Socio-Economic Differentials in Impoverishment Effects of Out-of-pocket Health Expenditure in China and India: Evidence from WHO SAGE

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Abstract

Using data from the WHO Study on Global Ageing and Adult Health (WHO-SAGE) we examined the socioeconomic differences in the effects of out-of-pocket health expenditure (OOPHE) on impoverishment in China and India. About 7% of the population in China and 8% of the population in India fall below the poverty line due to OOPHE. The percentage shortfall in income for the population from the poverty line due to OOPHE is 2% in China and 1.3% in India. Logistic regression result shows that lower wealth, inpatient care, and outpatient care are significantly associated with greater odds of falling below the poverty line due to OOPHE in both China and India. Person, being in the household without formally educated head, is more likely to fall below the poverty line due to OOPHE in China. Not having health insurance and rural residence increases the chance of becoming poor due to OOPHE in India.

Key Words Socio-economic differentials, Impoverishment Effect, Health Expenditure, WHO-SAGE, China, India

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Introduction

The provision of affordable health care is generally considered a fundamental goal of a welfare state. In addition to its role in maintaining and improving the health status of individuals and households, it impacts the economic prosperity of a society through its positive effects on labor productivity. The affordability of a health care system is often conceptualized in terms of "financial protection", that is, individuals and households should be protected from incurring a burden of health care expenditure that would adversely affect their economic wellbeing (Bredenkamp et al., 2011).

Nevertheless, policies in many countries compel households and individuals to cover a substantial portion of healthcare costs out-of-pocket. The annual mean per capita health expenditure was Int$1080 (purchasing power parity [PPP] estimate) globally in 2011 and varied from Int$68 in low income to Int$647 in middle income countries. Of the total health expenditure, per capita government contribution in 2011 was Int$623 worldwide, Int$27 in low income countries and Int$361 in middle income countries, respectively, whereas, out-of-pocket health expenditure (OOPHE) constituted 21% of the total health expenditure in 2011 globally. The percentage of health expenditure covered by OOPHE varied from 47% in low income countries to 34% in middle income countries (WHO, 2014).

In countries where a major part of health care is financed by OOPHE, health expenditures can have impoverishing effects on the economic status of households, especially among the poorer socioeconomic strata (Bredenkamp et al., 2011; Wagstaff and van Doorslaer, 2003; Laveesh et al., 2010 ; Kawabata et al., 2002; Alam and Mahal, 2014). For example, households in the lowest income quintile and/or with higher inpatient expenses are more likely to borrow or sell assets in order to cope with health care expenses (Leive and Xu, 2008). One analysis of health care financing strategy in 40 low and middle income countries by Kruk et al. (2009) revealed that about 26% (one billion) of households borrow or sell their assets to pay for health care. From a policy perspective, health care financing in the absence of any other health security

inflates the household consumption expenditure and hence underestimates the actual level of poverty in countries (Flores et al., 2008).

Though the scholarship on catastrophic health expenditures is fairly developed and there are a few studies examining the impoverishment effects of OOPHE across different countries (Balarajan et al., 2011; Garg and Karan, 2009; Li et al., 2013; Li et al., 2014; Li et al., 2012; van Doorslaer et al., 2007), detailed analyses of socioeconomic differentials in the impoverishment effects of OOPHE are rare. Therefore, in this paper, we investigate socioeconomic differentials in the impact of OOPHE on impoverishment in China and India. Li et al. (2014) and Li et al. (2012) investigate catastrophic health expenditure and impoverishment from medical expenses in China but their main focus is on the determinants of catastrophic health expenditure rather than the determinants of impoverishment effects, and only the extent of households becoming poor due to out-of-pocket expenditure has been reported as far as impoverishment effects are concerned. Similarly, (Garg and Karan, 2009; Balarajan et al., 2011) are limited to the estimation of overall poverty level increase due to OOPHE in India. In contrast, we use data from China and India to provide evidence on socioeconomic differentials in the share of OOPHE in total and non-food expenditures, the percentage of the population falling below poverty line (poverty head count) due to OOHPE, the the average poverty gap due to OOPHE, and the odds of becoming poor due to OOPHE.

Our choice of China and India is motivated by several considerations. First, China and India are not only the two most populous countries in the world but are also among the fastest growing economies of the present times. Second, among the developing countries, financial hardship of health payments is reportedly higher in China and India, with households relying excessively on OOPHE (van Doorslaer et al., 2007). Finally, a substantial proportion of the population falls below the poverty line due to OOPHE in these countries. For example, taking a poverty line of US$1.08, Van Doorslaer et al., (2006) estimated that about 2.6% (32 million) and 3.7% (37-39 million) of the population in China and India, respectively, fell below the poverty line due to OOPHE in 1999-2000 alone. Similarly Garg and Karan (2009) estimated that the overall poverty

level increased by 3.2% due to OOPHE in India in 1999-2000 and a study by Balarajan et al. (2011) indicated that about 39 millions Indians are pushed into poverty by OOPHE every year. Regarding China, estimates show that about 7.5% of households became poor due to OOPHE in China in 2008 (Li et al., 2012; Li et al., 2013).

Despite the potentially impoverishing effects of OOPHE, the annual per capita expenditure on health has increased from Int.$ 53 (PPP) in 1995 to Int.$ 432 (PPP) 2011 in China and from Int.$ 46 (PPP) in 1995 to Int.$ 141 (PPP) in 2011 in India (Figure 1). This is combined with near stagnation in the share of government expenditure as a percentage of total expenditure on health from 1995 to 2011 in both the countries, the government share being only 30% in India in 2011 (Figure 2). Nevertheless, the two countries have seen some improvement (China – 46% to 35% and India – 68% to 59%) in the share of OOPHE as a percentage of total expenditure on health during the time period from 1995-2011 (Figure 3).
[Figures 1, 2 and 3 about here]

The remainder of the paper is organized as follows: the next section briefly describes the methods and the data used in the paper, it is followed by a section summarizing the findings, and the final section provides our main conclusions along with a discussion of the main results.

Data and Methods

Data

We use data from the World Health Organization's Study on Global Ageing and Adult Health (SAGE), which was implemented in China, Ghana, India, Mexico, The Russian Federation and South Africa in the years 2007-2010. The target population in each country was adults (18 years and older), and data were also collected the households of study participants. The survey was primarily aimed to provide nationally comparable estimates on health status, wellbeing and health care utilization by the adult population in each country (Kowal et al., 2012). The data were collected using face-to-face paper and pencil interviews (PAPI) for India. In China, 50% PAPI and 50% face-to-face computer assisted personal interviews (CAPI) were used (Kowal et

al., 2012). The household (individual) response rates were about 99% (68%) in India to 95% (99%) in China. For further details on sampling and other procedures, refer to Kowal et al. (2012).

Though the information regarding the impoverishment effects of health payments in the survey is collected at the household level, the analysis has been adjusted using household size (by using appropriate sampling weights provided in the data) to generate population level estimates. In total, SAGE interviewed 10,218 households in China and 9626 households in India. Because our study compares out-of-pocket health expenditure to both total expenditure and non-food expenditure, households for which food expenditure was not reported were excluded from the analysis. The final sample includes 9591 (93.9% of total) households from China and 9583 (99.6% of total) households from India.

The survey captures household food expenditure for the last 7 days preceding the survey, non-food and health care and services expenditure for the 30 days preceding the survey, and expenditure on big purchases for the 12 months preceding the survey. To obtain comparable figures, we converted each expenditure measure to a 30-day basis.

Methods

In this paper we focus mainly on socioeconomic differentials in the share of OOPHE as a proportion both of total and of non-food expenditures (in terms of capacity to pay which has been defined subsequently), the impoverishment effects of OOPHE, and the odds of impoverishment due to OOPHE. It is worth noting that we have followed the definition and concepts of the impoverishment effect as described by Xu (2005).

Out-of-pocket health expenditure (OOPHE) and its share in total and non-food expenditure (capacity to pay)

Out-of-pocket health expenditure includes the net total of insurance reimbursement and household expenditure in last 30 days on doctors' registration and consultation, traditional and

alternative healers, diagnostic and laboratory tests, medication, dental care, ambulatory care, and other health care products or services. It also includes the net total of insurance reimbursement and household expenditure in last year on mandatory or voluntary health insurance premiums, health related aids, overnight stay in health facilities, and long term care.

It is worth noting that the estimate of OOPHE and its impoverishment effects depend on the reference period as well as the number of items (related to health expenditure) on which information has been collected in the survey (Lu et al., 2009). Unlike many previous studies, ours includes transportation and ambulance charges in the health expenditure figure, which constitutes a large share of total health expenditure in developing countries (Bredenkamp et al., 2011). Haffner et al. (1987) found that retrospective reports of ambulatory care up to 6 months prior to the survey and outpatient care up to 3 months prior to the survey provide reliable estimates (Haffner et al., 1987).

Capacity to pay is defined as the household's expenditure in excess of the subsistence expenditure, which is the minimum expenditure required to remain on or above the poverty line (Xu, 2005). The poverty line is the weighted average of the equivalent food expenditures in the range of food expenditure shares of total household expenditure that are at the 45th and 55th percentile across the whole sample (Xu, 2005). Therefore, a household is classified as poor if the its total expenditure is less than the subsistence expenditure (Xu, 2005) [Technical details in Appendix 1].

Impoverishment effects of OOPHE
We use two indices to capture the impoverishment effects of OOPHE: poverty head count ratio and poverty gap ratio. Poverty head count captures households whose net total household expenditure is less than the required subsistence expenditure solely due to OOPHE (Xu, 2005). The poverty headcount ratio is measured as the households who fall below the poverty line due to OOPHE as a proportion of all the households in the population. The poverty gap measures the percentage deficit from the poverty line of those households that have become poor due to

OOPHE, and poverty gap ratio measures the percentage deficit from the poverty line of households that have become poor due to OOPHE as a proportion of all the households in the population. In a sense, the poverty gap ratio measures the average percentage deficit from the poverty line due to OOPHE for the population (Van Doorslaer et al., 2006; O'Donnell et al., 2008; Wagstaff and van Doorslaer, 2003) [Technical details in Appendix 1].

Statistical Modeling

We modeled associations between selected socioeconomic characteristics and the odds of becoming poor due to OOPHE using logistic regression. The binary outcome variable was whether or not a household has become poor (net total household expenditure becoming less than the required subsistence expenditure) due to OOPHE (1 = poor due to OOPHE, 0=all others).

The independent variables included in the models are sex of the household head (male and female; male as reference), age of the household head (<50 years and >=50 years; <50 as reference), number elderly members (aged 50+) in the household (no elderly, one elderly and two or more elderly members in the household; no elderly member as reference); number of children (aged 0-5) in the household (no child and one or more children; no child as reference), household size, household head's educational status (no schooling, primary, secondary and college or more; no schooling as reference), wealth quintile to which a household belongs (poorest, poor, middle, wealthier and wealthiest; poor as reference), availability of health insurance (no member has health insurance and at least one member has health insurance; no member has health insurance as reference), place of residence (urban and rural; urban as reference), inpatient care received (no and yes; no as reference), and outpatient care received (no and yes; no as reference).

Results

Distribution of Socio-economic Characteristics

Table 1 shows the percentage distribution of the population by socioeconomic characteristics. Majority of the population in China and India lives in households headed by males with the percentages being 74% for China and 93% for India. Also more than half of the population in these two countries lives in households whose heads are 50 or older with the figure for China being 79%. In addition, most individuals live in households having at least one member who is 50 years or older. The average household is substantially larger in India, with more than 93% of the population living in households of four or more.

Regarding the educational status of households, India has a higher proportion of population living in households in which the head has no formal schooling (32%), whereas the corresponding figure in China is only 15%. In terms of health insurance, there is a stark contrast between the two countries. While 94% of the population in India lives in a household in which no member has health insurance, only 8% live in such households in China.

In the case of inpatient care, about 17% of the population in China and 13% of the population in India belongs to households in which at least one member received in-patient care during the period covered in the survey. When it comes to outpatient care, about 60% of the Indian population belongs to a household in which at least one member received outpatient care which is substantially higher than the percentage in China (46%).

[Table 1 about here]

Out-of-Pocket Health Expenditure

The mean share of out-of-pocket health expenditure (OOPHE) as a percentage of total as well as non-food expenditure (capacity to pay) is presented in Table 2. The share of OOPHE as a percentage of total expenditure is about 15% in China and 12% in India. OOPHE as a percentage of capacity to pay is same for both China and India (23%).

[Table 2 about here]

OOPHE as a percentage of total expenditure and as a percentage of capacity to pay is significantly higher in among those residing in female-headed households in China. It is also significantly higher among those belonging to households with an elder as the head and among households having at least an elderly member in both China and India. Interestingly, households with at least one child have a lower proportion of OOPHE in China but a higher proportion of OOPHE in India. There is a significant trend of an increasing proportion of OOPHE with decreasing household size in China but the association is insignificant in India. When it comes to educational status of household head OOPHE's share decreases with the increase in educational status of household head for both China and India (except for the share as a percentage of total expenditure in India, where the trend is unclear). Moving to the pattern of OOPHE's share with the wealth status, with the exception of OOPHE share as a percentage of total expenditure in India, OOPHE share shows a decreasing significant trend with increase in wealth.

OOPHE's share as a percentage of capacity to pay is significantly among households in which at least one member has health insurance in India. In all other cases the trend is not significant. Its share is significantly higher in rural areas in India and in the case of share as a percentage of capacity to pay in China. OOPHE's share in both China and India is significantly higher among those from households' where at least one member received inpatient and outpatient care compared to those from households' where no member received them.

Impoverishing Effects of OOPHE

The percentage of population falling below poverty line and the average deficit from the poverty line (poverty gap) due to OOPHE is presented in Table 3. About 7% and 8% of the population falls below poverty line due to OOPHE in China and India, respectively.

[Table 3 about here]

Regarding socioeconomic differentials in the percentage of population falling below poverty line due to OOPHE – age of household head and having elderly members in households makes a significant difference in China (where population residing in households headed by a member 50 years or above in age or having one or more elderly members have a higher prevalence of falling below poverty line); presence of one or more children significantly increases the prevalence of falling below poverty line in India; lower educational status of household head, lower wealth status of household and residing in rural areas are also significantly associated with higher prevalence of falling below poverty line in both China and India; further, not having health insurance makes a significant difference (with higher prevalence of falling below poverty line) in India; moreover, having received inpatient care has a significant effect (higher prevalence of falling below poverty line) in China as well as India.

The average shortfall from the poverty line (poverty gap ratio) due to OOPHE for the Chinese and Indian population is also presented in Table 3. The average percentage shortfall in income for the population, from the poverty line due to OOPHE is 2% in China and 1.3% in India. There are significant variations based on socioeconomic characteristics in the countries. Poverty gap ratio is significantly higher among those living in households headed by an elder (compared to a non-elderly) or having an elderly member in China. On the other hand poverty gap ratio is significantly higher among those living in households having at least one child in India. In addition, the poverty gap is significantly higher among those living in households in which the head has low educational status, households with lower wealth status, and living in rural areas in both China and India. The same is true for those living in households in which no member has health insurance in India. Similarly, the poverty gap is significantly higher among those belonging to households in which a member has received in-patient care in both China and India.

Odds of Falling Below Poverty Line due to OOPHE

The odds of falling below poverty line due to OOPHE and the associated socioeconomic differentials are presented in Table 4. Having a child aged 5 or younger in a household increases the odds of falling below the poverty line by 30% in India. Those living in a household in which the head has a college level education are only 0.42 times as likely to fall below the poverty line due to OOPHE compared to those living in a household in which the head has no formal education.

The odds of becoming poor due to OOPHE decreases significantly with the increase in household wealth in both China as well as India. The wealthiest 20% are only 0.37 and 0.19 times as likely to fall below poverty line as the poorest 20%, in China and India respectively. In addition, those in households in which at least one member has health insurance are 0.47 times as likely to fall below the poverty line due to OOPHE as those in households in which no member has health insurance in India. Furthermore, residing in rural areas increases the odds of becoming poor due to OOPHE by more than 100%.

Moreover, having received inpatient care significantly increases the odds of becoming poor due to OOPHE in both China (more than 100%) as well as India (77%). Similarly, having received outpatient care is also associated with significantly higher odds of impoverishment due to OOPHE in both countries (30% in China and 22% in India).

[Table 4 about here]

Conclusions

We use data from the WHO's Study on Global Ageing and Adult Health (SAGE) survey conducted during 2007-2010 to examine the socioeconomic differentials in the impoverishment effects of out-of-pocket health expenditure in China and India. We find that about 7% and 8% of the population falls below the poverty line due to OOPHE in China and India, respectively, with the proportion being significantly higher in the case of lower educational status of

household's head, lower wealth status of household, residence in rural areas and in-patient care in both China and India. In addition, the proportion is higher in the case of the household head being an elder or having an elderly member in the household in China. Furthermore, having a child in the household and not having health insurance increase the chances of falling below poverty line due to OOPHE in India. Our estimate of the percentage of the population that falls below the poverty line due to OOPHE for China (7%) is similar to the estimate of Li et al. (2012) who reported that about 7.5% of the households in China fall below the poverty line due to OOPHE. The slight difference could be for two reasons – first, our estimates are at the population level whereas the estimates presented in Li et al. (2012) are at the household level; and second, we use a different dataset.

We also find that the average percentage shortfall in income for the population from the poverty line (poverty gap ratio) due to OOPHE is 2% in China and 1.3% in India. The socioeconomic differentials in poverty gap ratio are similar to the socioeconomic differentials in the proportion falling below the poverty line due to OOPHE.

Our multivariate findings indicate that lower wealth status and inpatient as well as outpatient care increase the odds of falling below poverty line significantly (with the extent much higher in the case of in-patient care) due to OOPHE in both China and India. In addition, having a household head with no formal education increases the odds of falling below poverty line significantly (compared to a head with college level education) due to OOPHE in China; whereas having at least a child, not having health insurance and residing in rural areas increases the odds of becoming poor significantly due to OOPHE in India.
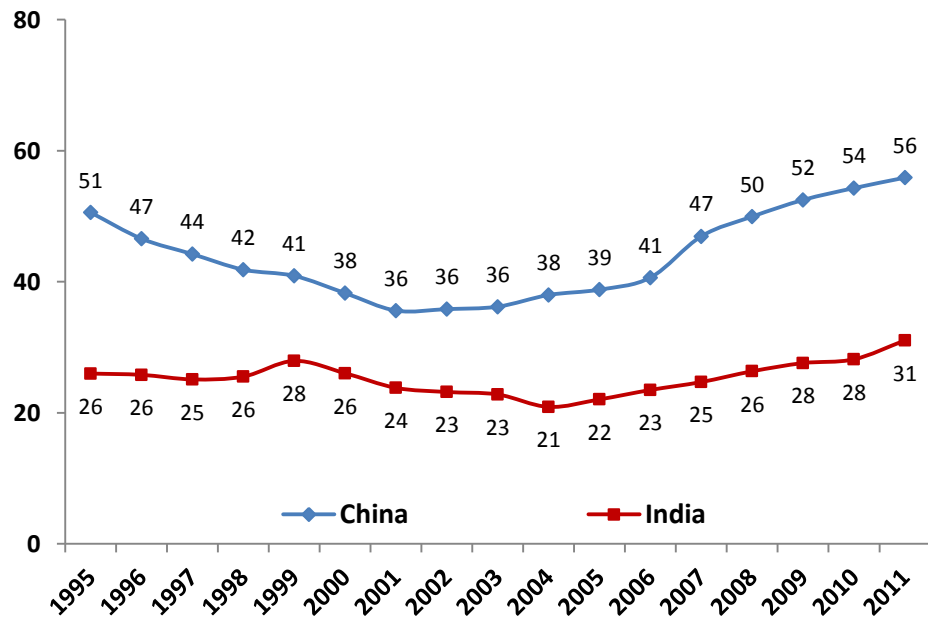
References:

Alam K and Mahal A. (2014) Economic impacts of health shocks on households in low and middle income countries: a review of the literature. *Global Health* 10: 21.

Balarajan Y, Selvaraj S and Subramanian SV. (2011) Health care and equity in India. *The Lancet* 377: 505-515.

Bredenkamp C, Mendola M and Gragnolati M. (2011) Catastrophic and impoverishing effects of health expenditure: new evidence from the Western Balkans. *Health Policy and Planning* 26: 349-356.

Flores G, Krishnakumar J, O'Donnell O, et al. (2008) Coping with health-care costs: implications for the measurement of catastrophic expenditures and poverty. *Health Economics* 17: 1393-1412.

Garg CC and Karan AK. (2009) Reducing out-of-pocket expenditures to reduce poverty: a disaggregated analysis at rural-urban and state level in India. *Health Policy and Planning* 24: 116-128.

Haffner J, Moschel G and ten Horn GHMM. (1987) Determination of the optimum Period of interview for retrospective collection of data. *European archives of psychiatry and neurological sciences* 236: 288-293.

Kawabata K, Xu K and Carrin G. (2002) Preventing impoverishment through protection against catastrophic health expenditure. *Bull World Health Organ* 80: 612.

Kowal P, Chatterji S, Naidoo N, et al. (2012) Data resource profile: the World Health Organization Study on global AGEing and adult health (SAGE). *Int J Epidemiol* 41: 1639-1649.

Kruk ME, Goldmann E and Galea S. (2009) Borrowing and selling to pay for health care in low- and middle-income countries. *Health Aff (Millwood)* 28: 1056-1066.

Laveesh B, Peter B and Rajeev A. (2010) The Impoverishing Effect of Healthcare Payments in India: New Methodology and Findings. *Economic and Political Weekly* XLV

Leive A and Xu K. (2008) Coping with out-of-pocket health payments: empirical evidence from 15 African countries. *Bull World Health Organ* 86: 849-856.

Li X, Shen JJ, Lu J, et al. (2013) Household catastrophic medical expenses in eastern China: determinants and policy implications. *BMC Health Serv Res* 13: 506.

Li Y, Wu Q, Liu C, et al. (2014) Catastrophic Health Expenditure and Rural Household Impoverishment in China: What Role Does the New Cooperative Health Insurance Scheme Play? *PLoS ONE* 9: e93253.

Li Y, Wu Q, Xu L, et al. (2012) Factors affecting catastrophic health expenditure and impoverishment from medical expenses in China: policy implications of universal health insurance. *Bull World Health Organ* 90: 664-671.

Lu C, Chin B, Li G, et al. (2009) Limitations of methods for measuring out-of-pocket and catastrophic private health expenditures. *Bull World Health Organ* 87: 238-244, 244A-244D.

O'Donnell O, Doorslaer Ev, Wagstaff A, et al. (2008) Catastrophic Payments for Health Care. *Analyzing Health Equity Using Household Survey Data.* Washington, D.C: The World Bank.

van Doorslaer E, O'Donnell O, Rannan-Eliya RP, et al. (2007) Catastrophic payments for health care in Asia. *Health Economics* 16: 1159-1184.

Van Doorslaer E, O'Donnell O, Rannan-Eliya RP, et al. (2006) Effect of payments for health care on poverty estimates in 11 countries in Asia: an analysis of household survey data. *The Lancet* 368: 1357-1364.

Wagstaff A and van Doorslaer E. (2003) Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993-1998. *Health Econ* 12: 921-934.

WHO. (2014) Health financing: Health expenditure per capita Data by World Bank income group. *Global Health Observatory Data Repository.* Geneva: World Health Organisation.

Xu K. (2005) Distribution of health payments and catastrophic expenditures Methodology. Geneva: World Health Organisation.

Figure 1. Per Capita Annual Expenditure on Health (PPP international $), 1995-2011[a]
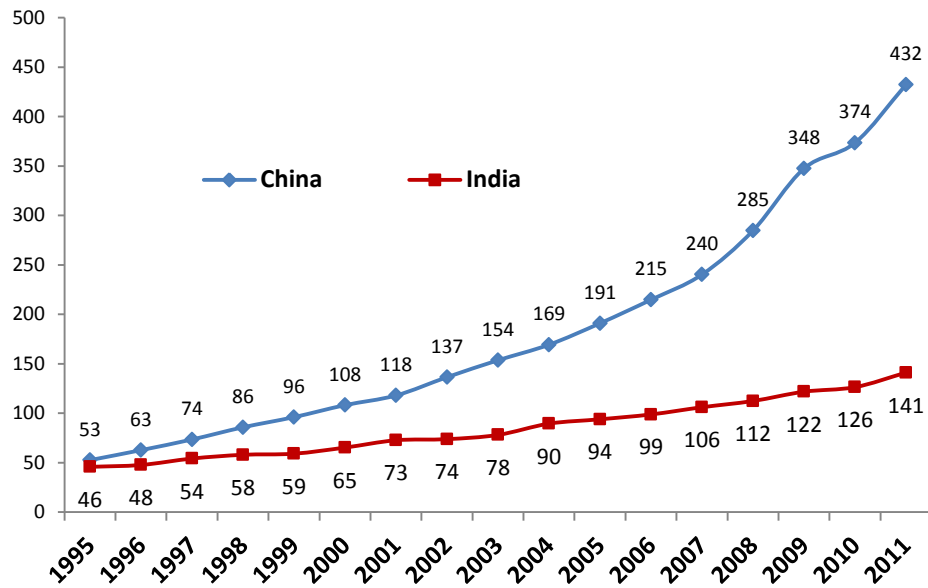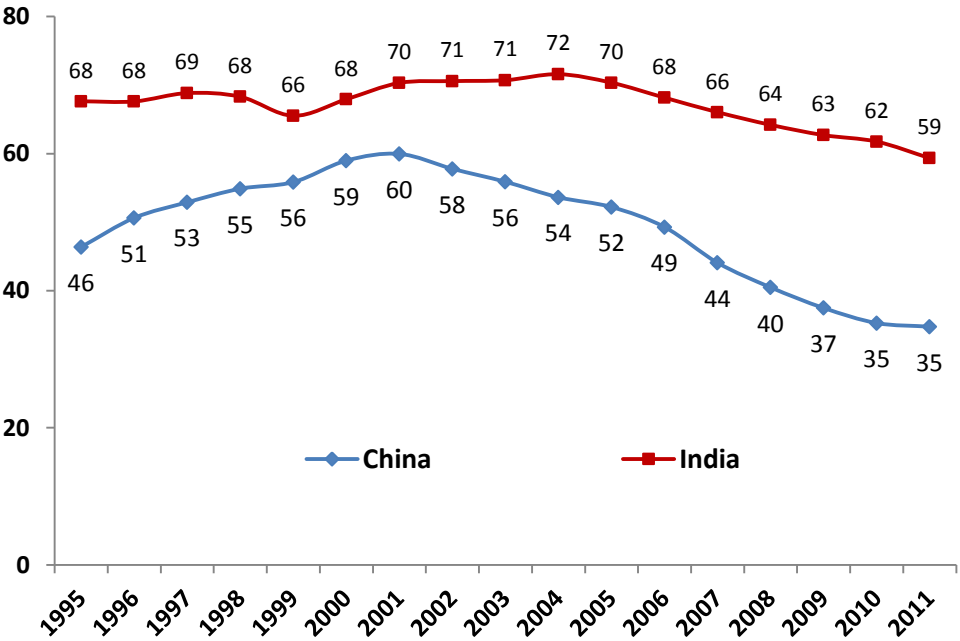

[a] Based on data from WHO (2014)

Figure 2. Government Expenditure as a Percentage of Total Expenditure on, 1995-2011[a]

[a] Based on data from WHO (2014)

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Figure 3. Out-of-pocket Health Expenditure as a Percentage of Total Expenditure on Health, 1995-2011[a]

[a] Based on data from WHO (2014)

Table 1. Percentage distribution of population by the selected household characteristics: China and India

		China (n=10138)	*India* (n=9621)
Sex of the household head	Male	73.9 (71.7,75.9)	92.8 (91.9,93.7)
	Female	26.1 (24.1,28.3)	7.2 (6.3,8.1)
Age of the household head	< 50 years	21.2 (19.6,23.0)	45.1(43.3,47.0)
	>=50 years	78.8 (77.0,80.4)	54.9 (53.0,56.7)
Household member aged 50+	None	12.3 (11.5,13.2)	27.9 (26.4,29.4)
	1	27.3 (26.0,28.6)	34.8 (33.4,36.2)
	>=2	60.4 (59.2,61.6)	37.4 (35.6,39.1)
Member aged ≤5 years	None	84.7 (83.2,86.2)	46.9 (44.7,49.0)
	>=1	15.3 (13.8,16.8)	53.1 (51.0,55.3)
Household size	1	5.6 (4.9,6.5)	0.3 (0.2,0.4)
	2-3	56.2 (54.1,58.3)	6.6 (5.9,7.2)
	>=4	38.2 (35.8,40.7)	93.1 (92.5,93.8)
Household head education status	No formal schooling	14.8 (13.2,16.6)	31.9 (29.6,34.2)
	Primary	38.1 (35.7,40.6)	29.2 (27.5,31.0)
	Secondary	41.0 (39.3,42.6)	31.3 (29.5,33.3)
	College +	6.1 (4.3,8.6)	7.6 (6.5,8.9)
Wealth quintile	Poorest	20 (18.1,22.0)	20 917.4,22.9)
	Poorer	20 (18.3,21.8)	20 (18.3,21.8)
	Middle	20 (18.9,21.2)	20 (18.6,21.5)
	Wealthier	20.1 (18.8,21.4)	20 (18.2,22.0)
	Wealthiest	19.9 (17.3,22.8)	20 (17.5,22.7)
Health insurance	No member	7.7 (6.7,8.8)	94.1 (92.9,95.1)
	Any member	92.3 (91.2,93.3)	5.9 (4.9,7.1)
Place of residence	Poor	31.8 (29.9,33.8)	29.8 (27.2,32.6)
	Urban	49.9 (48.6,51.3)	26.1 (20.9,31.9)
	Rural	50.1 (48.7,51.4)	73.9 (68.1,79.1)
Inpatient care received	No	83.0 (81.8,84.1)	86.6 (85.3,87.8)
	yes	17.0 (15.9,18.2)	13.4 (12.2,14.7)
Outpatient care received	No	54.3 (51.7,56.9)	40 (37.6,42.5)
	yes	45.7 (43.1,48.3)	60 (57.5,62.4)
Total		100.0	100.0

Note:- 95% CI given in parenthesis;

Table 2. Mean percentage share of out-of-pocket health expenditure (OOPHE) as a proportion of total expenditures and capacity to pay by selected household characteristics: China and India

		OOPHE's share in total expenditure				OOPHE's share in capacity to pay			
		China		India		China		India	
		% share (95% CI)	F-value^S	% share (95% CI)	F-value^S	% share (95% CI)	F-value^S	% share (95% CI)	F-value^S
Sex of the household head	Male	15.1 (14.3,15.9)	7*	11.6 (11.1,12.2)	0	23.2 (22.0,24.4)	9*	23.3 (22.4,24.2)	1
	Female	15.3 (14.4,16.2)		10.4 (9.0,11.8)		23.9 (22.5,25.2)		22.4 (19.5,25.4)	
Age of the household head	< 50 years	11.4 (9.9,12.9)	147*	10.7 (10.1,11.4)	39*	17.4 (15.4,19.5)	210*	22.4 (21.1,23.6)	25*
	>=50 years	16.1 (15.5,16.8)		12.2 (11.4,13.0)		25.0 (24.0,25.9)		24.0 (22.8,25.2)	
Fifty plus aged elderly	No elderly	10.3 (9.3,11.3)	82*	10.4 (9.7,11.2)	28*	14.8 (13.5,16.2)	117*	22.0 (20.6,23.5)	16*
	One elderly	13.3 (12.2,14.4)		11.2 (10.4,12.0)		21.8 (20.3,23.2)		23.3 (21.9,24.7)	
	2+ Elderly	17 (16.0,17.9)		12.7 (11.6,13.7)		25.8 (24.5,27.1)		24.1 (22.8,25.4)	
Member aged ≤5 years	No child	15.4 (14.7,16.1)	22*	10.6 (10.0,11.3)	29*	23.6 (22.6,24.7)	21*	20.6 (19.6,21.6)	95*
	1+ child	13.6 (11.9,15.3)		12.3 (11.5,13.1)		21.9 (19.8,24.0)		25.6 (24.3,26.9)	
Household size	1	18.6 (16.8,20.4)	18*	9.3 (5.9,12.7)	0	29.5 (26.9,32.1)	28*	23.1 (17.1,29.1)	1
	2-3	15.8 (15.0,16.5)		11.2 (10.0,12.5)		23.8 (22.8,24.7)		22.9 (20.8,25.0)	
	4+	13.7 (12.4,15.1)		11.6 (11.0,12.1)		21.9 (20.0,23.9)		23.3 (22.3,24.2)	
Household head Education status	No education	18.0 (16.4,19.6)	31*	11.8 (11.0,12.7)	4*	30.1 (27.9,32.2)	85*	26.9 (25.5,28.4)	54*
	Primary	16.3 (15.3,17.4)		10.9 (9.7,12.1)		25.1 (23.8,26.5)		22.4 (20.5,24.3)	
	Secondary	13.6 (12.8,14.5)		11.9 (11.0,12.8)		20.5 (19.3,21.6)		21.7 (20.3,23.1)	
	College +	10.7 (8.4,13.0)		11.2 (9.9,12.4)		15.7 (12.1,19.3)		17.4 (15.3,19.4)	
Wealth quintile	Poorest	16.9 (15.9,17.9)	25*	11.1 (9.9,12.2)	0	30.4 (29.0,31.7)	99*	28.3 (26.2,30.4)	69*
	Poorer	17.5 (16.2,18.8)		11.1 (9.8,12.3)		27.5 (25.9,29.2)		25.0 (22.7,27.4)	
	Middle	15.3 (14.1,16.4)		11.3 (9.9,12.6)		22.2 (20.8,23.6)		23.1 (21.0,25.1)	
	Wealthier	15.3 (13.8,16.7)		12.2 (11.2,13.2)		21.4 (19.5,23.2)		21.6 (20.1,23.1)	
	Wealthiest	10.8 (9.5,12.0)		12.1 (11.0,13.3)		15.4 (13.7,17.1)		18.2 (16.6,19.8)	
Health insurance	No member	13.3 (11.8,14.9)	3	11.5 (10.9,12.0)	3	22.7 (20.6,24.9)	1	23.4 (22.5,24.4)	13*
	Any member	15.3 (14.6,16.0)		12.5 (11.0,13.9)		23.4 (22.3,24.5)		20.2 (17.9,22.5)	
Place of residence	Urban	13.9 (12.9,15.0)	2	10.2 (9.3,11.2)	56*	21.6 (20.0,23.3)	7*	19.1 (17.6,20.6)	206*
	Rural	16.3 (15.4,17.3)		12.0 (11.3,12.7)		25.1 (23.8,26.3)		24.7 (23.6,25.8)	
Inpatient care received	No	13.3 (12.6,14.1)	359*	10.8 (10.3,11.4)	241*	21.2 (20.1,22.3)	293*	22.3 (21.4,23.2)	162*
	Yes	23.9 (22.5,25.3)		16.1 (14.5,17.6)		33.9 (32.0,35.7)		29.2 (26.8,31.7)	
Outpatient care received	No	14.1 (13.2,14.9)	15*	11.2 (10.4,12.1)	4	21.8 (20.7,22.8)	26*	22.1 (20.7,23.5)	12*
	Yes	16.4 (15.5,17.3)		11.7 (11.1,12.3)		25.3 (23.9,26.6)		24.0 (23.1,25.0)	
Total		15.1(14.4,15.8)		11.5 (11.0,12.1)		23.4 (22.3,24.4)		23.2 (22.3,24.1)	

Note:- * p≤0.05; ^{S}Two-way Anova F-value;95% CI given in parenthesis

Table 3. Percentage population falling poverty line (poverty head count ratio) and average deficit from the poverty line (poverty gap ratio) due to out-of-pocket health payments by selected household characteristics: China and India

		Poverty head count ratio (%)				Poverty gap ratio (%)			
		China		India		China		India	
		Poverty headcount (95% CI)	F-Stat.@	Poverty headcount (95% CI)	F-Stat.@	Poverty gap (95% CI)	F-value$	Poverty gap (95% CI)	F-value$
Sex of the household head	Male	7.6 (6.7,8.5)	0	8.1 (7.3,9.0)	1	2.0 (1.7,2.3)	0	1.3 (1.1,1.5)	0
	Female	7.1 (5.7,8.8)		6.6 (4.7,9.3)		1.8 (1.3,2.2)		1.0 (0.5,1.5)	
Age of the household head	< 50 years	5.8 (4.5,7.5)	6*	8.0 (6.8,9.4)	0	1.4 (0.9,1.9)	16*	1.3 (1.0,1.6)	3
	>=50 years	7.9 (7.1,8.8)		8.0 (6.8,9.5)		2.1 (1.8,2.4)		1.3 (1.0,1.6)	
Fifty plus aged elderly	No elderly	5.0 (3.5,7.1)	6*	8.3 (7.0,9.7)	1	1.2 (0.7,1.6)	9*	1.3 (1.0,1.6)	1
	One elderly	6.9 (5.9,8.0)		7.2 (6.1,8.5)		1.8 (1.4,2.2)		1.2 (0.9,1.5)	
	2+ Elderly	8.2 (7.2,9.3)		8.6 (7.1,10.4)		2.2 (1.8,2.5)		1.4 (1.0,1.7)	
Member aged ≤5 years	No child	7.2 (6.4,8.0)	3	6.9 (6.0,7.9)	7*	2.0 (1.7,2.2)	1	1.3 (0.9,1.6)	5*
	1+ child	8.9 (7.0,11.2)		9.0 (7.8,10.3)		2.0 (1.2,2.7)		1.3 (1.1,1.6)	
Household size	1	7.4 (6.1,9.0)	0	4.7 (2.3,9.4)	1	2.3 (1.7,3.0)	1	1.1 (0.3,1.9)	1
	2-3	7.5 (6.6,8.4)		9.0 (6.9,11.7)		2.1 (1.8,2.4)		1.6 (0.9,2.3)	
	4+	7.4 (6.0,9.2)		7.9 (7.2,8.8)		1.8 (1.3,2.2)		1.3 (1.1,1.5)	
Household head Education status	No education	9.6 (8.2,11.2)	13*	9.7 (8.3,11.3)	5*	2.9 (2.2,3.6)	12*	1.7 (1.3,2.1)	19*
	Primary	8.8 (7.8,10.1)		8.6 (7.0,10.5)		2.3 (1.8,2.7)		1.4 (1.0,1.9)	
	Secondary	6.1 (5.1,7.4)		6.9 (5.4,8.7)		1.5 (1.2,1.8)		1.0 (0.7,1.3)	
	College +	2.1 (1.1,4.3)		3.3 (1.9,5.8)		0.5 (0.1,0.9)		0.4 (0.1,0.6)	
Wealth quintile	Poorest	9.9 (8.1,12.0)	11*	11 (9.3,13.0)	9*	2.7 (2.1,3.2)	16*	2.1 (1.5,2.6)	30*
	Poorer	9.8 (8.3,11.6)		8.7(6.8,11.0)		2.8 (2.2,3.4)		1.4 (1.0,1.8)	
	Middle	7.5 (6.3,9.0)		9.1 (7.2,11.5)		2.1 (1.7,2.5)		1.5 (0.9,2.1)	
	Wealthier	6.1 (4.6,8.0)		8.0 (6.2,10.1)		1.4 (1.0,1.9)		1.0 (0.7,1.4)	
	Wealthiest	3.9 (2.9,5.2)		3.2 (2.2,4.8)		0.8 (0.6,1.0)		0.4 (0.2,0.6)	
Health insurance	No member	6.4 (5.2,7.8)	2	8.3 (7.6,9.2)	17*	1.7 (1.2,2.1)	0	1.3 (1.1,1.5)	15*
	Any member	7.5 (6.7,8.5)		2.7 (1.5,4.8)		2.0 (1.7,2.2)		0.4 (0.1,0.8)	
Place of residence	Urban	5.6 (4.4,7.0)	17*	5.7 (4.3,7.6)	8*	1.2 (0.9,1.5)	13*	1.0 (0.6,1.5)	49*
	Rural	9.3 (8.3,10.4)		8.8 (7.9,9.8)		2.7 (2.3,3.1)		1.4 (1.2,1.6)	
Inpatient care received	No	6.4 (5.7,7.3)	53*	7.6 (6.8,8.5)	7*	1.6 (1.3,1.8)	78*	1.2 (1.0,1.4)	12*
	Yes	12.3 (10.4,14.4)		10.5(8.5,13.0)		3.8 (3.0,4.7)		1.9 (1.3,2.5)	
Outpatient care received	No	7.1 (6.1,8.2)	1	7.7 (6.6,9.0)	0	1.8 (1.5,2.1)	1	1.4 (1.0,1.7)	1
	Yes	7.9 (6.8,9.1)		8.2 (7.3,9.3)		2.1 (1.8,2.5)		1.2 (1.0,1.5)	
Total		7.4(6.7,8.3)		8.0 (7.3,8.8)		2.0 (1.7,2.2)		1.3 (1.1,1.5)	

*Note:- * p≤0.05; @Survey design based F-statistics; $Two-way Anova F-value; 95% CI given in parenthesis*

Table 4. Odds of becoming poor due to out-of-pocket health payments by selected household characteristics: China and India

		China	*India*
Sex of the household head	Male®		
	Female	1.04(0.82,1.32)	1.04(0.77,1.40)
Age of the household head	< 50 years®		
	>=50 years	1.16(0.86,1.57)	1.23(0.93,1.62)
Fifty plus aged elderly$^{\alpha}$	No elderly®		
	One elderly	1.46(0.92,2.32)	0.85(0.66,1.11)
	2+ Elderly	1.51(0.89,2.55)	0.88(0.63,1.21)
Child age=<5 years	No child®		
	1+ child	1.13(0.85,1.5)	1.30*(1.1,1.54)
Household size$^{€}$	1®		
	2-3	1.17(0.88,1.55)	1.56(0.81,3.01)
	4+	1.25(0.9,1.72)	1.34(0.69,2.61)
Household head Education status	No education®		
	Primary	1.10(0.87,1.4)	0.98(0.80,1.21)
	Secondary	0.81(0.61,1.08)	0.85(0.66,1.08)
	College +	0.42*(0.24,0.73)	0.69(0.42,1.13)
Wealth quintile	Poorest®		
	Poor	0.86(0.66,1.11)	0.81(0.64,1.03)
	Middle	0.69*(0.51,0.94)	0.78*(0.63,0.98)
	Wealthier	0.51*(0.35,0.75)	0.61*(0.47,0.79)
	Wealthiest	0.37*(0.27,0.52)	0.19*(0.13,0.28)
Health insurance member	No member®		
	Any member	0.98(0.72,1.32)	0.47*(0.28,0.80)
Place of residence	Urban®		
	Rural	1.02(0.77,1.34)	2.01*(1.55,2.61)
Inpatient care received	No®		
	yes	2.19*(1.86,2.58)	1.77*(1.46,2.16)
Outpatient care received	No®		
	yes	1.30*(1.05,1.60)	1.22*(1.02,1.46)
Constant		0.05*(0.03,0.09)	0.04*(0.02,0.08)

*. Note:- * p≤0.05; 95% CI given in parenthesis*

Appendix 1. Definitions and Equations

All the definitions and expressions below are as per Xu (2005).

Household's capacity to pay:

$$Household's\ capacity\ to\ pay\ (ctp_i)\ = exp_i - se_i\ if\ se_i \leq food_i \qquad (1)$$

$$Household's\ capacity\ to\ pay\ (ctp_i) = exp_i - food_i\ if\ se_i > food_i$$

where, exp_i, se_i and $food_i$ are total expenditure, subsistence expenditure and food expenditure of ith the household, respectively.

Household subsistence expenditure:

$$Subsistence\ expenditure\ (se_i) = pl * eqsize_i \qquad (2)$$

where, pl and $eqsize_i$ are poverty line and equivalent household size (of the ith household).

Poverty line:

$$Poverty\ line(pl) = \frac{\sum w_i * eqfood_i}{\sum w_i} \qquad (3)$$

where $food_{45} <$ foodexp$_h <$ food$_{55}$; and,

$$equivalent\ food\ expenditure\ (eqfood_i) = \frac{food_i}{eqsize_i} \qquad (4)$$

where, $food_i$ is i^{th} household food expenditure and $eqsize_i$ is the equivalent household size.

Poverty head count and poverty head count ratio:

$$Poverty\ head\ count\ (Impoor_i)\ = 1\ if\ exp_i \geq se_i\ and\ (exp_i - OOPHE_i) < se_i \qquad (5)$$

'0' otherwise; where, exp_i is the total expenditure of the ith household; and,

$$Poverty\ head\ count\ ratio\ (HCR) = \frac{\sum_{i=1}^{N} Impoor_i}{N} \qquad (6)$$

The poverty gap for the ith household can be defined as:

$$Poverty\ gap_i = Impoor_i * \{se_i - (exp_i - OOPHE_i)\}/se_i \qquad (7)$$

and,

$$Poverty\ gap\ ratio\ (PGR) = \frac{1}{N}\sum_{i=1}^{N} Poverty\ gap_i \qquad (8)$$