	0.076
Noninstitutional Health Payment (No)	0.702**	0.122	0.515**	0.109
_Constant	−1.432**	0.521	−4.137**	0.472
Selection				
Rural (Urban)	0.157**	0.019	0.156**	0.019
Size of Household	0.003	0.003	0.004	0.003
Log of Monthly Household Expenditure	0.579**	0.016	0.578**	0.016
Head - Education				
Illiterate	0.348**	0.028	0.349**	0.028
Literate but < primary	0.375**	0.032	0.376**	0.032
Primary	0.339**	0.028	0.340**	0.028
Middle	0.315**	0.028	0.315**	0.028
Secondary/ Sn. Secondary	0.212**	0.028	0.213**	0.027
Diploma/ Degree	0.006**	0.000	0.006**	0.000
_Constant	−4.888**	0.125	−4.880**	0.124
/athrho	−0.370	0.154	−0.033	0.147
/lnsigma				
rho	−0.354	0.134	−0.033	0.146
sigma				
lambda				
Wald chi2(43)	1,886		1,778	
Prob > chi2	0.000		0.000	
Wald test of Indep. (rho=0):chi2 Prob>chi2	0.0159		0.8225	

P<0.05; ** p<0.01; OR=odds ratio; SE=standard error; na= not applicable
Note: (D) means probit regression for Catastrophe-1; (E) means probit regression for Catastrophe-2.

3. Multinomial Logit

Table 5 shows that urban areas are more likely to have households that fell below the poverty line due to health payments after adjusting for other factors in the model. Likewise, larger households had higher chances of falling below the poverty line compared to smaller households. A significant finding is that the chance of falling below the poverty line was higher in relatively poorer households compared to households above the poverty line that had no health payments (the reference group). This is in contrast to previous models (outcomes A to E) where richer households above the poverty line had higher chances of making health payments compared to those above the poverty line who had no health payments (the reference group). Age of household head was significant for health payments but was not significant for falling below the poverty line.

Table 5
Results of Multinomial Logit Model for Households Above and Below the Poverty Line

	(F) Households above Poverty Line		(G) Households below Poverty Line	
	Coef.	SE	Coef.	SE
Rural (Urban)	0.082	0.043	−0.878**	0.147
State (Uttar Pradesh)				
Union Territories	−1.563**	0.058	−2.137**	0.236
Jammu and Kashmir	−0.478**	0.056	−1.466**	0.188
Himachal Pradesh	−0.937**	0.054	−1.263**	0.163
Punjab	0.024	0.054	−0.915**	0.133
Uttarakhand	−0.925**	0.064	−0.644**	0.162
Haryana	−0.888**	0.055	−1.245**	0.146
Delhi	−0.298**	0.082	−2.248**	0.458
Rajasthan	−1.275**	0.044	−1.407**	0.102
Bihar	−0.630**	0.046	−1.342**	0.106
North-East states including Assam	−1.097**	0.036	−2.463**	0.105
West Bengal	−0.145**	0.043	−0.650**	0.091
Jharkhand	−0.891**	0.054	−1.270**	0.128
Orissa	−0.452**	0.051	−0.795**	0.105
Chattisgarh	−1.046**	0.059	−1.007**	0.121
Madhya Pradesh	−0.836**	0.046	−0.811**	0.092
Gujarat	−1.259**	0.046	−1.528**	0.121
Maharashtra	−0.856**	0.040	−0.591**	0.083
Andhra Pradesh	−0.786**	0.039	−2.039**	0.107
Karnataka	−1.185**	0.045	−1.947**	0.125
Goa	−1.325**	0.120	−0.851*	0.354
Kerala	−0.541**	0.048	−0.263*	0.106
Tamil Nadu	−0.895**	0.041	−1.444**	0.098
Household Size	0.001	0.005	0.476**	0.011
Household Type (Rural–Agricultural Labor)				
Rural–self-employed nonagriculture	−0.109**	0.033	−0.343**	0.073
Rural–other labor	−0.090*	0.038	−0.098	0.081
Rural–self-employed agriculture	−0.160**	0.031	−0.734**	0.073
Urban–self-employed	−0.236**	0.054	−0.323	0.165
Urban–regular wage/salary-earning	−0.306**	0.054	−0.533**	0.169
Urban–casual labor	−0.099	0.067	0.064	0.174
Others	−0.140**	0.035	−0.779**	0.092
Social Group (Others)				
Scheduled tribes	−0.278**	0.026	−0.035	0.081
Scheduled castes	0.184**	0.024	0.548**	0.060
Other backward castes	0.067**	0.019	0.225**	0.054
Log of Monthly Household Expenditure	0.935**	0.018	−1.595**	0.055
Head - Education				
Illiterate	0.368**	0.030	1.407**	0.136
Literate but < primary	0.424**	0.034	1.400**	0.142
Primary	0.435**	0.030	1.259**	0.139

continued.

Table 5. ***continued.***

	(F) Households above Poverty Line		(G) Households below Poverty Line	
	Coef.	SE	Coef.	SE
Middle	0.398**	0.028	1.152**	0.138
Secondary/ Sn. Secondary	0.249**	0.026	0.715**	0.141
Age of Head of Hosuehold	0.012**	0.001	–0.001	0.002
Constant	–6.957**	0.151	8.688**	0.458
Number of observations		98,661		
LR chi2(82)		15,740		
Prob > chi2		0		
Pseudo R2		0.10300		
Log likelihood =		–68,560		

P<0.05; ** p<0.01; SE=standard error; na= not applicable.
Note: Households above (F) and below (G) the poverty line were compared to households above the poverty line that do not have any health payments.

IV. DISCUSSION

Despite using Heckman sample selection methods to adjust for households that did not seek any health care or did not have any health payments, it cannot be ruled out that poor people, especially from remote rural areas, do not have access to health care and face adverse health consequences, which the models might not have adjusted fully (Merlis 2002, Fabricant et al. 1999). Households are likely to opt out of health care despite health needs due to various reasons including poverty, cultural barriers, etc.; or as a result of the utilization paradox, where price elasticity of demand for health care varies with income, with more price elasticity in lower-income households compared to higher-income households (Borah 2006). Hence, our estimates on poverty impact of health payments can be considered as conservative.

The average OOP share of total consumption expenditure (4.6%) is slightly lower than the 4.84% reported from the previous (sixth) quinquennial round (Garg and Karan 2005, van Doorslaer et al. 2005 and 2006), but higher than the 2.2% observed from the 1996 household health survey (Peters et al. 2002). The minor differences from the 2000 round could be due to use of uniform recall period in this study compared to use of mixed recall period in previous studies. For nonfood, the average OOP share of nonfood expenditure is 9.7%, which is slightly lower than 10.7% previously recorded by Garg and Karan (2005) and van Doorslaer et al. (2005). Poverty headcount rate increased by 12.7% after health payments, which is slightly higher than the 11.9% recorded earlier by van Doorslaer et al. (2005). Incidence of Catastrophe-1 was 13.1%, which was higher than 10.84% previously reported by O' Donnell et al. (2005) and van Doorslaer et al. (2007). Catastrophe-2 was 5.1%, which was also higher than 3.44% previously reported (van Doorslaer et al. 2007). These findings indicate that despite posting more than 8% annual GDP growth rate, the OOP health payments and catastrophic health payments have not changed significantly in India. This could be an indication that unless appropriate and effective health insurance systems for risk pooling and subsidizing health care for those who cannot afford are put in place, high economic growth alone might not be able to address the catastrophic effects of health payments in India.

The richest decile spent 7.3% of their household total expenditure on health payments (compared to 2.5% by the poorest decile), which is close to what was reported by van Drooslaer

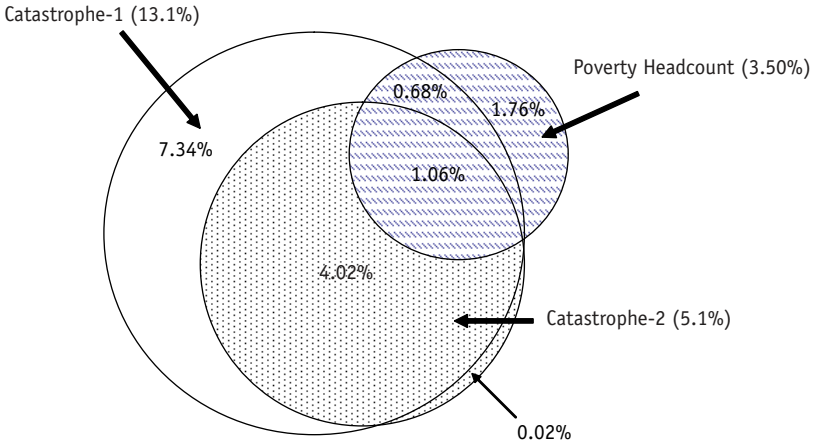
(2007). Out of pocket expenditure—both absolute and share of consumption in both total and nonfood—increases with total consumption expenditure, in line with previous finding of Peters et al. (2002), Roy and Howard (2006), and O' Donnell et al. (2005). The lack of heath insurance and risk pooling mechanisms and poor access to health care in public facilities (Roy and Howard 2006) are partly responsible for higher elasticity of health payments with overall consumption expenditure. In addition, inability to control for prices of health care in the models, and the use of consumption expenditure (expenditures can increase by tapping into savings or borrowing) instead of income are some of the methodological issues for the observed elasticity between health payments and consumption expenditure (O' Donnell et al. 2005). Another explanation for observed elasticity between health expenditures and consumption expenditure is that households facing higher medical needs resort to sale of assets and/or borrowing, resulting in transient rise in total household expenditure (O' Donnell et al. 2005, Bonu et al. 2005, Peters et al. 2002). However, the absolutely poor may neither have assets to sell nor have access to credit, and hence their ability to pay for health care is relatively much further reduced compared to the rich.

Larger households are less likely to show catastrophic health payments. This is in line with findings of O' Donnell et al. (2005) and is unusual, one that India shares with Sri Lanka, which O' Donnell et al. (2005) explain. Compared to the urban regular wage/salary earner, all the other groups had higher chances of Catastrophe-1 and Catastrophe-2, and in the multivariate analysis, rural agricultural labor had the highest chances for both catastrophes. Rural households have a higher proportion of their expenditures (both total and nonfood) spent on health payments. In multivariate regression, rural households were more likely to suffer Catastrophe-2 compared to urban households ($p<0.01$). Again, these results are similar to those of O' Donnell et al. (2005).

Around 3.5% of the people fell below the poverty line after adjusting for health payments, which represents 4.9% of the population above the poverty line, or close to 40 million people. These estimates are slightly higher than those found by Garg and Karan (2005) earlier, where the percentage of the population falling below the poverty line in 1999–2000 was 3.25% (or 32.5 million people). This is disconcerting, since the economy is growing, yet catastrophic health payments are affecting a larger number of people.

Do traditional measures of catastrophic health payments capture the people who fall below the poverty line due to health payments? We explore this further in Figure 4, where the relationship between Catastrophe-1 and Catastrophe-2 against poverty headcount is depicted. Catastophe-1 is able to capture only 50% of the people falling below the poverty line, and performs slightly better than Catastrophe-2 in capturing poverty headcount. Catrostrophe-1 includes most of Catastrophe-2 households.

Figure 4
Venn Diagram Showing Relationship between Catastrophe-1, Catastrophe-2, and Poverty Headcount
(people above poverty line who fall below poverty line due to health payments)



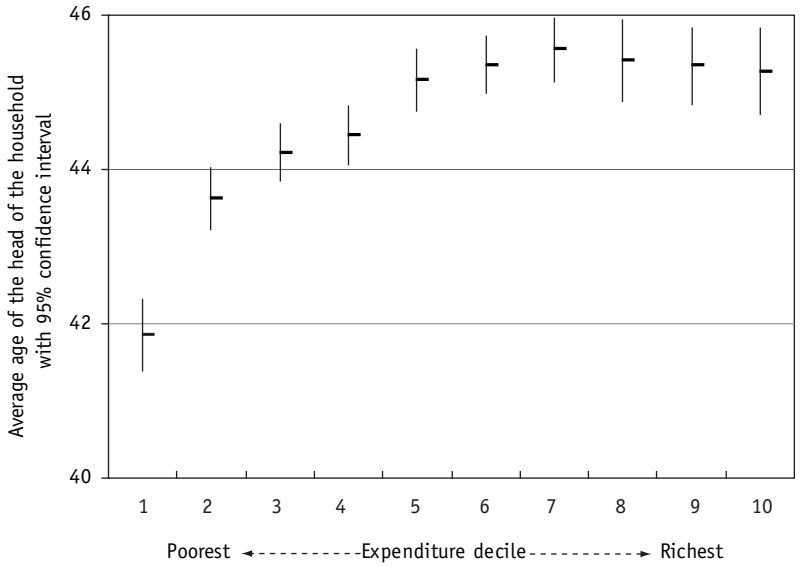
Note:
- *Catastrophe-1:* Health payments over 10% of overall household consumption expenditure.
- *Catastrophe-2:* Health payments over 40% of nonfood consumption expenditure.
- *Poverty headcount:* The difference between postpayment poverty headcount ratio and prepayment headcount ratio gives the poverty impact in terms of poverty headcount of health payments.

These findings are conservative and most likely represent the lower boundary of the band for the simple reason that this study does not adjust for extremely poor households, which forego health care (and avoid health payments), and instead suffer adverse health consequences (reduced life expectancy and increased morbidity). Figure 5 gives a picture of potential consequences of reduced health care access due to financial reasons among the poorest expenditure decile, where the average age of the head of the household is approximately three years lower than the average age of the head of the richest decile.

From a policy perspective, one of the most important subgroups of households is the one that falls below the poverty line due to health payments. This group, as explained earlier, is more likely to be from urban areas, have large household size, come from poorer households with lower education, and originate from Uttar Pradesh state. In particular, the negative association with household wealth, and the positive relationship with size of household and urban residence is contrary to the relationship observed in most other outcomes. Poorer states are likely to have more people above the poverty line falling below the poverty line due to health payments (Figure 1). It is intriguing to observe that the relationship between state per capita GDP and OOP health payments as a percentage of household total expenditure has a weak relationship. For example, Kerala and Uttar Pradesh have the highest proportion of household expenditure spent on health payments, while Bihar, which is closer to Uttar Pradesh in other aspects, has one of the lowest. Kerala can be explained because it is in advanced stages of demographic transition with epidemiological transition at an advanced stage. Why Uttar Pradesh and Bihar differ so much is a subject for further research. We can only speculate that in both Bihar and Uttar Pradesh, public services are weak, thus people depend on

the private sector. It is likely that the private sector is well developed in Uttar Pradesh, while in Bihar it is still weak, resulting in low health payments in Bihar.

Figure 5
Average Age of Head of Household by Various Expenditure Decile



Note: A significantly lower average age of head of household in the two poorest expenditure deciles could be an indication of lower life expectancy in these two deciles. Low health payments in the poor households indicate that due to poverty, the poorest households forego health care (and reduce health payments), and instead face health consequences such as lower life expectancy.

Policies to reduce the number of Indians living on less than $1-a-day need to include measures to reduce such catastrophic OOP (van Doorslaer et al. 2006). Health insurance reduces average OOP expenditures significantly, and reduces the likelihood of catastrophic health spending (Kawabata et al. 2002), especially among individuals with lower income. One of the important criteria for public spending on health care include public financing for catastrophically costly care when contributory insurance will not work or when there are good reasons to finance insurance policy (Musgrove 1999).

It is essential to expand successful community health insurance schemes to encompass larger populations, especially the poor households in the informal sector (Roy and Howard 2007). The design and implementation of an equitable scheme must involve a careful assessment of barriers to health care seeking and interventions to address the main barriers; and reimbursements requiring minimum paperwork, paid out at the time and place of service utilization (Ranson et al. 2006). More research into alternative health care financing strategies and related mechanisms for coping with the direct and indirect costs of illness is urgently required to inform the development of appropriate social policies to improve access to essential health services and break the vicious cycle between illness and poverty (McIntyre et al. 2005). In order to extend coverage to the poorest quartile, a corresponding subsidy has to be considered for community-based health insurance.

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