Borrowing for hospitalization in India

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Abstract:

Borrowing to cover hospital costs is a major concern in developing countries, like India, as it may push households into despairs of poverty and indebtedness. The present study examines factors that lead to borrowing for hospitalization in case of Indian households. For this purpose, we use sample selection model. The analysis points out vulnerability of households from deprived sections of society and uneducated households, as they are more likely to borrow. Moreover, higher availability of public hospitals lowers probability of borrowing in rural areas. Thus, increasing coverage of public hospitals in rural areas might prove to be helpful.

Keywords: Hospital costs, Borrowing, Sample Selection Model.
JEL Code(s): I18, I19

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1. Introduction:

Studies on strategies adopted by households to cope with large out-of-pocket (OOP) health expenditure provide important insights to policy makers. OOP expenditure may lead to impoverishment and financial catastrophe (Wagstaff and van Doorslaer, 2003, O'Donnell *et al.*, 2005, Cavagnero *et al.*, 2006 and Garg and Karan, 2009). To cope with the economic burden of health shock households have to depend on sources of finance, such as borrowing and selling assets, in addition to income as income is often inadequate (Sauerborn *et al.*, 1996, Kabir *et al.*, 2000, and Russell, 2005). Studies examining sources of financing health expenditure throw light on adverse effects of heavy reliance on these sources (Kabir *et al.*, 2000, Krishna, 2004, van Damme *et al.* 2004, Krishna, 2006, and Russell and Gilson 2006). Against this backdrop, in the present paper, we concentrate on borrowing and examine factors that lead households to borrow for in-patient health care costs.

In India, OOP health expenditure constitutes around 70 percent of total health expenditure in the country (Government of India (GoI), 2005a and 2005b). As a result, in the event of health shock, most of the economic burden of health costs is on households. dependence on borrowing to finance OOP health expenditure, particularly hospital costs, is quite high. For instance, the NSS survey on 'Health Care and Morbidity' reveals that Indian households, on an average, financed 34 and 21 per cent of total hospitalization costs in rural and urban areas, respectively, through borrowing in the year 2004 (GoI, 2006). Coping strategies, such as borrowing, are helpful to smooth present consumption when there is unexpected expenditure on health care. High level of dependence on borrowing is likely to have impact on household's future consumption (Narayan and Petesch, 2002, van Damme *et al.*, 2004, Krishna, 2004, Krishna, 2006, and Russell and Gilson, 2006) and thus, requires attention from policy makers.

In this context, the present paper examines factors which increase dependence of Indian households on borrowing to finance hospital costs. In India, public sector plays major role in providing health care, especially free heath care to poor (GoI, 2002 and 2008). Free public sector health care facilities may act as an instrument to reduce poor

household's dependence on coping strategies such as borrowing to finance health care expenditure[1]. For instance, Vaishnavi and Dash (2009) shows that about 60 percent of households using private inpatient services faced financial catastrophe due to health care expenditure in year 2004 and suggests greater use of public health care facilities as possible solution to the problem. Against this backdrop, we are interested in finding whether public hospitals provide financial protection to Indian households, in the sense of reducing household's dependence on borrowing. We follow the studies like, Flores *et al.* (2008), Bonu *et al.* (2005), and Lieve and Xu (2008) and examine determinants of borrowing for hospitalization for India after correcting for sample selection bias which arises because the sample is restricted to only those households having some hospitalized member. We carry out the analysis for rural and urban of 15 major Indian states and compare the results. Our study is closely related to above three studies and differs from them in the following important ways:

- We correct for the selection bias which arises because the sample is restricted to only those households having at least one hospitalization case. Literature ignores the presence of such selection bias.
- We include supply side factors such as availability of public hospitals at state level to examine their impact on probability of borrowing.
- We examine effect of socio-economic characteristics of household on probability of borrowing for hospitalization.
- We separately estimate probability of borrowing for rural and urban sectors. This is important as different factors might prove to be important in different settings. These differences are ignored by previous studies.

The rest of the paper is organized as follows. Section 2 describes data source and variables. Section 3 provides descriptive statistics. Section 4 explains methodology to estimate probability of borrowing. Section 5 discusses empirical findings. Finally, section 6 concludes.

[1] It may be noted that provision of public health care facilities has not done with explicit objective of reducing OOP health expenditure. Without trying to evaluate government policy, in the present paper we examine implications of public health care provision for financing OOP health expenditure

2. Data and Variables:

The primary data source for our study is the NSSO survey on 'Morbidity and Health Care' in the 60th round (January-June, 2004) [2]. This survey covers 47,302 rural households and 26,566 urban households. A stratified multi-stage sampling strategy has been adopted for this survey. We exclude small proportion of households[3] with health insurance to avoid endogeneity problem. The data set provides information on presence of ailing member in the household with 15 days reference period. Moreover, it gives information regarding every hospitalization case that household experiences in a reference period of 365 days.

Dependent Variables:

We analyze determinants of probability of borrowing for hospitalization after correcting for the sample selection bias. In this model, the first stage dependent variable is whether there is at least one hospitalization case experienced by household and the second stage dependent variable is whether household finances hospital costs through borrowing.

The data set provides detailed information for every hospitalization case with a reference period of 365 days. We use this information to formulate the dependent variable at the first step, i.e., whether any member of the household was hospitalized during the last 365 days.

The survey collects information on sources of financing these inpatient costs at household level aggregating over all hospitalization cases experienced by the household. Since sources of financing each hospital case is not available separately, the analysis of the present chapter is carried out at household level and not at each ailment level[4]. The sources of financing are divided into four broad categories, namely, income/savings, borrowing (commercial), contributions from friends and relatives and other sources such as selling assets. This information is used to construct the second stage dependent

[2] For detailed information on survey techniques and variable definitions refer to GoI (2006).
[3] As per NSSO 60th round survey on 'Morbidity and Health Care', in rural India, less than one percent of the households have at least one member with health insurance and in urban India, 4.7 percent of the households have at least one insured member.
[4] Since information regarding source of finance is at household level, we also have to define new variables at household level from the each ailment specific variables. The definitions of various variables are given in Table 1.

variable, namely, whether borrowing has been used as a source of financing hospital costs.

Explanatory Variables:

In the present paper, as a primary objective, we examine the effect of public hospitals on probability of borrowing. As a secondary interest, we analyze how probability of borrowing varies with social and economics characteristics of household and characteristics of hospitalized person. So, explanatory variables include economic variables, hospitalization case specific variables, demographic variables, characteristics of household head, environmental risk factors and supply side variables. The NSS data set provides information on all variables, except for supply side factors. The source of information for these variables is reported below.

Economic Variables:

Economic status of household affects its decision to borrow. We include consumption quintile class and land holding classes to control for economic status. Secondly, the magnitude of hospital costs determines whether household borrows for hospitalization. It may be noted that absolute value of hospital costs may not be sufficient to capture effect of costs on borrowing. Household is likely to borrow only if it is difficult to finance hospital costs through income or savings. Thus, we include ratio of hospital costs to total expenditure in multivariate analysis as one of the explanatory variables[5]. Presence of more than one earning members helps in diversifying risk and it is included in regression analysis as control.

Hospitalization Case Specific Variables:

Hospitalization case specific variables are important to understand household's dependence on borrowing and intra-household differences. The information on each hospitalization case consists of duration of stay at hospital, whether person is admitted in a public hospital, age of the person hospitalized, whether head of household is hospitalized and total number of hospitalization cases experienced by the household in reference period. We include all these variables as explanatory variables in the analysis.

[5] The NSSO data provides information on household's monthly consumption expenditure. From this information, we calculated annual household consumption as MCE*(365/30). Flores *et al.* (2008) also uses similar method to calculate annual household consumption expenditure.

Household Characterisitcs:

Household's demographic characteristics influence likelihood of getting ill, which in turn affect probability of hospitalization and borrowing. To capture this fact, we include demographic characteristics, namely, household size, and number of children and elderly persons in the household. In Indian context, social status of household is also likely to affect household ability to access health care and ability to borrow. Thus, these variables are also included in the model.

Characteristics of Household Head:

Head of the household is usually responsible for taking the major decisions like getting medical care and borrowing. As a result, it is important to account for the characteristics of the head of the household. We include education and gender of head as explanatory variables. Moreover, we also include a dummy variable if head is a regular wage earner in the model. Regular wage will show some amount of financial stability and thus may reduce the dependence on borrowing.

Environmental Characteristics:

Environmental factors affect probability of getting ill and thus probability of hospitalization. We include the dummy variables for the presence of pucca house, good drainage facilities and sanitary toilets. Moreover, they may also serve as indicators of household's wealth. Thus, these factors are likely to affect probability of hospitalization and borrowing.

Supply-side Factors:

Apart from the demand side factors, probability of borrowing also depends on supply-side factors, such as, availability of public hospitals, and share of government expenditure in total health expenditure. These two factors are likely to reduce financial burden of health shock on households and thus, negatively affect the probability of borrowing[6]. Thus, we include these two variables at state level. Information on availability of public hospitals is collected from www.indiastat.com[7]. The information relates to years 2004-06, with different reference year for each of the states. Data on

[6] For instance, Xu *et al.* (2003) shows that the lower share of government in total health expenditure of a country is associated with incidence of catastrophic health expenditure by households, indicating higher financial burden on households.

[7] While considering supply-side factors we exclude Assam and Bihar from analysis of urban sector due to non-availability of information on public hospitals for these states.

population in rural and urban areas of each state is taken from the Census of India, 2001 and that on share of government expenditure (for year 2001-02) is taken from the National Health Accounts (GoI, 2005b). Even though the periods of reference for supply side factors do not confirm with the NSS survey period, we perceive them to be a good proxy and provide needed information as the periods are in close proximity.

3. Descriptive Statistics:

It may be noted that decision to finance hospitalization costs through borrowing is observed only for those households who experience at least one hospitalization case. It is possible that certain household characteristics such as income or education of head might affect both probability of hospitalization and probability of borrowing. In the case of developing countries like India, poor households are unable to get health care services due to financial reasons. For instance, in the year 2004, 28 and 20 percent of total untreated ailment was due to financial problems in rural and urban India, respectively (GoI, 2006). In such a scenario, we expect to find systematic variations in incidence of hospitalization across income groups. Moreover, awareness about illness and health care facilities is also likely to affect decision to get treatment. These hypotheses are confirmed when we analyze the findings of Table 2.

Table 2 shows percentage of households experiencing at least one hospitalization case across consumption quintile groups and education of the head of household. It can be observed that percentage of households with at least one hospitalized member increase with consumption quintile groups in both rural and urban areas. Similarly, incidence of hospitalization also increases with education level of the head of the household. As a result, when we consider only hospitalized households, it is likely that sub-sample is not randomly selected. In order to correct for this bias, we use Heckman's sample selection model which is described in the next section.

The focus of the present study is to analyze determinants of borrowing for hospitalization. Hospitalization is generally associated with large costs and distribution of hospital costs varies across consumption quintile groups. Figure 1 and Figure 2 provide box plot diagrams for hospital costs across consumption quintile groups in rural

and urban areas[8]. It may be observed that distribution of hospital costs is highly skewed with only small proportion of households spending large sums on hospitalization. At the same time, median level of expenditure on hospitalization increases with consumption quintile groups in both rural and urban areas. However, it is important to note that even though households from higher income groups spend larger on hospitalization, they are likely to afford these costs and thus less likely to get adversely affected.

Analysis of proportion of households borrowing for hospitalization shows that dependence on borrowing changes considerably across income groups and education levels (Table 3). Education of the head of household reduces incidence of borrowing as only 23 percent of households borrowed with the head educated above primary level as opposed to 44 percent with illiterate head in urban areas. Table 3 also points out the differences in household's borrowing across rural and urban sectors. As a result, it is expected that the determinants of borrowing differ across sectors. To capture this fact, we carry out the regression analysis for rural and urban sectors separately.

The observations of this section show that household's economic condition and educational background affect both probability of hospitalization and probability of borrowing. Thus, we carry out the multivariate analysis using the sample selection model. Econometric methodology used for this purpose is described in the next section.

4. Econometric Specification:

Decision to finance hospitalization costs through borrowing is observed only for those households who experience at least one hospitalization case. As we have seen in the previous section, certain household characteristics such as income or education of head possibly affect both probability of hospitalization and probability of borrowing. This may lead to sample selection bias. If we ignore this sample selection bias then estimated coefficients will over- or under-estimate the effect of explanatory variables. In order to correct for selection bias, we use Heckman's sample selection model (see Heckman (1976, 1979) and Greene (2003) for details). Here, initially we estimate the

[8] While plotting these figures 39 and 81 outlier observations are ignored for rural and urban areas respectively.

probability of hospitalization using probit model, where the underlying latent function is given by;

$$y_{1i}^{*} = \delta + \gamma_1 EconomicVariables_i + \gamma_2 HouseholdCharacteristics_i + \gamma_3 HouseholdHeadCharacteristics_i + \gamma_5 \text{Re}\, gionalCharacteristics_i + \eta_i$$

After estimating this selection model, probability of borrowing is estimated using the probit model, where the latent function underlying household's decision is given by,

$$y_{2i}^{*} = \alpha + \beta_1 EconomicVariables_i + \beta_2 HospitalCaseCharacteristics_i + \beta_3 DemographicVariables_i + \beta_4 HouseholdHeadCharacteristics_i + \beta_5 \text{Re}\, gionalCharacteristics_i + \varepsilon_i$$

And, the probability of borrowing may be written as:

$$\begin{aligned} \Pr(y_{2i} = 1) &= \Pr(\varepsilon_i < x_i\beta \mid x_i) \\ &= \Phi(x_i\beta) \end{aligned}$$

In the above equation, y_i shows whether the i[th] household borrows to finance hospital costs, $\Phi(.)$ is the normal distribution function, x_i is the vector of explanatory variables described in the latent equation[9] and β is the vector of coefficients and ε_i is a random disturbance term. Here, β consists of α, β_1, β_2, β_3, β_4, and β_5.

5. Empirical Findings:

The results of the sample selection model confirm that the probability of hospitalization and probability of borrowing are not independent decisions. Probability of hospitalization and probability of borrowing are negatively associated with correlation coefficient -0.577 and -0.496 for rural and urban sectors, respectively (Table 5)[10]. This

[9] Detailed description of explanatory variables is provided in Section 2 and in Table 1.

[10] Table 4 and Table 5 depict the results with state level dummy variables. Table 6 and Table 7 present results with state level supply side factors, namely, availability of public hospitals, and share of government

finding shows that ignoring non-random selection of sample biases the coefficients and it is important to correct for sample selection.

Findings of the selection model clearly point out the importance of public hospitals in rural areas. We find that if the household resides in a state where availability of public hospitals is lower then the household has higher probability of hospitalization and lower probability of borrowing to finance hospital costs (Table 6 and Table 7). This result suggests that increasing the coverage of public hospitals may reduce financial burden of illness on households and thus lower their dependence on borrowing. However, availability of public hospitals does not affect probability of borrowing in the urban sector.

Apart from the availability of public hospitals, some household characteristics also influence probability of borrowing for hospitalization. For instance, we find that if the household belongs to deprived sections of society, i.e. SC, ST and OBC, then the dependence on borrowing is significantly higher than the others in urban India (Table 5 and Table 7). So there is a need to protect vulnerable sections of the society from high hospital costs which may result in indebtedness.

As expected, economic status of household as well as demographic characteristics influence its decision to borrow for hospitalization. An interesting finding of the multivariate analysis is that probability of borrowing is higher if younger members of the household are hospitalized than elderly members. Flores, *et al.* (2008) and Kabir, *et al.* (2000) report similar observations for India and Bangladesh respectively. This finding may suggest that household is ready to borrow and adopt riskier strategies of financing for child's hospitalization rather than for an old member's hospitalization.

6. Conclusion:

The main finding of the present study is that the availability of public hospitals reduces the probability of borrowing in the rural India. Thus, increasing coverage of public hospitals in rural sector may reduce households' dependence on borrowing to finance hospital costs. Moreover, we find that the households from socially deprived

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expenditure in total health expenditure. Due to unavailability of data on number of hospitals in urban areas of Assam and Bihar, we include only 13 states (for urban India) while considering supply side factors.

sections of society are more likely to borrow for hospitalization. Thus, financial protection must be given to these households against the health risk. Additionally, there are intra-household differences and households are less likely to use riskier strategies such as borrowing when elderly member is hospitalized. In such cases, it is likely that health care is forgone when income is not sufficient. Thus, there is a need to provide financial protection against health shock to senior citizens.

Limitations of the analysis may be kept in mind while interpreting the results of the present paper. Firstly, household may borrow to finance their consumption expenditure after hospitalization. This fact is not captured in our data set and thus adverse impact of hospitalization on households in terms of borrowing is likely to be underreported. Secondly, it is possible that health shock occurs simultaneously with some other idiosyncratic shocks. In such as situation, household's decision regarding borrowing depends on aggregate effect of such shocks. Our analysis ignores presence of shocks other than health shocks.

Nonetheless, our study provides some guidelines for future policy. Findings of the study show that public hospitals may prove to be an important instrument for reducing borrowing in rural India. Thus, there is a need to increase the coverage of public hospitals in rural sector. Moreover, since large proportion of households are dependent on borrowing to finance hospital costs, other instruments such as medical insurance are also needed to reduce this dependence on borrowing.

Table 1: Definitions of Explanatory Variables

Variables	Variable Definition
Economic Variables	
Consumption1-Consumption5	Five per capita consumption quintiles Base category = Consumption1
Healthexp1-Healthexp5	Five health expenditure (hospitalization costs as a proportion of household consumption) quintiles Base category = Healthexp1
Marginal Farmer (Base Category)	= 1 if the land possessed by household is less than 0.01 hectares
Small Farmer	= 1 if the land possessed by household is between 0.02 and 0.4 hectares
Medium Farmer	= 1 if the land possessed by household is between 0.41 and 1.0 hectares
Large Farmer	= 1 if the land possessed by household is more than 1.1 hectares
Many_Earners	= 1 if more than one household members are earning some type of income; = 0 otherwise
Characteristics of Hospitalization Cases	
Duration	Average number of days hospitalized
Public Hospital	= 1 if household member has been admitted to public hospital at least in one hospitalization case; = 0 otherwise
Number of Hospitalization Cases	Total number of hospitalization cases in the household during last 365 days
Head of Household	= 1 if head of the household has been hospitalized in at least one of the hospitalization cases; = 0 otherwise
Age <10 (Base Category)	= 1 if the average age of hospitalized household members is below 10 years; = 0 otherwise
Age 10-25	= 1 if the average age of hospitalized household members is above 10 years and below 25 years of age; = 0 otherwise
Age 25-45	= 1 if the average age of hospitalized household members is above 25 years and below 45 years of age; = 0 otherwise
Age 45-65	= 1 if the average age of hospitalized household members is above 45 years and below 65 years of age; = 0 otherwise
Age >65	= 1 if the average age of hospitalized household members is above 65 years of age; = 0 otherwise
Household Characteristics	
General (Base Category)	= 1 if household belongs to the general class; = 0 otherwise
Scheduled Castes	= 1 if household belongs to scheduled castes; = 0 otherwise
Scheduled Tribes	= 1 if household belongs to scheduled tribes; = 0 otherwise
Other Backward Classes	= 1 if household belongs to other backward classes; = 0 otherwise
Household Size	Total number of household members
Number of Elderly Members	Total number of elderly members in the household
Number of Children	Total number of children in the household
Ailing Person	= 1 if household has at least one ailing member in 15 days reference period; = 0 otherwise

Table 1: Definitions of Explanatory Variables (Contd.)

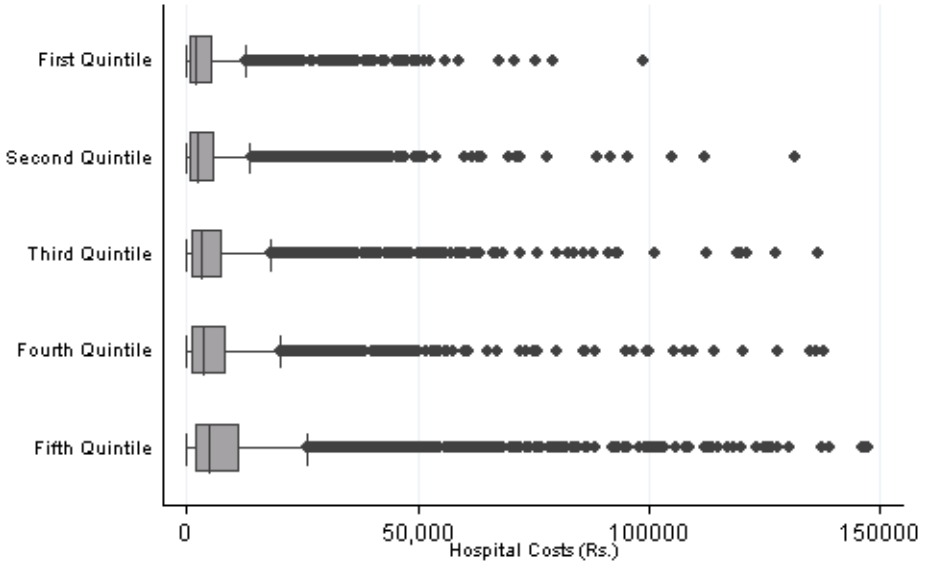
Characteristics of Head of the Household	
Illiterate	= 1 if head of the household is illiterate;
(Base Category)	= 0 otherwise
Literate	= 1 if head of the household is literate;
	= 0 otherwise
Primary	= 1 if head of the household has completed primary education;
	= 0 otherwise
Post-primary	= 1 if head of the household has completed post-primary education;
	= 0 otherwise
Regular Wage	= 1 if head of the household is regular wage earner;
Earner	= 0 otherwise
Gender (Male)	= 1 if head of the household is male;
	= 0 otherwise
Environmental Characteristics	
Pucca House	= 1 if structure of house is pucca; = 0 otherwise
Safe Drainage	= 1 if house has a safe drainage system; = 0 otherwise
Sanitary Toilet	= 1 if house has a sanitary toilet; = 0 otherwise
State Characteristics	
Population per Public Hospital	Population per public hospital in state
Public Exp Share	Share of public expenditure in total health expenditure in state
Avg. Popn per Branch	Average population covered by per bank branch in state
Road Length	Road length (in kilometre) per 100 square kilometre

Table 2: Households Experiencing At least One Hospitalization Case across Consumption Quintile Groups and Education Level

	Percentage Hospitalized		***Percentage Hospitalized (Weighted)***	
Consumption Quintile Group	***Rural***	***Urban***	***Rural***	***Urban***
Poorest	35.24	37.10	7.97	12.26
2	35.02	38.99	8.55	13.43
3	37.83	40.19	10.07	14.05
4	38.89	37.87	11.65	11.68
Richest	42.14	40.80	14.87	12.62
Education Level	***Rural***	***Urban***	***Rural***	***Urban***
Illiterate	33.65	34.64	8.50	11.67
Literate	39.92	38.75	11.48	13.04
Primary	40.95	41.77	12.86	14.78
Above Primary	42.57	39.95	12.78	12.52

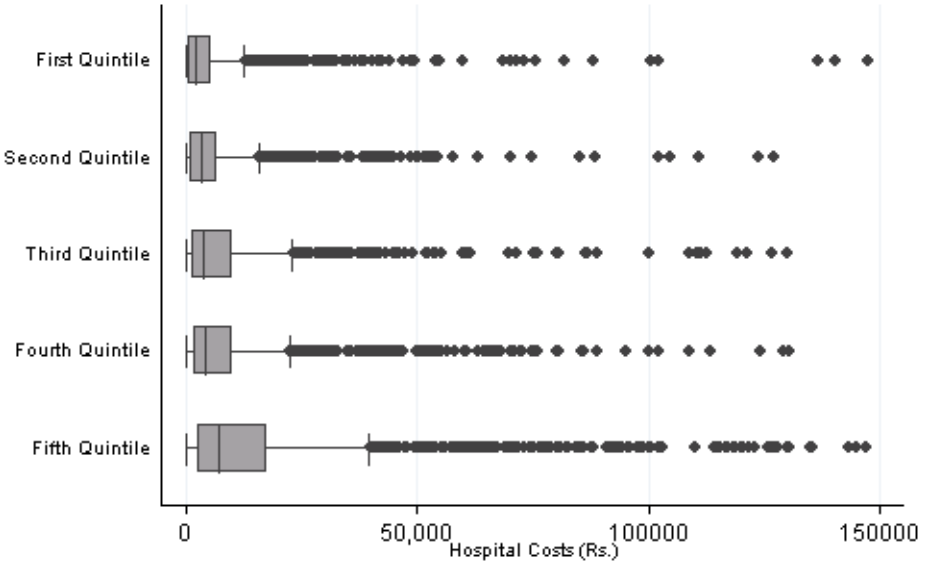
Source: NSSO survey on Health Care and Morbidity (60^{th} Round) and Author's Calculations
Note: Data is for 15 major states of India.

Figure 1: Hospitalisation Costs across Consumption Groups (Rural)



Source: NSSO survey on Morbidity and Health Care (60th Round)

Figure 2: Hospitalisation Costs across Consumption Groups (Urban)



Source: NSSO survey on Morbidity and Health Care (60th Round)

Table 3: Percentage of Households Borrowing to Finance Hospital Costs across Consumption Quintile Groups and Education Level

	Percentage Borrowed		*Percentage Borrowed (Weighted)*	
Consumption Quintile Group	***Rural***	***Urban***	***Rural***	***Urban***
Poorest	53.73	42.20	55.07	42.67
2	51.55	37.84	52.25	42.23
3	50.82	34.67	53.30	35.96
4	48.51	23.40	50.07	25.27
Richest	39.96	17.51	39.93	16.13
Education Level	***Rural***	***Urban***	***Rural***	***Urban***
Illiterate	55.25	42.93	55.14	44.17
Literate	49.50	35.23	50.58	40.90
Primary	46.31	37.70	47.98	39.23
Above Primary	39.71	23.54	40.96	22.82

Source: NSSO survey on Health Care and Morbidity (60th Round) and Author's Calculations
Note: Data is for 15 major states of India.

Table 4: Determinants of Probability of Hospitalization

Variables	**Rural**		**Urban**	
	Marginal Effects	**p-value**	**Marginal Effects**	**p-value**
Economic Variables				
Consumption2	0.010	0.030	0.012	0.151
Consumption3	0.020	0.000	0.022	0.008
Consumption4	0.031	0.000	0.012	0.159
Consumption5	0.046	0.000	0.023	0.010
Small Farmer	-0.002	0.564	…	…
Medium Farmer	0.002	0.673	…	…
Large Farmer	0.004	0.300	…	…
Household Characteristics				
Scheduled Castes	0.004	0.387	0.018	0.022
Scheduled Tribes	-0.019	0.000	0.012	0.451
Other Backward Classes	0.001	0.767	0.009	0.151
Household Size	0.010	0.000	0.016	0.000
No. of Elderly Members	0.021	0.000	0.032	0.000
No. of Children	0.003	0.054	0.003	0.398
Ailing Person	0.057	0.000	0.085	0.000
Characteristics of Head of the Household				
Literate	0.008	0.086	4.9E-04	0.961
Primary	0.011	0.014	0.022	0.020
Post-primary	0.011	0.007	0.007	0.315
Gender (Male)	0.017	0.000	0.003	0.701
Environmental Characteristics				
Pucca House	0.004	0.171	0.004	0.538
Safe Drainage	0.004	0.565	0.002	0.751
Sanitary Toilet	0.012	0.003	0.004	0.580

Note: State dummies are included in the regression analysis.
Constant was included while estimating above probit model.

Table 5: Determinants of Probability of Borrowing for Hospitalization Costs

Variables	Rural		Urban	
	Marginal Effects	p-value	Marginal Effects	p-value
Economic Variables				
Consumption2	-0.013	0.366	0.027	0.326
Consumption3	0.004	0.805	-0.033	0.214
Consumption4	-0.020	0.243	-0.113	0.000
Consumption5	-0.059	0.001	-0.202	0.000
Healthexp2	0.120	0.000	0.260	0.000
Healthexp3	0.186	0.000	0.374	0.000
Healthexp4	0.249	0.000	0.476	0.000
Healthexp5	0.304	0.000	0.614	0.000
Small Farmer	0.008	0.483	…	…
Medium Farmer	-0.050	0.003	…	…
Large Farmer	-0.081	0.000	…	…
Many_Earners	0.026	0.019	-0.010	0.601
Characteristics of Hospitalization Cases				
Duration	0.001	0.024	-9.1E-05	0.904
Public Hospital	-0.004	0.671	0.055	0.007
No of Hospital Cases	0.033	0.002	0.013	0.350
Head of Household	-0.016	0.135	0.012	0.594
Age 10-25	0.010	0.490	-0.001	0.976
Age 25-45	0.009	0.517	-0.030	0.308
Age 45-65	-0.024	0.129	-0.131	0.000
Age >65	-0.065	0.006	-0.201	0.000
Household Characteristics				
Scheduled Castes	0.026	0.054	0.084	0.002
Scheduled Tribes	0.001	0.978	0.134	0.018
Other Backward Classes	0.000	0.974	0.041	0.058
Household Size	-0.004	0.044	-0.020	0.000
No. of Elderly Members	-0.041	0.000	-0.055	0.001
Number of Children	-0.013	0.012	-0.003	0.809
Characteristics of Head of the Household				
Literate	-0.029	0.043	-0.009	0.795
Primary	-0.046	0.003	-0.032	0.275
Post-primary	-0.080	0.000	-0.149	0.000
Regular Wage Earner	-0.035	0.085	0.024	0.226
Gender (Male)	0.055	0.013	0.046	0.138
Environmental Characteristics				
Pucca House	-0.056	0.000	-0.086	0.001
Safe Drainage	-0.053	0.011	-0.043	0.029
Sanitary Toilet	-0.059	0.000	-0.061	0.014
Number of Observations	36975		19498	
No. of Uncensored Obsn	13872		7406	
ρ	-0.577		-0.496	
Chi-sq	26.74		18.51	
Prob> Chi-sq	0.000		0.000	

Note: State dummies are included in the regression analysis.
Constant was included while estimating above probit model.

Table 6: Determinants of Probability of Hospitalization (with Supply Side Factors)

Variables	Rural		Urban	
	Marginal Effects	p-value	Marginal Effects	p-value
Economic Variables				
Consumption2	0.009	0.047	0.015	0.063
Consumption3	0.020	0.000	0.027	0.001
Consumption4	0.033	0.000	0.018	0.023
Consumption5	0.051	0.000	0.030	0.001
Small Farmer	-0.006	0.107		
Medium Farmer	-0.008	0.053		
Large Farmer	-0.002	0.689		
Household Characteristics				
Scheduled Castes	0.010	0.009	0.017	0.058
Scheduled Tribes	-0.013	0.019	0.019	0.240
Other Backward Classes	0.012	0.000	0.010	0.102
Household Size	0.009	0.000	0.016	0.000
No. of Elderly Members	0.024	0.000	0.033	0.000
Number of Children	0.003	0.141	0.003	0.490
Ailing Person	0.057	0.000	0.087	0.000
Characteristics of Head of the Household				
Literate	0.009	0.069	0.004	0.628
Primary	0.013	0.004	0.030	0.002
Post-primary	0.012	0.003	0.011	0.120
Gender (Male)	0.015	0.002	1.2E-04	0.977
Environmental Characteristics				
Pucca House	0.013	0.000	0.002	0.788
Safe Drainage	0.004	0.495	0.003	0.638
Sanitary Toilet	0.010	0.005	-4.2E-05	0.846
State Characteristics				
Popn per Pub Hospital	-1.3E-07	0.000	9.3E-08	0.012
Road Length	3.1E-04	0.000	3.3E-04	0.000

Note: For urban sector, we exclude Assam and Bihar as information on hospitals was not available for these states. Constant was included while estimating above probit model.

Table 7: Determinants of Probability of Borrowing for Hospitalization Costs (with Supply Side Factors)

Variables	Rural		Urban	
	Marginal Effects	p-value	Marginal Effects	p-value
Economic Variables				
Consumption2	-0.014	0.313	0.034	0.204
Consumption3	0.002	0.909	-0.023	0.374
Consumption4	-0.018	0.237	-0.100	0.001
Consumption5	-0.060	0.000	-0.186	0.000
Healthexp2	0.113	0.000	0.230	0.000
Healthexp3	0.175	0.000	0.322	0.000
Healthexp4	0.233	0.000	0.413	0.000
Healthexp5	0.284	0.000	0.531	0.000
Small Farmer	0.009	0.379	…	…
Medium Farmer	-0.042	0.001	…	…
Large Farmer	-0.074	0.000	…	…
Many_Earners	0.028	0.002	-0.003	0.884
Characteristics of Hospitalization Cases				
Duration	0.001	0.005	4.9E-05	0.943
Public Hospital	-0.005	0.570	0.029	0.112
No of Hospital Cases	0.032	0.000	0.017	0.203
Head of Household	-0.015	0.111	0.008	0.692
Age 10-25	0.010	0.470	0.006	0.853
Age 25-45	0.009	0.506	-0.019	0.481
Age 45-65	-0.021	0.136	-0.110	0.000
Age >65	-0.060	0.002	-0.182	0.000
Household Characteristics				
Scheduled Castes	0.023	0.059	0.082	0.001
Scheduled Tribes	0.007	0.690	0.115	0.036
Other Backward Classes	-0.002	0.821	0.061	0.001
Household Size	-0.005	0.008	-0.025	0.000
No. of Elderly Members	-0.043	0.000	-0.052	0.001
Number of Children	-0.011	0.014	0.001	0.949
Characteristics of Head of the Household				
Literate	-0.029	0.020	-0.011	0.725
Primary	-0.048	0.000	-0.033	0.237
Post-primary	-0.082	0.000	-0.139	0.000
Regular Wage Earner	-0.034	0.052	0.021	0.255
Gender (Male)	0.055	0.000	0.031	0.269
Environmental Characteristics				
Pucca House	-0.056	0.000	-0.085	0.000
Safe Drainage	-0.051	0.003	-0.036	0.049
Sanitary Toilet	-0.052	0.000	-0.054	0.015
State Characteristics				
Popn per Pub Hospital	1.3E-07	0.000	-9.0E-08	0.456
Public Exp Share	0.002	0.002	0.004	0.001
Number of Observations	36975		18412	
No. of Uncensored Obsn	13872		7062	
ρ	-0.601		-0.558	
Chi-sq (for $\rho = 0$)	44.78		35.02	
Prob> Chi-sq	0.000		0.000	

Note: For urban sector, we exclude Assam and Bihar as information on hospitals was not available for these states
Constant was included while estimating above probit model.

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