Use of hospital services and socio-economic status in urban India: Does health insurance ensure equitable outcomes?

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Detailed Abstract

High out of pocket expenditure incurred while seeking medical services is one of the major reasons for inequitable access to health care. This calls for the introduction of universal health care policies. Designing and introducing such policies requires, inter alia, an understanding of the relationship between health and socio-economic status (SES).

Unfortunately this relationship is difficult to determine empirically because asymmetric information creates a principal-agent relationship between the patient and the health care provider, leading to moral hazard problems. Thus, 'induced demand' may distort the health-SES gradient. Theoretical literature suggests that actions of the patient – other than health seeking behavior – may act to reduce the inefficiencies in the health care markets. Such activities, like purchasing health insurance, are referred to as 'compliances'. However, introducing health insurance into the decision-making framework also opens the door for moral hazard on the part of the patient, as they may be willing to seek health care even if strictly not required. This creates a double moral hazard – reinforcing the original moral hazard problem created by the physician induced demand for health care. Further, patients who believe that they are more likely to seek health care treatment may be the ones who undertake compliances in the form of purchasing health insurance (adverse selection).

This paper examines these issues empirically in the context of India, using unit level data from the NSSO "Morbidity and Health Care" survey. The study seeks to identify determinants of hospitalization. We find that – contrary to existing empirical literature – SES is as an important determinant of usage of hospitalization services even in the presence of compliances. However, results of a simultaneous equation model reveal that moral hazard and adverse selection may accentuate existing health inequities.

Results of a simultaneous equation model reveal the dual existence of moral hazard and adverse selection problems in health care seeking behaviour in the presence of health insurance. This contracts the market for health insurance (by keeping insurance premium high), and accentuates the SES-linked inequalities in usage of hospitalization

services. The paper argues that this market failure is matched by state failure in the form of failing to provide universal health coverage to the socio-economically vulnerable sections of the population.

Short Abstract

In recent years universal health coverage has become an important issue in developing countries. Successful introduction of such a social security system requires knowledge of the relationship between socio-economic status and usage of health care services. This paper examines this relationship, and analyzes the impact of introducing health insurance into the model, using data for India, a major developing country with poor health outcomes. In contrast to similar works undertaken for developed countries, results of the instrumental variable model estimated reveals that the positive relation between usage of in-patient services and socio-economic status persists even in the presence of health insurance. This implies that insurance is unable to eliminate the inequities in accessing health care services stemming from disparities in socio-economic status. In fact, the presence of a double moral hazard and adverse selection leads to further attenuation of inequity in the health care market. The study is based on unit level data from the "Morbidity and Health Care Survey" undertaken by the National Sample Survey Organization (2005-06).

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Does health insurance ensure equitable outcomes?

1. INTRODUCTION

The challenge to the health care system is to make health care equitable and sustainable in terms of efficient use of resources as well as in terms of its financing (Van Doorslaer et al., 1993; Cuyler and Wagstaff, 1993; Hurley, 2000; Oliver and Mossialos, 2008). Increased access to health care based on need can promote equity and also achieve efficiency through a reduction of per capita health care costs (Routh et al., 2004). However, on one hand, under-utilization of health services (Wurthwein et al., 2001) and, on the other hand, continuous increase in out-of-pocket (OOP) expenses resulting in impoverishment of the poor (Xu et al., 2003; Wagstaff and Doorslaer, 2003; Berman et al., 2010; Ghosh, 2011; Selvaraj and Karan, 2012) have remained longstanding problems in the developing economies.

Access to health care services is relatively universal in the developed countries and the importance of income in determining the demand for health care has undergone some dilution mainly due to third party payments (Becker, 1964; Mincer, 1974; Somers, 1986; Pappas et al., 1993 and Guralnik et al., 1993). The situation is different for the developing countries with reliance on out-of-pocket payments which is inefficient and less accountable than other methods of financing. It is also iniquitous to the poor on whom the disease burden falls disproportionately more, who are more susceptible to disease and who are more likely to be pushed into poverty trap (Gumber, 1997; Visaria and Gumber, 1994). A World Bank study notes that people are forced to adopt costly strategies to meet health care expenditure – 40 percent are forced to take loans or sell assets to finance OOP (Peters et al., 2002; see also Karuna Trust, 2003).

The picture is not different in India with nearly 80 percent of the health care expenditures borne by the individuals and a mere 0.9 percent funding by the Government. Peters et al. (2002) reports that one-fourth of Indians slip below the poverty line as a result of hospital

stay.[1] Thus, high OOP is one of the major reasons for inequitable access to health care in India. This calls for the introduction of universal health coverage (Mahal and Fan, 2011) or, at least, policies spreading health care costs more equitably across the population, improving access to health services and reducing households from falling below the poverty line due to catastrophic healthcare expenditures. Designing and introducing such policies requires, inter alia, an understanding of the relationship between health care seeking behavior and socio-economic status (SES) (GOI, 2011 Kuate-Defo, 1997) – referred to as the health-SES gradient in literature. The reason is that resources are limited in developing countries. In such cases, identification of economically vulnerable communities deprived of access to health facilities and characterized by poor health outcomes across several counts will enable optimal use of limited resources through targeting.

Such understanding, however, is obscured by the existence of information related externalities in the health market. These externalities typically create a principal-agent problem in the health care market, resulting in moral hazard[2] – so that an inefficient health outcome is generated. In such a situation, the presence of *compliances* - health related efforts of the patient like defensive expenditure, seeking insurance coverage, etc - may potentially act to lead the market back to an efficient outcome. Empirical studies of health care seeking behavior in developed countries have shown that such compliances may reduce the influence of socio-economic status on health status. This implies that health care inequities are reduced by compliances, an important form of which is health insurance.

Unfortunately, such studies cover the experience of only developed countries. Although there is a large body of literature on the importance of health insurance in reducing inequities in health market outcomes (Ahuja, 2004; Ahuja and De, 2004; GOI, 2005; Mahal and Fan, 2011), studies exploring the health-SES gradient in the presence of health insurance are lacking for India. The present study is an attempt to remedy this deficiency.

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[1] A recent study estimates that health care seeking behavior led poverty head count ratio to increase by 3.5 percent in India (Shahrawat and Rao, 2012).
[2] Moral hazard refers to a situation wherein incentives encourage an individual to maximize his objective function, at the cost of social welfare.

The objective of this study is to examine the relationship between health and SES, and analyze how the introduction of compliances in the framework affects this relationship.

The structure of the paper is as follows: Section 2 discusses the theoretical structure underlying the empirical analysis. Section 3 describes the database used in the study, and explaining the methodology adopted. Findings are presented and analyzed in the next section. We initially look at the health-SES gradient in the absence of compliances. Subsequently, this is extended by incorporating the possibility of purchasing health insurance. Findings and policy conclusions are summed up in a concluding section.

2. Background

The health care market is characterized by information asymmetries between the patient and physician, resulting in a principal-agent relationship. This often distorts the potentially simple monotonic relationship between SES and usage of health services. For instance, researchers have argued that the demand for medical care is an induced preference (Feldstein, 1977), where physicians' interest, peer pressure and ethical concern play an important role in shaping the usage of health care. Hence, there is a possibility that, guided by physicians, the patients end up in purchasing services more than they actually require, or can afford. This may result in moral hazard.[3]

Now, in patient-physician relationship, patients (who are considered as principal) also have some choice variables (compliances) that may substantially affect the use of health care services. Now, in situations where the patient cannot evaluate the worth of the physician's advice and the physician does not possess exact information about the treatment seeking behaviour of the patient, compliances can play an important role in ensuring efficient health care seeking behavior. This, in turn, provides scope for entry of "complementary agents" into the market for health care services affecting the physician-patient relationship. An important instance of such complementary agents is companies providing health insurance. Such companies play the role of mediator in the contractual

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[3] In the absence of complete information it is often difficult to identify such cases of demand enhancement. Further, this phenomenon may not be as common as normally presumed (Kramer and Fuchs, 1972; Reinhardt, 1985, Pauly, 1968; Bardey and Lesur, 2004).

arrangements between the two key participants of the health care sector, physicians and patients (Gaynor, 1994; Cutler and Zeckhauser, 2000), and result in individual actions - like the demand for medical care, the consumption of health care goods and its financing – becoming different from what is theorized in the absence of insurance companies. Specifically, it has been shown that incorporating insurance companies in an otherwise exclusive physician-patient relationship reduce the problem of mutual asymmetric information between the actions of physicians and patients (Selden, 1990; Blomqvist, 1991; Ellis and McGuire, 1990; Ma and McGuire, 1997; Kim and Wang, 1998). This leads to more efficient health outcomes. Simultaneously, such compliances reduce the importance of SES in determining usage of health care services (Becker, 1964; Guralnik et al., 1993; Mincer, 1974; Pappas et al., 1993; Somers, 1986). This implies that outcomes will be more equitable, as even people with poor SES can access quality health care facilities (Balarajan et al., 2011; Glazier et al., 2009).[4]

However, the introduction of compliances may also have an adverse impact on the outcome. The presence of compliances means that the patient too is participating in the 'production' of health. Literature on principal-agent relations show that, in such cases, a *double* moral hazard may emerge (Bhattacharya and Lafontaine, 1995; Cooper and Ross, 1985; Demski and Sappington, 1991). Specifically, in the health market, this may lead insured patients to seek treatment even when such treatment is not essential. This tendency may be encouraged by physicians (the moral hazard problem discussed earlier), so that we get a double moral hazard effect. Simultaneously, as demonstrated by Rothschild and Stiglitz (1976), the presence of asymmetric information in the insurance market may lead to an adverse selection problem.[5] This has also been verified by empirical studies on health insurance (Belli, 2001; Browne, 1992; Conrad et al., 1985; Cutler and Zekhauser, 1998; di Novi, 2008; Wright, 2010). Both these processes may operate together so that an inefficient and inequitable equilibrium results (Markova 2006; Wallace, 2002).

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[4] Richardon et al. (2012), however, points out that barriers to accessing health services remained even after the introduction of mandatory social health insurance coverage in Moldovia.

[5] Adverse selection is "the tendency of high risks to be more likely to buy insurance or to buy larger amounts than low risks" (Cummins, et al., 1982). This results from an asymmetry in market information in favor of the buyer of insurance.

Thus, theoretical and empirical literature fails to provide a conclusive answer as to how health insurance will affect the health-SES gradient. At an obvious level, the answer depends upon (for theoretical studies) on the nature of construct and its underlying construct, and (for empirical situations) on the contextual situation. This motivates us to examine the nature of the health-SES gradient in India, a growing developing country with poor health indicators and low per capita public spending on health, and analyze the impact of compliances on this relationship.

The focus is on in-patient services in India - first in the absence and then in presence of compliances (in the form of health insurance). The rationale behind the estimation of the former model is to check the role of SES in determining the usage of health care services. Only one dimension of moral hazard, emanating from the physician's side, will be present. In the second step, we introduce health insurance, dropping the implicit assumption of strategic independence between compliances and usage of in-patient services. Our objective is to test for the existence of distortions produced by compliances. One of the causes of this distortion is to produce endogenity through a two-way relation between hospitalization and insurance purchase. The measurement of usage of hospital services in the presence of this endogenity helps to analyze whether there is a possibility of moral hazard and/or adverse selection and whether health-SES gradient is distorted by such market failures.

2. DATABASE AND METHODOLOGY

2.1. Database

This study is based on unit level National Sample Survey (NSS) Organization data for the 60th round ("Morbidity and Health care"). The data was collected through an all-India survey undertaken from January to June 2004. Using multi stage sampling for the rural and the urban areas the survey covered 199 million households, comprising 959 million individuals. Respondents were interviewed using a close ended questionnaire.

2.2 SES, Hospitalization and Insurance

One of the most important determinant of hospitalization is socio-economic status (SES) of the individual. A high SES has two counteracting forces on the demand for health (Grossman, 1972b; Grossman, 2000). On the one hand it increases the value of available healthy time and hence the incentive to maintain health capital. On the other hand it makes own time for producing gross investments in health more costly, thereby reducing the demand for health. The net effect is to make the demand for health positively correlated with SES of individuals. With an increase in third party insurance coverage, however, the importance of SES in determining medical care demand has diminished (Becker, 1964; Mincer, 1974; Somers, 1986; Pappas et al., 1993 and Guralnik et al., 1993).

Since the objective of this analysis is to analyse the relationship between SES and hospitalization usage, and examine the impact of insurance on this relationship, let us briefly look at what NSS data shows.

NSS does not collect information on income, but on monthly household expenditure. The 60th Round collects information on consumption expenditure incurred over the last 30 days preceding the survey out of purchase, home produced stock, receipts in exchange of goods and services, gifts and loans and free collection. This is annualized, , and converted to log values (LPCE).

Among other variables capturing socio-economic status are education (Grossman, 1975; Wagstaff, 1986b; Kemna, 1987; Van Doorslaer, 1987; Arkes, 2004; Oreopoulas, 2006) and occupation (Economou et al., 2008; Cohen and Sinding, 1996). Although NSS gives this information for all individuals, we have used education and occupation for the household head, who is the decision-maker. The educational level is recoded into five categories — no education (comprising illiterate and with informal education, HILLIT), below primary (those who have less than five years of schooling, HBPRIM), primary (comprising those who have completed primary level, but have less than 10 years of schooling, HPRIM), secondary (those who have completed 10 years of schooling, HSEC) and the remaining persons (who have at least 12 years of education, HHSEC).

The information on occupation has been recoded using the National Classification of Occupation (1968). In all eight categories were formed — professional (HPRF), administrative workers (HADMIN), clerks (HCLERK), service sector workers (HSERVICE), sales(wo)men (HSALES), workers engaged in manufacturing (HMANF), and primary sector workers (HPSECTOR). All remaining household heads were clubbed in a residual category (HOTHERS).

Information on insurance premium paid is also provided. This is recoded to obtain a binary variable indicating whether the respondent is covered under insurance or not (BINS). In this context, it should be noted that though NSS collects data on premium paid for private health insurance and Government health schemes, we use the information on only the former. This is because coverage under Government health scheme is compulsory and does not constitute compliances.

Finally, information on usage of in-patient and out-patient medical services in any health facility is given. The reference periods are 365 days and 15 days preceding survey, respectively. We have considered only in-patient services, coding it in binary form to identify whether the respondent has availed of in-patient services, or not. The focus on in-patient services, as compared to out-patient services, is justified on the grounds that the former – though less frequent – imposes higher costs (both monetary and opportunity) on the individual and the household. This is a major problem in developing countries, with poor social security networks, where hospitalization may lead to "catastrophic expenditure" (Wagstaff, 2006; Wagstaff and Doorslaer, 2003). Moreover, in India, only inpatient services are presently covered under health insurance.

This study is based on only the urban sample. This may be justified on the negligible coverage of rural households under insurance schemes. In urban areas, out of 132,563 incidents of admission to hospital services, only 2.86 were covered under any form of insurance and 0.99 under private insurance. Corresponding figures are even lower in rural

areas, 1.65 percent and 0.61 percent, respectively, so that analysis does not yield any useful results. So we retained only 34.58 percent of the total sample of 383,338 cases.

2.3 Methodology

The paper is based on multi-variate regression analysis, directed towards deriving the relationship between SES (expenditure, and household head's education and occupation) and usage of hospitalization services, controlling for socio-demographic factors (namely age, socio-religious identity and gender of respondent, gender of household head, and household size), living environment[6] and accessibility to hospital services (per capita hospital beds).

Now the study variable is whether the respondent has been hospitalized in the 365 days preceding the survey, or not. As this is a binary variable, the equations may be estimated using either logit or probit models. In the first (basic) model, where there are no compliances, estimation has been done using a single equation probit model, as both logit and probit variants have been known to give similar results.

In the second model we extended the basic model by introducing compliances in the form of health insurance. Now health insurance policies may lead to a trade off between risk sharing and agency problems. This leads to either moral hazard[7] (the incentive to seek more health care by the insured) or adverse selection[8] (the tendency of the sick to choose more generous insurance than the healthy),[9] or both – affecting the outcome of compliance efforts. In econometric terms, if adverse selection exists, persons expecting to be hospitalized in the future are more likely to purchase health insurance, i.e.

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[6] The variable 'living environment' is the score from factor analysis undertaken on variables indicating structure of house, quality of drinking water (based on combination of source of drinking water and nature of its treatment), type of drainage and sanitation, and source of energy. The Kaiser-Meyer-Olkin (KMO) test for data adequacy (0.7644) indicate that Factor Analysis is permissible; the eigen value is 2.29, capturing 45.76% of the variation. Normalized scores (ranging from 0 to 100) are used in the econometric analysis. High scores indicate healthier living conditions.

[7] Given a choice situation, asymmetry of information encourages an individual to maximize her personal behaviour at the cost of other persons, by behaving 'inappropriately'.

[8] Given uncertainty due to asymmetric information, an individual takes a sub-optimal decision.

[9] In addition, we can also have the problem of supply-induced demand (the incentive of the physicians to refer insured patients for hospital admission).

$$\text{Insurance} = f(\text{Hospitalization}). \qquad\qquad [1]$$

On the other hand, in the presence of moral hazard, an existing policy holder is more likely to seek health care, including inpatient services. This implies :

$$\text{Hospitalization} = g(\text{Insurance}). \qquad\qquad [2]$$

This simultaneity, or endogenity, calls for introducing the instrumental variable method. The entire discussion is based on a probit model.

In this paper, we have estimated two simultaneous equation models. The first model is an extension of the basic SES-hospitalization model supplemented by compliances. This model tests for moral hazard. This calls for first regressing decision to purchase insurance on an instrumental variable, LPCE and appropriate control variables (demographic variables and traits of household head), followed by regressing decision to seek hopsital services on estimated probability of purchasing insurance (derived from the first stage model), LPCE and the control variables used in the basic model.

In an instrumental variable method, choice of the instrument is very important – the better the instrument, stronger will be the results. The instrument should be related to decision to purchase insurance, but not affect hospitalization. In this paper we have used *magnitude of loss in household income due to hospitalization*. This follows from the permanent income hypothesis, which states that choices made by consumers regarding their consumption patterns are determined not by current income but by their longer-term income expectations. This implies that transitory, short-term changes in income may have little effect on consumer spending behavior, as consumers may adopt strategies for consumption smoothening in the face of short run transitory shocks. This has also been observed for health shocks, wherein households will seek protection against loss of current disposable income by purchasing health insurance (Folland et al., 2006). Such loss, however, need not affect current hospitalization usage.[10]

As noted previously, the introduction of compliances into decision-making creates another information-related market failure – adverse selection – that now affects outcome

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[10] Correlation between loss in income due to hospitalization and hospitalization is 0.0125.

in the market for health care. This can be detected from the regression model of the decision to purchase health insurance. In the second two-stage model we first estimate:

$$HOSP = f \text{ (Instrument, LPCE, Control variables)}. \qquad [3]$$

The estimated probablity of being hospitalized is plugged into the insurance model:

$$INSURANCE = g \text{ (PHOSP, LPCE, Control variables)} \qquad [4]$$

where PHOSP indicates estimated probablity of being hospitalized. The instruments here are accessibility of hospital services measured by per capita beds, which determines usage of inpatient services but does not affect insurance coverage, and whether respondent had been ill in 15 days preceding survey.

The control variables in the HOSP regression are: age and gender of respondent, socio-religious identity, traits of household head (gender, education and occupation) and living environment. In the INSURANCE equation, the control variables are age (in quadratic form) and gender of respondent, socio-religious identity, traits of household head (gender, education and occupation).

3. FINDINGS
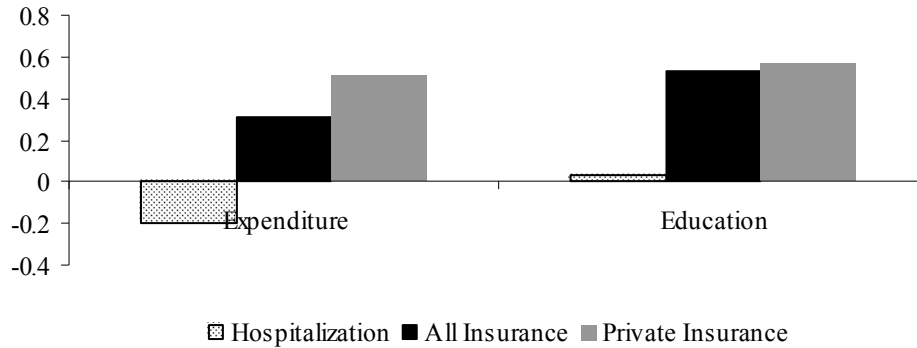
3.1 SES, hospitalization and insurance coverage

The extent to which individual access to inpatient services and access to health insurance varies acoss different expenditure classes may be seen graphically (Fig. 1). It appears that use of hospitalization services is around eight percent for the lowest three quintile expenditure groups, after which it decreases slightly. Coverage under all insurance schemes and specifically under private insurance, however, increases over the quintile groups.

Fig. 1: Variation in percentage hospitalized, covered under insurance & covered under private insurance by expenditure quintile
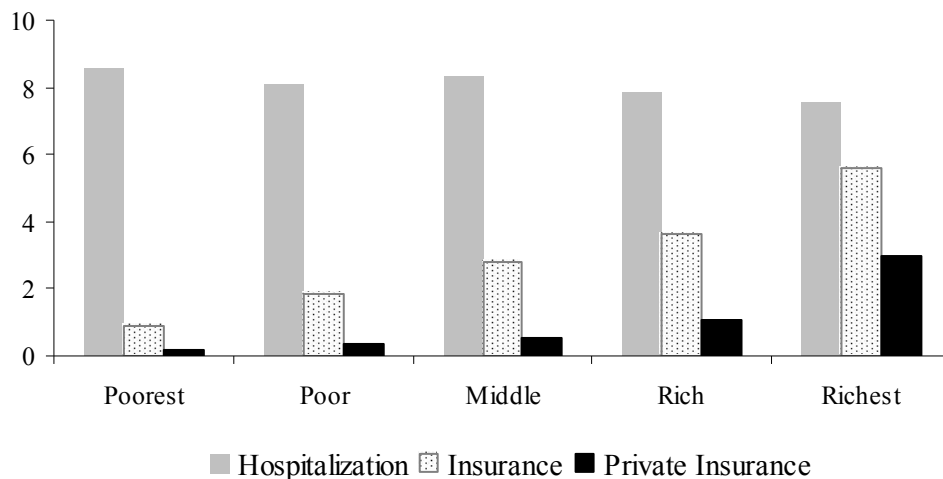

The extent to which access to hospital services and insurance coverage is equitable may be measured using a concentration index suggested by *Kakwani* et al., (1997). For utilization of hospital services, the value of the index is -0.02, while its value is 0.31 for access to any type of insurance and 0.51 for access to private insurance. While a negative value of the concentration index (as estimated for for hospitalization) normally implies that it is the poor who tend to use such sevices, in this case the absolute value is very small indicating that use is 'equitable'. The positive (and high) value of the index for insurance indicates that, ironically, it is the well-off (and less vulnerable) households who are covered by health insurance policies.

Fig. 2: Estimate of extent of progressiveness in access to hospital services and insurance coverage using Kakwani's index

☒ Hospitalization ■ All Insurance ▪ Private Insurance

Analysis of proportion of persons seeking hospitalization services, or covered under insurance (both any and private) also yields similar results. While there is no clear pattern for usage of hospitlaization services, coverage under insurance is higher among families headed by more educated heads (Fig. 3). Kakwani's index 0.03 (hospitalization) also indicate lack of any clear relationship between hospitalization and education. In case of insurance coverage, however, we find a high degree of inequity (0.53, any insurance and 0.57, private insurance).

Fig. 3: Variation in percentage hospitalized, covered under insurance & covered under private insurance by education of household head

▪ Hospitalization ▪ Insurance ▪ Private insurance
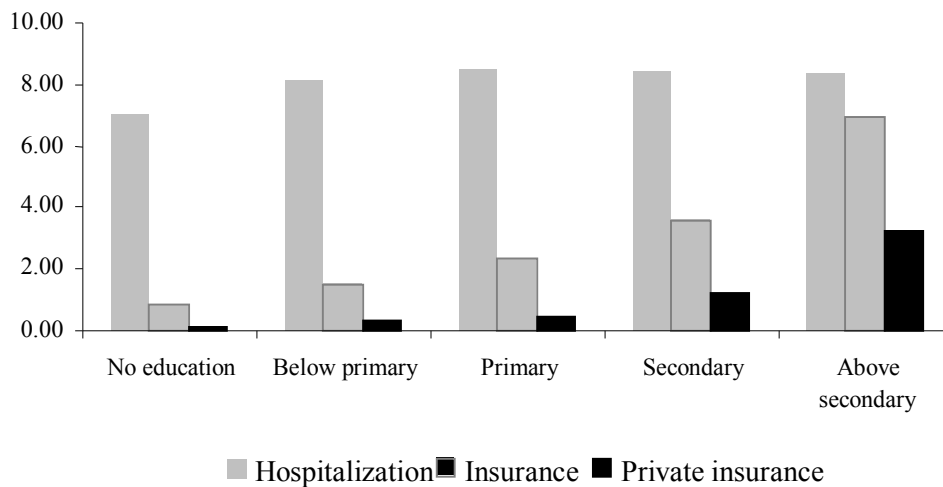
The pattern of hospitalization and insurance coverage may also be expected to vary across occupational categories. While the proportion of respondents hospitalized varies across occupational categories, no clear pattern is seen (Fig. 4). It is highest among families headed by persons in the residual category, followed by service sector workers, clerks and professionals. Insurance coverage is high among in the formal sector — particularly among clerks, professionals and administrators; private insurance, however, is mainly restricted to families headed by professionals and administrators.

Fig. 4: Variation in percentage hospitalized, covered under insurance & covered under private insurance by occupation of household head

■ Hospitalization ▦ Insurance ■ Private Insurance
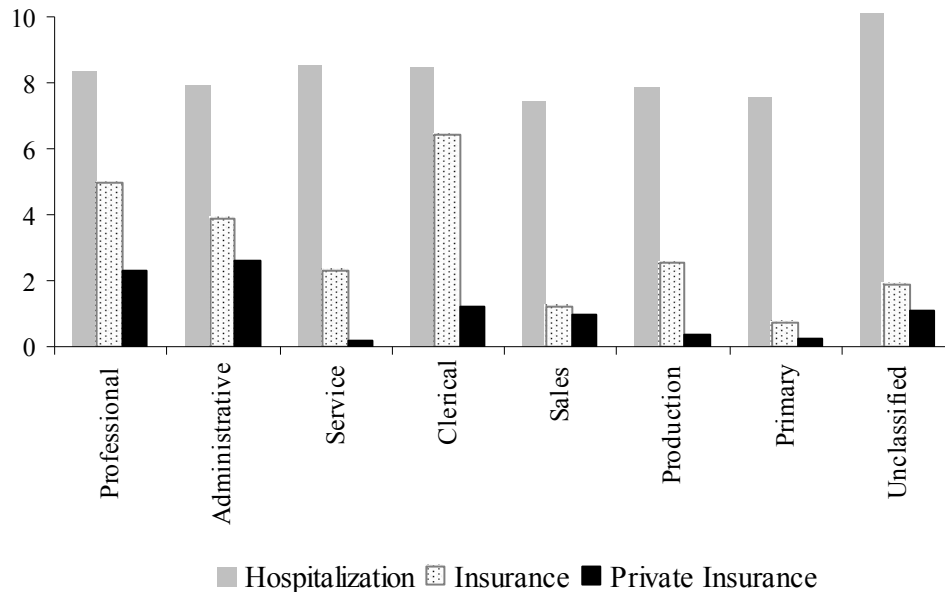
The above analysis, however, is indicative as it does not control for variables like supply-side factors, individual traits (like age), and household characteristics (like socio-religious identity, household size, etc.). This calls for multivariate analysis to which we turn to in the next section.

3.2 Multi-variate analysis — With and without compliances

We have estimated two models regressing whether the respondent was hospitalized on SES — a single equation model without compliances, and a second model including compliances, which was estimated using two stage least square. Results of the model are reported in Table 2. It can be seen that results are very similar for both models.

It was expected that the demand for health care, like any other commodity demand, should depend positively on the patient's ability to pay (proxied by household expenditure levels, LPCE). In both models, the coefficient of log of per capita income (LPCE) is positive and significant at 1% level.

The other proxies for SES were education and occupation. Interestingly, we find an inverse U-shape between education of household head and usage of hospital services. This may be explained as follows. Less educated household heads are less aware of the need for hospitalization (Grossman and Kaestner, 1997); their economic capability to bear hospitalization expenses is also low.[11] At the other end, educated household heads (with more than Secondary level of education) are more aware (Behrman and Wolfe, 1982; Pal, 1999; Henderson, 2002), but as they live in better conditions[12] they are less exposed to health hazards and require less in-patient services.

Except for HMANF, coefficients of other occupation dummies are significant at either 1% or 5% level. Moreover, all coefficients are negative, indicating that probability of using inpatient services is higher among service holders (the reference category). This may reflect their lower purchasing power — mean income of heads working in the service or manufacturing sector (Rs. 52050 and Rs.49706, respectively) is lower than that of other sectors (combined mean of Rs.62545).

Table 2: Regression results of Hospitalization on SES – With and without compliances

Variables	Without compliances			With compliances		
	OR	**z**	**Prob**	**OR**	**z**	**Prob**
PREDBINS				3.79	2.42	0.02
LPCE	1.14	5.10	0.00	1.10	3.39	0.00

[11] Mean annual income of illiterate headed households — Rs.47,708, 23 percent below mean annual income of sample — is lower than that of other households

[12] Factor score of living environment for households headed by secondary and higher level heads are 73 and 81 respectively, compared to sample average of 62.

Variables	Without compliances			With compliances		
	OR	z	Prob	OR	z	Prob
HBPRIM (Ref)	1.00			1.00		
HILLIT	0.80	-6.10	0.00	0.80	-6.22	0.00
HPRIM	0.94	-1.86	0.06	0.94	-1.92	0.06
HSEC	0.94	-1.78	0.08	0.94	-1.93	0.05
HHSEC	0.85	-4.17	0.00	0.83	-4.66	0.00
HSERVICE (Ref)	1.00			1.00		
HPROF	0.87	-2.75	0.01	0.86	-2.86	0.00
HADMIN	0.88	-2.61	0.01	0.86	-2.98	0.00
HCLERK	0.90	-2.15	0.03	0.90	-2.13	0.03
HSALES	0.86	-3.41	0.00	0.85	-3.56	0.00
HPSECTOR	0.92	-1.64	0.10	0.92	-1.66	0.10
HMANF	0.95	-1.16	0.25	0.95	-1.29	0.20
HOTHERS	0.79	-4.31	0.00	0.78	-4.38	0.00
NLENV	1.00	-0.33	0.75	1.00	-0.09	0.93
AGE	1.02	44.37	0.00	1.02	43.81	0.00
MALE (Ref)	1.00			1.00		
FEMALE	0.95	-2.69	0.01	0.95	-2.52	0.01
HSCST (Ref)	1.00			1.00		
HUC	0.89	-3.50	0.00	0.88	-3.60	0.00
OBC	0.94	-1.87	0.06	0.94	-1.90	0.06
MUSLIM	0.97	-0.74	0.46	0.98	-0.65	0.52
OSRC	0.91	-2.11	0.04	0.91	-2.24	0.03
HHSIZE	0.91	-18.60	0.00	0.91	-16.44	0.00
HFEMALE	1.04	0.97	0.33	1.04	0.98	0.33
PCBEDS	1.00	4.30	0.00	1.00	4.29	0.00
Observations	132417			132417		
LR χ^2	2772.59		0.00	2778.14		0.00
Pseudo R^2	0.04			0.04		

Thus, contrary to literature (Mincer, 1974; Somers, 1986; Pappas et al., 1993; Guralnik et al., 1993), we find that the health-SES gradient persists even if we introduce compliances in to our model. One reason may be the low insurance coverage in India (GOI, 2004). Moreover, SES may remain an issue due to the complete or partial withdrawal of "cashless insurance cover" because of problems like co-insurance, co-payment etc.[13] However, the value of the LPCE coefficient falls slightly from 1.14 to 1.10.

The coefficient of predicted BINS (probability of purchasing insurance) in the model with compliances is positive and significant.[14] This implies that *insurance policy holders are more likely to seek hospitalization services*, indicating the presence of a moral hazard problem. Note that, this model shows the existence of the *double* moral hazard, it does not distinguish between moral hazard on the part of the patient, and moral hazard on the part of the physician.

Research has established that the environment in which a person lives has a strong influence on morbidity, mortality and other indicators of health (Corvalán et al., 1999; Karn et al., 2003; Maas et al., 2009; Berg et al., 2010). The coefficient of living environment (NLENV) is insignificant. This result, however, merely reflects the strong correlation between LPCE and NLENV (0.4761).

Age of respondent is positively related to the incidence of hospitalization as theorized. This corroborates results of theoretical studies that as health capital depreciates with age, demand for hospital care increases (Zweifel et al., 2009; Grossman, 1972a).

Female members have lower probability of being hospitalized compared to their male counterparts. This supports the view that there exists a bias against females in medical care. Social restrictions on mobility of women - in particular, constraints on overnight

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[13] In 2010, for instance, major health insurance companies in India announced the withdrawal of cashless hospitalization facilities to policy holders as private sector hospitals were overcharging patients.
[14] The first step model is, in brief: BINS = 0.00001 LOSSHHI (+ other control variables). LR χ^2 is 2662.54 (p=0.00). LOSSHHI has a t-ratio of 1.62.

stay outside the home - are important. Another possible explanation is that men suffer from life style related ailments like, drinking, smoking, stress, overeating (Henderson, 2002) and hence require more medical care. Moreover, in developing countries men are more 'valuable' in terms of financial contributions to the family, compared to women, and hence are more likely to be taken to the hospital when ill (Cohen, 1998; Todaro, 2002).

Compared to HSC&STs, all other socio-religious communities (except Muslims) have lower hospitalization usage. The lower usage of hospital services by SCs and STS reflect their economic vulnerability,[15] rather than living in healthy environment.[16] Despite havng higher levels of annual household expenditure (Rs.58952) and factor scores for living environment (57) than SCs and STs, usage of inpatient services by Muslims does not differ significantly from SCs and STs. This may reflect lack of access to health services (GOI, 2006).

Although gender of the household head may also become an important factor determining use of hospital services (Ngugi, 1999; Hausmann-Muela et al. 2003, Mukherjee et al., 2011), we do not find this HFEMALE to be significant in our analysis.

We have used number of beds per 1,00,000 persons in the state as a proxy for availability of health care facilities. The coefficient of per capita availability of inpatient health care facilities is positive and significant, indicating that greater availability of such facilities leads to higher levels of usage of such services.

3.3 Detecting adverse selection
In the next two-stage model we test for the presence of adverse selection. Results reveal that the coefficient of HOSP is significant at 1% level and is positive (Table 3).[17] This

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[15] Mean income of SCs and STs are Rs. 52475 and Rs.47564 (combined mean Rs.4832) is lower than that of Upper Castes (Rs.75078), OBCs (Rs.53647) and OSRCs (Rs.72889).
[16] Normalized factor score for living environment is 47 for both SCs and STs, against 73 (HUCs), 57 (HOBCs) and 64 (OSRCs).
[17] The first step model is: HOSP = -1.48 HSTAT15 + 0.00004 PCBEDS (+ Other control variables). LR χ^2 is 6038.34 (p=0.00). HSTAT15 and PCBEDS have t-ratios of -60.68 (significant at 1% level) and 2.14 (significant at 5% level), respectively.

implies that *respondents who expect to be hospitalized are more likely to purchase health insurance*, indicating the presence of adverse selection.

Table 3: Results of Regression Model of Insurance: Detecting Adverse Selection

Variables	Odd Ratio	z	Prob.
PREDHOSP	6.90	4.72	0.00
LPCE	4.83	25.69	0.00
HBPRIM (Ref)	1.00		
HILLIT	0.57	-2.83	0.01
HPRIM	0.97	-0.21	0.83
HSEC	1.62	4.33	0.00
HHSEC	2.32	7.45	0.00
HSERVICE (Ref)	1.00		
HPROF	3.23	4.97	0.00
HADMIN	4.49	6.44	0.00
HCLERK	2.55	3.90	0.00
HSALES	3.59	5.44	0.00
HPSECTOR	1.51	1.34	0.18
HMANF	2.59	3.98	0.00
HOTHER	2.64	3.80	0.00
AGE	1.04	7.38	0.00
SAGE	0.99	-6.65	0.00
MALE (Ref)	1.00		
FEMALE	0.79	-4.07	0.00
HSC&ST (Ref)	1.00		
HUC	1.79	4.04	0.00
OBC	1.63	3.19	0.00
MUSLIM	0.54	-2.87	0.00
OSRC	2.27	5.27	0.00
HHSIZE	0.78	-15.51	0.00

Variables	Odd Ratio	z	Prob.
HMALE (Ref)	1.00		
HFEMALE	0.92	-0.69	0.49
LOSSHHI	1.00	1.29	0.20
Observations	132417		
LR χ^2	2719.71		0.00
Pseudo R^2	0.18		

Socio-economic status is found to be a significant predictor of decision to purchase insurance. Respondents coming from families with high expenditure levels or headed by more educated heads are more likely to purchase insurance. In the case of occupation, we find that all coefficients, barring that of HPSECTOR, are significant at 1% level. This implies that if the family head is an professional, administrator, clerk, salesman, manufacturing sector worker or falls in the residual category, (s)he is more lilkley to be covered under insurance than if (s)he comes from a family headed by a service sector worker. In particular, respondents from families headed by administrators, salesmen and professionals are most likely to seek insurance cover.

Female respondents are less likely to be covered under health insurance; the probability of being insured increases wth age, but not linearly. Muslims are averse towards acquiring health insurance; in contrast, HUCs, HOBCs and OSRCs are more likely to purchase insurance than HSCSTs. The odd ratio of HHSIZE is less than unity — this may be because larger households are less likley to have resources to purchase insurance. LOSSHHO and gender of household head are both insignificant at 10% level.

3.4 Variations across socio-economic status

Finally, we compare the magitude of coefficients of (predicted) BINS and (predicted) HOSP across expenditure classes and education levels. This will give us an idea of how the strength of moral hazard and adverse selection varies over these two variables.

For this exercise, we have re-estimated the earlier equations after adding slope dummies for expenditure and education levels, respectively. The equation for HOSP is given below:

$$HOSP = \alpha + \beta\, PREDBINS + \gamma_1 SD_1 + \gamma_2 SD_2 + \gamma_4 SD_4 + \gamma_5 SD_5 + \delta\, \text{Control Variables}$$

$$\text{when } SD_i = PREDHOSP \text{ if respondent is from i}^{th} \text{ quintile}$$

$$= 0 \text{ otherwise.}$$

Similarly we construct equations for INSURANCE and incorporate slope dummies for educational levels in these two equations.

Fig. 5: Variation of coefficients of HOSP and BINS across expenditure groups
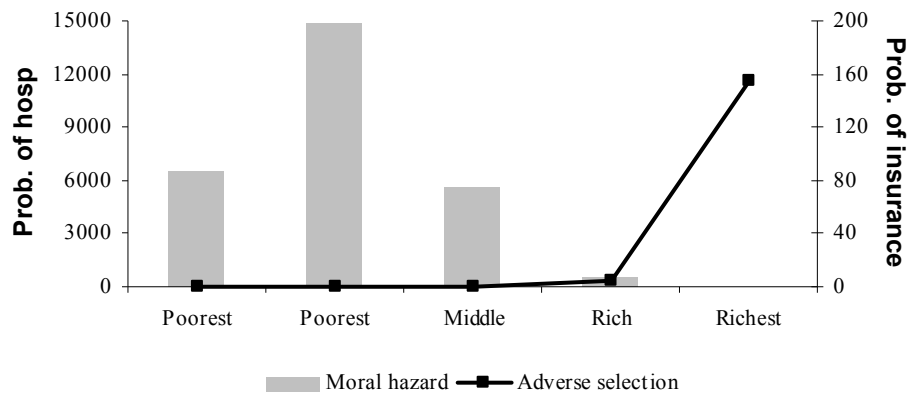
It can be seen that tendency of insured people to seek in patient care (moral hazard) is lower for respondents beloninging to higher expenditure classes (Fig. 5). This is in line with earlier studies of health insurance in developing countries (Jowitt et al., 2004). With respect to the tendency to purchase insurance, however, we find that it is the fourth — and particularly the fifth — quintile that displays adverse selection. This has interesting implications as this economic class is not only the least economically vulnerable but also may drive up the insurance price beyond the ability of the lower quintiles.

Now, one important problem in interpreting the coefficient in the HOSP equation as indicative of the presence of moral hazard is that it may simply reflect greater awareness of the importance of health as a capital. This may be checked by examining the variation of coefficients of pobability of seeking in-patient care over educational levels.

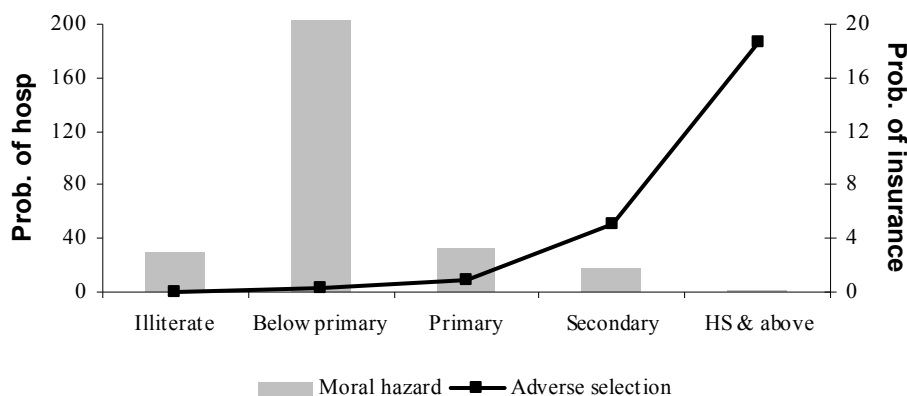**Fig. 6: Variation of coefficients of HOSP and BINS across education levels**

Fig. 6, however, negates this possbility as we find that tendency to seek in patient care decreases at higher levels of education. This supports our initial suspicion that moral hazard is present in the Indian health market. However, likelihood of seeking insurance coverage increases with educational levels. Note that this does not negate the possible presence of adverse selection.

5. CONCLUSION

The paper analyzes the nature of usage of inpatient services among Indian households. In the absence of any compliance from the patient's side, SES is found to be strongly influencing her decision to seek hospital care. The role of demographic factors and living environment is mostly in line with our expectations and knowledge developed from the literature. In contrast to literature, however, SES remains an important determinant of hospitalization usage even in the presence of compliances. This implies that the health insurance market in India is not being able to eliminate the inequities in seeking health care services substantially by providing coverage to those most in need of it. It is true that, in urban areas, the health-SES gradient does become less steeper, but the decrease is not marked – odd ratio of LPCE falls from 1.14 in the absence of compliances to 1.10 after introducing compliances. There may be two reasons for this. One is the failure of the state to provide health coverage to the poorer households. Secondly, the linking of tax rebates to investment in health insurance policies encourages relatively affluent

households to purchase health insurance, pervasively increasing existing equities in the health care market. The impact of these two forces is to make insurance coverage highly regressive, indicated by the value of Kakwani's concentration index (0.51).

Another problem is the presence of adverse selection, leading to further distortions in market equilibrium. Asymmetric information leads to two types of problems. Firstly, results show that persons who believe that they may be hospitalized in the future are more likely to purchase insurance, indicating the presence of adverse selection. Secondly, the presence of insurance coverage significantly affects the decision to be hospitalized, leading to more claims. Both these effects create an upward pressure on the price of insurance, thereby further pushing health insurance beyond the reach of the poorer sections of the community. This is concerning, in terms of ability to access health facilities and high out of pocket expenditure and their long term impact on equity, economic vulnerability and health outcomes. Our findings call for a re-examination of health and allied markets in India, and seek ways to providing coverage to vulnerable sections of the community.

The Report of the Committee on Health Survey and Development (chaired by Sir Jospeh Bhore) had recommended in as early as 1946 that the state should take full responsibility for providing preventive and curative services to all Indians. This had been shelved, and health pushed back in the priority list of central and state governments in favour of industrialization-based economic growth. This has led to low government spending on health sector (4.17% in 2009, compared to a global average of 10%), producing some of the poorest health outcomes in the world.[18] In recent years, schemes like the *Rashtriya Swasthya Bima Yojana*, *Yeswasini* and *Aarogyasri* has been introduced, but with little

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[18] In India, 52.7% of births are attended by skilled health workers (against 65.3% for the world); maternal mortality rate is 26% (against 23.0% for the world); infant mortality rate is 47.6% (against 41.61% for the world); child mortality rate is 62.7% (against 57.9% for the world); 66% of children aged 12-23 are immunized for DPT (against 82.0% for the world); life expectancy is 64.8 years (against 69.4 years for the world). Data is given for last year for which data is available in respective databases. Sources: (for infant mortality rate) http://www.indexmundi.com/g/g.aspx?v=29&c=xx&l=en, and (for all other indicators) http://data.worldbank.org/indicator accessed on 12 December 2011.

impact (Aggarwal, 2010).[19] The recent report of the High Level Expert Group (HLEG) on Universal Health Coverage for India (GOI, 2011) too calls upon the state to provide "affordable, accountable, appropriate health services of assured quality … with the government being the guarantor and enabler, although not necessarily the only provider …" (GOI, 2011: 9). Our findings indicate that when universal health coverage is introduced, this may create moral hazard, leading to a massive upsurge in demand for health care facilities. Implementing this recommendation will, therefore, require a complete overhaul of the health sector, incorporating aspects like remodeling healthcare institutions, establishing infrastructure to create human resources in health, delineating protocols for treatment, providing medicines and finding resources to fund this massive exercise. The last is particularly important as the HLEG estimates that public spending on health will have to jump from the current 1.2% of GDP to 3% of GDP in 2022. Moreover, implementing this scheme will have to face opposition from vested interests in the health sector. Whether the Indian government will be able to rise to this challenge, therefore, is something that has to be seen in the future.

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[19] Shahrawat and Rao (2012) points out that schemes like RSBY cover only inpatient expenditure, while expenditure on drugs are the main cause of impoverishment, comprising the chunk of OOP in India (82 percent for outpatients, 42 percent for inpatients).

Table A1: Socio-Economic Profile of the Respondents (as % of urban population)

Household Head		Respondent		Household	
Gender of Head		**Gender of respondent**		**Household size**	
Male	90.47	Male	51.13	1-3 members	11.8
Female	9.53	Female	48.87	4 members	17.00
Occupation of Head		**Age of respondent**		5 members	19.00
Professional	8.84	0-6 years	13.82	6 members	16.38
Administrative	11.13	7-18 years	23.2	7 members	11.22
Clerical	9.74	19-30 years	23.32	8 or more members	24.60
Sales	17.71	31-45 years	19.73	**Socio-religious identity**	
Service	7.67	46-59 years	10.45	H-UC	32.44
Primary	7.98	60 years & above	9.48	H-ST	2.00
Production	31.54	**Health status of respondent**		H-SC	12.68
Unclassified	5.39	Ailing	10.28	H-OBC	26.77
Education of head		Not ailing	89.75	Muslims	16.43
No formal education	21.45	**Insurance coverage**		Others	9.68
Primary, or less	22.36	Public insurance	1.87	**Quality of living environment**	
Middle	17.37	Private insurance	0.99		
Secondary & Hr Sec	22.62	No coverage	97.14	Worst (0-20)	10.40
Above HS	16.19			Poor (21-40)	13.58
				Middle (41-60)	16.22
				Good (61-80)	23.14
				Best (81-100)	36.66

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