



Factoring Affecting the Demand for Health Insurance in a Micro Insurance Scheme

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Factoring affecting the demand for insurance in a micro health insurance scheme

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Abstract

Health insurance schemes are increasingly recognised as preferable mechanisms to finance health care provision. In this direction micro health insurance schemes and community based health insurance schemes are assuming significant importance in reaching large number of people. However, at the community level despite low premiums the penetration of health insurance is small. The objective of this paper is to analyse factors determining the demand for private health insurance in a micro insurance scheme setting. The study uses two-stage model to examine this issue. First, we determine the factors which affect the insurance purchase decisions and at second level we focus on studying factors which affect the amount of insurance purchase using Heckman two-stage estimation procedure. The data of this study is based on survey and collection of primary data from the Anand district of Gujarat where Charotar Arogya Mandal is offering a health insurance scheme. The results indicate that income and healthcare expenditure are significant determinants of health insurance purchase. Age, coverage of illnesses and knowledge about insurance were also found to be affecting health insurance purchase decision positively. For the decision regarding amount of health insurance purchase, income was found to be having significant but non-linear relationship. In addition, number of children in the family, age, and perception regarding future healthcare expenditure were also found to be significant. The study discusses implications of these results.

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I. Introduction

India is the fifth largest country in terms of purchasing power parity and is considered one of the fastest emerging economies in the world. However, its health status remains a major concern. Infant mortality rate of India is as high as 54.6 while it is around 23 for China. Similarly life expectancy at birth for India is around 64.7, while it is in the range of 77-80 for many countries (see Appendix 1). To a large extent the health indices of a country get determined the way health care gets financed. In the case of India, though total expenditure on health is increasing steadily but its mix of public and private spending is a major cause of concern.

The total health care spending of India is around 6 per cent of GDP. This is comparable to other economies which have attained better status of health. However, the public healthcare expenditure is just 0.9 per cent of GDP. The average public spending of many other emerging and less-developed countries is 2 to 3 per cent of GDP. The private expenditure on health is more than 80 per cent in India and most of it is out-of-pocket. This makes it one of the most private health economies in the world. A very small part of this expenditure is covered by insurance. In developing countries where *per se* the need for spending on health is high, high levels of private health expenditures pose serious challenge. The sheer size of these expenditures once it has risen to high levels can impede control of health expenditures itself. The high private health expenditures are also cause of concern because most of these expenditures are out-of-pocket having serious implications for pushing many households below poverty line. This is because private health sector is unregulated and is vulnerable to private provider payment system. Therefore, considering this there is a need to develop alternative mechanisms which can be developed to provide for better healthcare at lesser per capita cost and having lesser consequences for the net worth of households.

Health insurance schemes are increasingly recognised as preferable mechanisms to finance health care provision. Other alternative such as cost-recovery strategies and user fees have been criticised (Gilson 1998, Sauerborn, Nougara et al. 1994) on grounds that it affects access to care. The option of insurance seems to be a promising alternative as it pools and transfers risk of unforeseeable health care costs for a pre-determined fixed premium (Griffin 1992).

Health insurance in India is in nascent stage but growing very fast. Private health insurance was introduced in 1987 when Mediclaim policy was launched by government owned insurance companies. However, its performance has not been very encouraging. To improve upon the penetration of insurance in India, to bring competition and get fresh capital in the insurance sector, Government of India opened the insurance sector for private companies in 2000. Very few private insurers have ventured in health and it is becoming difficult to make inroads in health insurance.

At community level the need for insurance mechanisms is quite significant. Many community based organisations (CBOs) have started micro insurance schemes to meet the requirements of healthcare and protect people belonging to lower income groups from catastrophic risks. It has been observed that despite the low premiums these schemes offer, people do not buy health insurance and total pool remains small making these schemes less viable. To understand this phenomenon we need to understand the factors which affect health insurance purchase decision. Based on this understanding appropriate policies can be

developed. This understanding would also help CBOs and insurance companies to target customers with more focused approach.

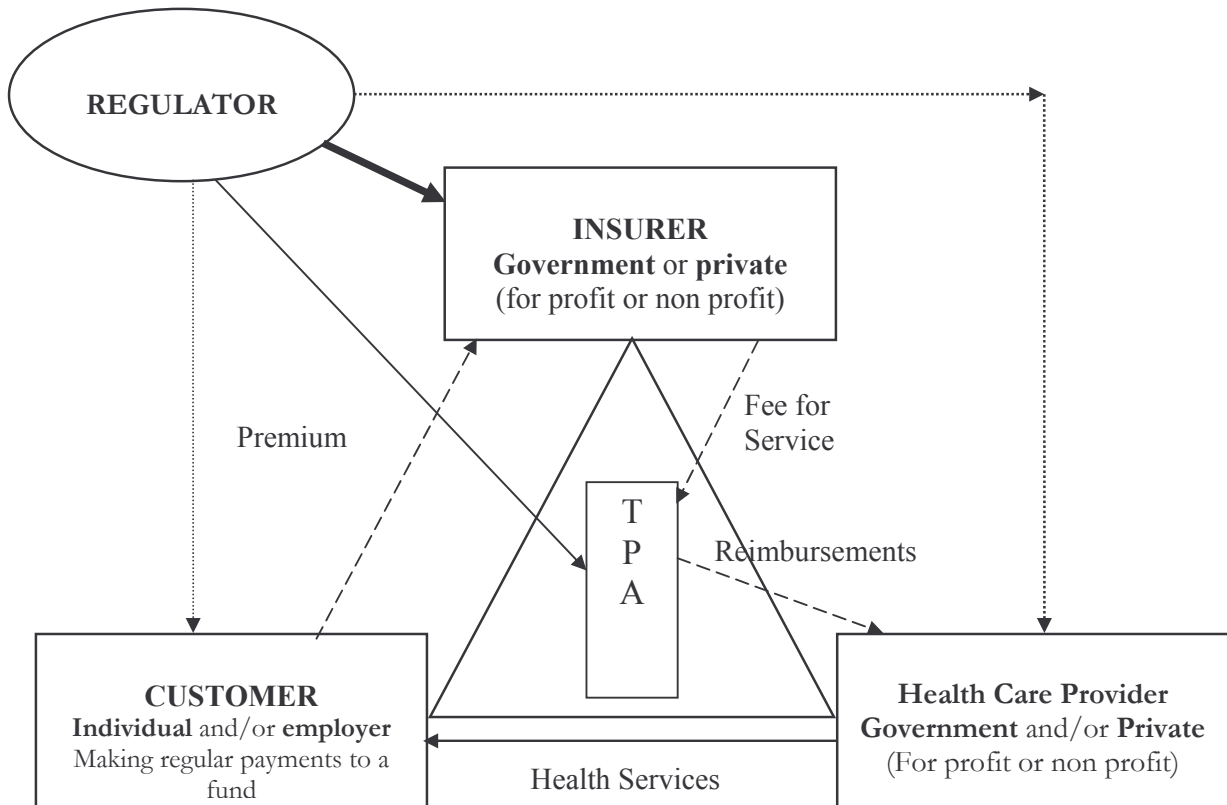
The objective of this paper is to analyse factors determining the demand for private health insurance in a micro insurance scheme setting. The demand for health insurance has been analysed at two levels. First, we analyse the factors determining the decision to purchase health insurance and second, factors that determine the amount (extent or coverage) of health insurance. The outline of the paper is as follows: Section II discusses health insurance situation in India. In third section we review the literature related to health insurance. Section four discusses methodology, data, sample and model related issues. This section also provides description of the model used in the study and issues related to estimation of the model. We finally discuss results of the study and describe key determinants of insurance purchase decision. The paper concludes with a brief discussion about the results and its implication to researchers, policy makers and insurance companies.

II. Health Insurance in India

The insurance sector has experienced significant development during the last decade. With the liberalisation of the sector entry of private providers has been made possible. The government has also set-up Insurance and Regulatory and Development Authority (IRDA) to develop and regulate this sector and also protect the interests of policy-holders. Health insurance is prone to moral hazard risk. Particularly these risks are high in an unregulated market where there are no regulations on costs and quantity of care to be provided. Health sector remains inadequately regulated in India and to minimise these risks and ensure cash less facility, IRDA has allowed Third Party Administrators (TPAs) who acts as intermediary between insurance companies, providers and customers. At present there are 25 TPAs and 12 general insurance companies. Total number of insurance policy holders is 11.2 million out of which almost 90 per cent have bought their policies from four public sector general insurance companies. Total premium collected by these four companies was around 11290 million for Mediclaim. Of the 10.2 million enrolled by these four companies (excluding GIC, Employment Guarantee Corporation, AICL), which are permitted to market health insurance products, Mediclaim alone accounts for 9.7 million persons, the rest being enrolled under other insurance schemes such as Jan Arogya, etc (Rao 2004). For the period 2003-04 claim ratio was around 96 per cent which is increasing over the years. It is estimated that health insurance market potential is a minimum of Rs. 150 billion while so far only Rs. 17 billion up to 2004-05 has been tapped. Only 3 per cent of the population is covered by private health insurance.

Figure 1 provides the description of key stakeholders in private health insurance and their inter-relationships.

Figure 1: Standard Health Insurance Model



From the above diagram, we can see that there are three main stakeholders in the health insurance system. These are insurance companies, healthcare providers, and customers. Other than these, two more parties which are important and involved in the process are third party administrators (TPA) and regulator.

Important difference between health insurance and any other kind of insurance is that, in the case of health insurance, there are more stakeholders than in other types of insurance and this makes the whole process more complex and difficult to control. Other than the number of stakeholders, there are different types (based on profit motive and ownership) for each stakeholder which makes health insurance more complex. The following matrix describes this.

Figure 2: Types of Insurance companies

Types of Insurance Companies		
	Private	Public
For Profit	Private Insurance companies	General Insurance Company
Not For Profit	Community Based Health Insurance	Employee State Insurance

Insurance schemes are of different kinds and they differ on the basis of their ownership and profit orientation. However, the basic premise of risk pooling is same. The ways in which insurance systems are implemented across countries vary in terms of how the money is collected, who pays and who buys the services and from whom. For example in Canada, the

financing is through taxation; people pay an income on payroll tax, and the proceeds are used by the Government to purchase or provide health insurance. In other nations, the financing is through private insurance; individuals or their employers contribute to health insurance companies, which then provide insurance for the population. While the payment for any individual may differ in these two systems (a tax financed system generally imposes relatively more on rich), the implications for provision of health insurance are generally slight. Governments in both systems are intimately involved in determining what services are covered, the cost sharing that patients face and the restrictions imposed on providers. Countries like England and Italy finance health insurance through general taxation and provide service publicly. Countries such as Canada and Germany finance insurance publicly for contract for services through private providers (Cutler and Zeckhauser 1999).

Micro Health Insurance in India

Health risks and resulting catastrophic financial losses are probably significant threats to the people, particularly persons belonging to lower income groups as these people will be excluded from private health insurance. A health shock leads to direct expenditures for medicine, transport and treatment but also to indirect costs related to loss of wages (Asfaw and Braun 2004). Since studies have found a very strong link between health and income (for low-income levels) poor are the most susceptible to a health shock (CMH 2001, Morrisson 2002). Given the problems with public health delivery system, the access to and utilisation of these facilities remain problem. Strategy to improve the access by developing insurance system to private providers has been one such area. For low-income people in rural and informal sector market based insurance such as Mediclaim can not meet the requirements because of its high cost. Insurance companies and healthcare providers face high transaction costs and also they do not have local information available with them. This makes their job of providing health insurance to this segment very difficult and schemes which are of local origin have more chance of being successful (Zeller and Sharma 1998) They have potentially higher chance of attracting more members because of high level of trust with them. Several community based organisations in India have focused on developing community based insurance schemes during the last decade. Most of these community based insurance schemes (CBHI) are also known as micro health insurance schemes. Micro insurance is a form of health, life or property insurance, which offers limited protection at a low contribution (hence “micro”). It is aimed at poor sections of the population and designed to help them cover themselves collectively against risks (hence “insurance”)². More specifically micro insurance and CBHI are different; we are using these two terms interchangeably here.

In India, community health insurance started way back in Kolkata in 1952 which was part of a student’s movement. This scheme, which is called the Student’s Health Home (SHH), caters to the schools and universities students of West Bengal. Currently there are more than 20 documented CHI programmes, of which five were initiated in the past three years (Devadasan, Ranson et al. 2004). The mechanism for providing health insurance in community based health insurance schemes is different from normal market based schemes like Mediclaim. Though the basic principle of covering future risks by paying premium in advance is same in all health insurance schemes, CBHI schemes are tailored for local needs and provide health insurance at low cost.

CBHI schemes in India can be divided in three broad categories based on who is the insurer (Devadasan, Ranson et al. 2004). Table 1 indicates that these three categories are quite distinct from each other in terms of the function of the agency. An agency here can be a NGO, Trust, Hospital or Cooperative etc. Their role can vary from performing as

² http://www.microhealthinsurance-india.org/content/index_eng.html

intermediary where both treatment and insurance are provided by intermediary itself or where the treatment and insurance are provided by third party.

Types of CBHI	Healthcare Intermediary	Health Insurer	Healthcare Provider
(Examples)	SEWA, BAIF, Karuna Trust,	Tribhuvandas Foundation, DHAN, Yeshaswini	Sewagram, MGIMS, VHS, RAHA
Role	<ul style="list-style-type: none"> Plays role of agent Purchase care from providers Purchase insurance from insurance companies 	<ul style="list-style-type: none"> Plays role of insurer Provide Insurance Purchase care from independent provider 	<ul style="list-style-type: none"> Plays role of both insurer and provider Provide Healthcare Running Insurance scheme
Transaction costs	Low-medium	Low	Low
Membership Size (size of risk pool)	Not important	Important	Important
Inpatient/ Outpatient Care	Is an issue	Is an issue	Is NOT an issue
Benefit on provision side	Negligible	Low	Significant
Informational Problems	Is an issue	May be an issue	Not an issue
Payment Mechanism	Mostly Fixed Indemnity	Mostly Fixed Indemnity	Cashless System Mostly
Nature of Pool	Membership/ Geography Based	Membership/ Geography Based	Geography Based

Source: Adapted from Devadasan, Ranson et al. 2004, and Ahuja 2005

One important point to note here is that the classification here is a broad one and there are few CBHI schemes which may have characteristics of more than one category. For example Krupa health insurance scheme which is offered by Charotar Arogya Mandal should come under health insurer category but since Charotar Arogya Mandal trust has its own hospital also therefore it is able to act as healthcare provider also, and therefore it has characteristics of healthcare provider category also.

Micro health insurance as a mechanism of providing health insurance is emerging in India. In extending the reach of affordable healthcare to the poor, the role of these CBHI schemes will be very crucial. The success of many of these schemes, though at a smaller level at present, provides important lessons for the policy makers. It shows that if an organisation which has trust of local people will offer an insurance scheme which is tailored to local needs and provides a reasonable coverage at low premium, there is a good chance that it will be successful.

One important point to remember here is that CBHI schemes have their own problems which are non-availability of good providers, lack of professional management, financial sustainability issues and non-recognition by IRDA. These problems need to be taken into account while assessing their benefits. Though at present CBHI schemes in India are serving

a very small population, if lessons learnt from each of these schemes can be used to design more of such schemes in different parts and at much larger level, they can be very beneficial.

III. Literature Review

The literature review suggests that income is one of the important determinants of purchase of health insurance (Scotton 1969, Cameron, Trivedi et al. 1988, Savage and Wright 1999). Income has been found to be having a positive association with health insurance purchase decision consistently in different studies conducted in different countries Propper (1989) in UK; Cameron, Trivedi et al. (1988) in Australia and Hurd and McGarry (1997) in USA.

Healthcare expenditure is another important variable affecting health insurance purchase (Kronick and Gilmer 1999). Relation of health insurance purchase decision and health expenditure is based on the premise that families which have higher chances of requiring hospitalisation will have higher probability of buying health insurance. Some other socio-economic factors like age, education etc. have also been found to be important factors affecting health insurance purchase.

In India knowledge and awareness about health insurance could be important factor for health insurance purchase decision. Very few studies have tried to analyse reasons for low penetration of health insurance in India (Wadhawan 1987, Ellis 2000, Bhat and Mavalankar 2001). Some studies have tried to analyse community based health insurance in India (Devadasan, Ranson et al. 2004, Ahuja 2005. Rao (2004) discusses the issues and challenges for health insurance sector in India. These and other studies have tried to analyse health insurance sector in India, but not much systematic empirical work has been done and this area is largely unexplored.

The theory of risk has been applied extensively to the literature related to health insurance decision (Arrow 1963; Feldstein 1973). Under conditions of consumer rationality and risk averseness, the decision to purchase insurance is made on the basis of expected utility gain.

Health insurance choice essentially entailed a simple decision - whether or not to purchase private health insurance (Barrett and Conlon 2003). Binary discrete choice models using either logit or probit has been used to analyse determinants of this type of purchase decision. Cameron and Trivedi (1991) specified a conditional expected utility function that is associated with alternative health care regimes. The consumer chooses the regime that maximises expected utility.

The utility gains, expected from the purchase of private insurance are related to the expected medical need of the people in the first instance. Some individuals face greater risk vulnerability than others due to their age, pre-existing health status, job profile and marital status. For example, Hopkins and Kidd (1996) suggest that the probable distribution of future health states is based on present and past health states.

Price as the determinant of health insurance demand has been examined in terms of premium, but more specifically also focusing on the loading charges³. The theory makes unambiguous predictions about the relationship between loading charges and demand for insurance hypothesising as the loading charges increase, demand for insurance decreases.

³ A health insurance premium has two components: first, the expected cost of medical benefits, and second, the loading fee—the cost of insurance administration, a return to the insurer to bearing risk, and insurance company profit. Because most people are risk averse, many people would rather pay the loading fee than risk a large out-of-pocket payment if they are uninsured and become sick.

Feldstein (1973) has argued that as the price of health care increases, the demand for insurance should increase as well because this causes an increase in the risk of net worth depletion and thus an increase in the demand for insurance. Healthcare expenditure largely depends on healthcare costs. Recent research has documented that most of the secular change in health insurance coverage can be attributed to higher health care costs (Chernew, Cutler et al. 2002).

One important reason for higher healthcare costs is the introduction of new technologies which may lead to higher demand for insurance in the face of rising costs (Nyman 1999). However, people belonging to different income groups are likely to respond differently to these changes. Kronick and Gilmer (1999) argue persons with low incomes and few assets buy insurance primarily to protect their health. Most such persons could not possibly pay for the care they would need if they were uninsured. They might be forced to deplete their assets and the risk to health and future earnings for such persons can be substantial and therefore they may be willing to buy insurance.

The health status of the family is another important factor which may influence the health insurance purchase decision. In literature studies have used variables like hospitalisation, doctor consultation, self health assessment to proxy for health status (Hopkins and Kidd 1996, Barrett and Conlon 2003). Healthcare expenditure of the household may be another proxy of health status of the household. Health expenditure *per se* may not tell much about health burden on household and health expenditure as a percentage of total expenditure may provide a better idea about the health burden on a household.

Several recent papers examine the empirical evidence for adverse selection in health insurance markets in the United States. In these studies 'adverse selection' is defined as the situation where consumers have differential health risks but are not charged a premium equal to the expected marginal cost of their insurance. As a result, 'high risk' consumers find insurance most attractive and will tend to take out more generous and expensive policies relative to 'low risk' consumers (Cutler and Zeckhauser 1998). Therefore, more health expenditure of family may give rise to higher probability of health insurance purchase.

This view of the role of education in health decision-making has been well documented by Grossman (1972) and Muurinen (1982). The implication is that not only is a better educated person likely to be healthier which would lower the probability of insurance, but also he/she is likely to be better informed about both the services available in the public hospital system and the benefits of joining a private health insurance fund. The indirect effect of education is its impact on income.

Education and income are generally positively correlated (Van De Ven and Van Praag 1981). Higher income generally decreases the opportunity cost associated with the purchase of private health insurance. Overall, increases in both income and education would be expected to lead to an increase in the probability of buying the insurance.

Another set of factors which are found important in the literature of health insurance are demographic and economic variables. These variables are employment, age, marital status and gender. The available evidence suggests that socioeconomic variables act on choice in the expected ways. Those who are employed and those in executive positions are likely to purchase insurance (Butler 1999; Savage and Wright 1999). Married respondents are more likely to take out coverage (Cameron & McCallum 1995), though family size apparently has been of little influence on the purchase decision (Cameron and Trivedi 1991). Age has also been shown to have a significant influence on insurance choice. Age has also been found

having positive and significant impact on the probability of having insurance cover (Cameron, Trivedi et al. 1988, Nguui, Burrows et al. 1989, Savage and Wright 1999). Gender also plays an important role in the insurance decision through its effect on expected medical consumption. Sindelar (1982) notes that most of the higher demand for medical services by women may be explained by increased need during the reproductive years.

The perception of individuals towards the risk is also an important factor. A consumer's knowledge of being at risk by being a member of a particular group of people with high-risk characteristics (e.g., those who know they have high cholesterol) likely to influence their insurance decision. Hopkins and Kidd (1996) and Butler (1999) found that smokers are less likely to purchase insurance. Smoking behaviour is viewed in these studies as a proxy for risk-aversion.

Of the other possible determinants of the decision to purchase insurance, an obvious factor is price. However few studies have attempted to estimate price elasticity of demand. This is because of lack of price information and also because of limited variation in price in highly regulated health insurance market. To overcome this problem Butler (1999) constructed 'effective prices' from information on insurance fund premium revenue (averaged over policies sold) and the expected benefits paid out by age category.

Another important point here is that for many people, the purchase of private health insurance is a family rather than an individual decision; therefore, the characteristics of the family unit are important. An example is the impact that a dependent child or dependent old age parents has on the private health insurance decision.

The studies in Indian context on health insurance are scanty. Several recent papers and reports have critically reviewed the Indian health delivery and financing system (Bhat and Mavalankar 2000, Berman and Khan 1993, World Bank 1995, Planning Commission 1996, etc). These studies have documented issues and challenges the system faces in terms of accessibility, efficiency and quality of the health care delivery. Also the studies point out the excessive financial burden on the Indian households. This excessive financial burden on households may arise for a variety of reasons. At one level, they can be blamed on India's public health care system, which is under-funded and suffers from quality and access problems, forcing consumers to visit the private and relatively more expensive treatments. Ellis et al. (2000) contended that these financial burdens arise because the consumers are either not insured or are insured inadequately for their health care expenses.

The public expenditure on health is less than 1 per cent of GDP (Bhat and Jain 2005). Also more than 80 per cent of total healthcare expenditure is out-of-pocket expenditure. Reliance on out of pocket payments is inefficient and it is also unfair for the poor on whom the burden of disease fall more than proportionately (Ahuja 2005). Channelling these high private expenditures through insurance system is real challenge in Indian context. (Gumber and Kulkarni 2000) compared the Mediclaim, ESIS and SEWA health insurance policies to find the similarity and differences among them. Sujatha Rao (2004) discusses the issues and challenges for health insurance sector in India. She found financing to be most important component to improve health system in India and advocated that health insurance should be given very high priority by the government as a financing mechanism. In another study Acharya and Ranson (2005) compared four different CBHIs in Gujarat and tried to analyse their insurance schemes. They conclude that there are many research areas still left to be explored in Indian health insurance. For example what are the main factors for community to accept/refuse the membership of CBHI? What is the role of socio-economic variables such as caste, income, assets, employment, education, etc., in enrolment and utilisation?

Does the distance from the health centres or hospitals play a role in signing up or not for membership? We try to address some of these questions in this paper.

III. Research Methodology

From the literature review, we can see that there are many areas in the field of demand for health insurance, which are unexplored or need to be explored in some other contexts. Some important theoretical and methodological gaps found are as follows:

First, health insurance has been found to be an important method to improve the health care scenario by reducing the risks. Income has been found to be an important factor affecting health insurance purchase in most of the studies. Another important factor which should be related to health insurance purchase is healthcare expenditure of family. Families and individuals are likely to buy insurance if health expenditure is high. Other variables like income, education, gender, age, marital status and risk averseness has also been found to be significant in decision to purchase health insurance. In Indian context understanding the effect of these factors affecting purchase decision of insurance is a gap.

Second, most of the studies which we have come across have been using discrete choice models to model for health insurance purchase decision. They have used Logit or Probit to analyse this decision problem. In these studies they have focused only on the problem related to purchase decision of health insurance where dependent variable has two outcomes buying or not buying health insurance. None of the studies have gone to the next level and tried to analyse the amount or extent of health insurance purchase. Propper (1989) analyses only the choice decision of whether to purchase or not purchase health insurance and indicates next level of decision as major gap. What is the number of person to be covered in a household is a conditional decision, conditional on the decision to buy any insurance and has been identified as topic for further research.

Finally, most of the studies use only continuous and/or categorical variables. We have not come across any study which analyses this decision by using some ordinal or interval scale variables also where perceptions of the customers have also been included.

Therefore, in this study we make an attempt to analyse factors which determine health insurance purchase decision by using model having continuous, categorical and interval variables and estimating the model in two stages: first, buying decision of insurance and second, the extent of health insurance purchase.

Data

Using primary data collected through survey has been most frequently used method of data collection for studying insurance purchase decision (Feldstein 1973, Ngui, Burrows et al. 1990, Kronick and Gilmer 1999, Paulin and Dietz 1995). We use survey method for collecting data to study association between private health expenditure and health insurance.

Anand district in Gujarat was selected as area where survey was done. Charotar Arogya Mandal is offering a health insurance scheme in Anand where they are offering health insurance to the people living in Anand and nearby districts. Here people can get treatment at Shri Krishna Hospital, Karamsad which is a renowned hospital of that area.

This health insurance scheme called Krupa, is more focused for the people in Anand and nearby districts. The main target segment for this is lower and middle income group people of this area. The premium is based on coverage taken and the age of the person being

insured. Hospitalisation costs are covered under this health insurance scheme up to the coverage amount. OPD is also provided free of charge. Some medicines and diagnostic tests are excluded. However, members of this scheme get some discount on diagnostic services and pharmacy. The scheme fulfils the criteria of micro-insurance scheme as it provides limited protection to people at low contribution. One key difference here is that in this scheme members can pay more and get higher coverage also. The key differences between this scheme and some other schemes are provided in Table 2.

	SEWA	KRUPA	MEDICLAIM
Membership Requirement	For members of SEWA	Anybody can join	Anybody can join
Premium range (in Rs.)	40-120	90-2,325	175-2,825
Coverage Range (in Rs.)	1500	5,000-100,000	15,000-300,000
Number of Policies	63,000	43,000	97,00,000
Management of Fund	Insurance Company	Self	Insurance Company
Enrolment time	Fixt time period	Anytime	Anytime
Hospitalisation Coverage	Yes	Yes	Yes
OPD Facility	No	Yes	No
Maternity Coverage	Yes	Yes	No
Insurance Plan	Reimbursement	Cashless	Reimbursement

While SEWA's scheme is primarily for its members and part of overall insurance package Krupa is open for everybody and a standalone scheme which is similar to Mediciclaim. The premium amount in Krupa and SEWA is very low than Mediciclaim because it is more targeted for people from lower and middle income category.

Since penetration of other health insurance schemes in this area is low, we are able to get a good defined sample. It may be noted that sample respondents of this survey have been exposed mostly to this insurance scheme only. For selecting unit of analysis to do survey, we can take individual as unit of analysis (Bazzoli 1987). Another option is take consumer units⁴ as a unit of analysis as was done by Miller (1990). Later on, many researchers used family as the unit of analysis (Reise 1993, Paulin and Dietz 1995). In another study in UK and Wales household has been taken as unit of study for health insurance demand. It has been done because health is a family decision and health of one family member may affect health of another family member. In this study, we adopt household as a unit of analysis. The household has been defined as a group of persons normally living together and taking food from the same kitchen excluding persons who are not related by family or legal arrangements. We use stratified random sampling method so that we have all categories of people in the sample, for example people who have bought insurance, people who have not bought insurance and also people who have renewed insurance policy later. During the survey it was found that most people of the area knew only about this insurance scheme.

Data was collected through a questionnaire. The data was also collected on different socio-economic variables like income, gender, education occupation etc. Other important parameters on which we gathered information is related to variables like healthcare expenditure and hospitalisation. Some part of the questionnaire has been adapted from the work of Paulin and Dietz (1995) and some questions have their roots in literature. Some questions related to people's perception about buying health insurance on interval scale data

⁴ A consumer unit is a single person living alone or sharing a household with others who are all financially independent; member of a household related by blood, marriage, adoption or other legal arrangement; or two or more person living together who share responsibility for at least two out of three major types of expenses; food, housing and other expenses.

has been used in the questionnaire. These factors were identified during our interview and discussion with policy holders and other stakeholders of health insurance.

Methodology

We use econometric analysis to find the factors affecting health insurance purchase decision. The decision of buying health insurance has been formulated in two interrelated choices. First, the choice is related to the decision to buy or not buy the insurance. Second, if the decision to buy insurance is positive then the second choice is to buy for how many people in the family and for what kind of coverage (extent or amount of insurance). In each choice here, the decision-maker faces a finite and exhaustive set of mutually exclusive alternatives, the qualitative choice models can be applied to describe these two choices. All that is required is for the choice set facing the decision-maker to be defined appropriately. Therefore, the second decision will come only if first decision is positive.

Estimating these relationships pose methodological problems. One problem is selection bias in the first stage. Given the small penetration of insurance in communities, the decision of buying of insurance is observed for a restricted and non-random sample. This is a common problem in survey method of data collection. Very often people that respond to a survey are self-selected, so they do not constitute a random sample of the general population. The seminal work of Heckman (1979) addresses the problem of self-selection. This method makes it possible to assess presence of selection bias, identify the factors contributing to the selection bias and to control for this bias in estimating the relationships. Heckman (1979) discusses the bias that results from using non-randomly selected samples when estimating behavioral relationships as "omitted variables" bias. He proposes a simple consistent method to estimate these models, using a bivariate normal model for the selection equation, and ordinary least squares to estimate the behavioral equation with the selected sample. The key insight in Heckman's work is that if we can estimate the probability that an observation is selected into the sample, we can use this probability estimate to correct the model.

In our analysis first we segregate households who have taken insurance and who have not taken insurance and then we see that to what extent (or amount) households have bought insurance by only analysing households who have bought health insurance. In the framework of sample selection, we could specify one equation for whether or not a household is buying insurance and another equation for determining the extent of buying insurance.

The basic idea of a sample selection model is that the outcome variable, y , is only observed if some criterion, defined with respect to a variable z , is met. The common form of the model has two stages. In the first stage, a dichotomous variable z determines whether or not y is observed, y being observed only if $z=1$ (and you estimate a model with some matrix of independent variables w and get alpha coefficients, the model is estimated, of course, with an error term, e).

In the second state, we model the expected value of y , conditional on its being observed. So, we observe z , a dummy variable, which is a realization of an unobserved (or latent) continuous variable z^* , having a normally distributed, independent error, e , with a mean zero and a constant variance σ^2_e . For values of $z=1$, we observe y , which is the observed realization of a second latent variable (and model that with some independent variables X and get a vector of coefficients β), y^* , which has a normally distributed, independent error, u , with a mean zero and a constant variance σ^2_u . The two errors are assumed to have a correlation ρ . The joint distribution of u and e is bivariate normal.

$$\begin{array}{l}
 z_i^* = w_i' \alpha + e_i \\
 z_i = 0 \text{ if } z_i^* \leq 0; \\
 z_i = 1 \text{ if } z_i^* > 0
 \end{array}
 \left. \vphantom{\begin{array}{l} z_i^* = w_i' \alpha + e_i \\ z_i = 0 \text{ if } z_i^* \leq 0; \\ z_i = 1 \text{ if } z_i^* > 0 \end{array}} \right\} \text{ Selection Equation}$$

$$\begin{array}{l}
 y_i^* = x_i' \beta + u_i \\
 y_i = y_i^* \text{ if } z_i = 1 \\
 y_i \text{ not observed if } z_i = 0
 \end{array}
 \left. \vphantom{\begin{array}{l} y_i^* = x_i' \beta + u_i \\ y_i = y_i^* \text{ if } z_i = 1 \\ y_i \text{ not observed if } z_i = 0 \end{array}} \right\} \text{ Outcome Equation}$$

In our model, in the first equation dependent variable is a binary variable, which takes the value of one if household has bought health insurance and zero if it has not bought health insurance. Binary dependent variables are extremely common in the social sciences. Since dependent variable can only take two values here, we are not able to use simple OLS. We use binary discrete choice modelling methodology in this study. Here the observed dependent variable is discrete. An appropriate estimator in this case can be either the probit and logit maximum likelihood estimator. We have used probit model in this study to analyse first equation related to health insurance purchase decision⁵.

In the second equation, where only the observations where households having bought health insurance have been used, the dependent variable is measuring extent of health insurance purchase and is a continuous variable. Therefore, we can use OLS in this case. One important point here is that in the second equation we use Inverse Mills Ratio (IMR) as one of the independent variable. IMR is calculated in the first equation. The inverse Mills ratio is a "correction term" for the bias that arises from the selectivity bias problem. Heckman characterized the sample selection problem as a special case of omitted variable problem with IMR being the omitted variable if directly OLS were used on the subsample without using the selection equation, then this estimator is consistent.

In the case of independent variables in both equations other than income and health expenditure, many control variables have been used. These control variables are as follows:

- Age
- Gender
- Education
- Number of children
- Number of people in family

As discussed above we have identified eight qualitative factors which effect health insurance purchase decision. These factors have been identified after interviews and discussions with various stakeholders and based on references from health insurance literature. While analysing the model we will also be using these factors as independent variables. Respondents were asked to rate these variables on the scale of one to five where five is for strongest. These variables have been used as interval variable. The factors which were used in the study are as follows:

⁵ The probit and logit model are indistinguishable from each other except for their tails where logit has fatter tails Gujarati, D. (2003). Basic Econometrics. New York, Mc Graw Hill.. The choice between logit and probit models is largely one of convenience and convention, since the substantive results are generated indistinguishable Long, J. S. (1997). Regression Models for Categorical and Limited Dependent Variables. London, Sage Publications. In the case of multiple equation models like Heckman generally Probit model is preferred.

- Cost
- Quality
- Accessibility
- Coverage of illnesses
- Coverage of services
- Trust
- Illness expenditure
- Knowledge about insurance

The following table provides the definition of variables used in the study. Dependent variable is a binary variable while independent variables are both continuous variables and ordinal variables.

Table 3: Variables and their Definitions

Variable	Definition
Insurance Purchase	Whether any health insurance policy has been purchased has been in the household. This variable is 1 when policy has been purchased and 0 when policy has not been purchased
Extent of Health Insurance Purchase	This is calculated by total amount of premium paid per year divided by Total expenditure per year of the household.
Total Health Expenditure (In Rs.)	Sum of hospitalisation expenses and other healthcare expenditures in past one year.
Total Hospitalisation Cost	It contains hospitalisation cost (in Rs.) incurred by the household in past one year for the treatment of any of the family member.
Other Health Costs	Health expenditure of the family (in Rs.) other than hospitalisation expenditures
Income (In Rs.)	Annual household income. Three variables of income has been used in the study: Income – Income of the household Income ² – Square of the income of household Income ³ – Cube of the income of household
Age	Age of the head of household has been collected and divided into five groups: Group 1 – Less than 25 years Group 2 – 26 to 38 years Group 3 – 39 to 50 years Group 4 – 50 to 62 years Group 5 – More than 62 years
Gender	Gender of the head of the household
Education	Latest Educational qualification of the household head. Education has been divided into five categories and has been treated as continuous variable
Child	Number of children in the family (Child below 18 years)
Members in Family	Number of people in the household
Interval Variables	
Cost	Price of the insurance purchase
Quality	Actual or perceived quality of the services provided on treatment after purchase the policy
Accessibility	Distance of service provider from the household
Coverage of illnesses	Types of illnesses covered in the insurance policy
Coverage of services	Range of medical services covered in the insurance policy
Trust	Trust in the insurer and the service provider
Knowledge about insurance	Knowledge and awareness about the insurance policy and its benefits
Health/Illness expenditure	Expectation of household about healthcare expenditure

One important difference between this study and other studies is the estimation procedure. We are estimating not only the health insurance purchase decision and factors which affects it, but also the factors which are affecting the extent of insurance purchase. The issue of sample selection has been discussed above. The models which were used for the two equations are as follows:

Equation 1 (Probit)

$$\begin{aligned} (\text{Insurance Purchase})_i = & \beta_0 + \beta_1*(\text{Income})_i + \beta_2*(\text{Income}^2)_i + \beta_3*(\text{Income}^3)_i + \beta_4*(\text{Health} \\ & \text{expenditure/Total Expenditure})_i + \beta_5*(\text{Age1})_i + \beta_6*(\text{Age2})_i + \\ & \beta_7*(\text{Age3})_i + \beta_8*(\text{Age4})_i + \beta_9*(\text{Education})_i + \beta_{10}*(\text{Gender})_i + \\ & \beta_{11}*(\text{Hospitalisation Cost})_i + \beta_{12}*(\text{Other Health Costs})_i + \\ & \beta_{13}*(\text{Cost})_i + \beta_{14}*(\text{Quality of Care})_i + \beta_{15}*(\text{Accessibility})_i + \\ & \beta_{16}*(\text{Coverage of illnesses})_i + \beta_{17}*(\text{Coverage of services})_i + \\ & \beta_{18}*(\text{Trust})_i + \beta_{19}*(\text{Knowledge about insurance})_i + \beta_{20}*(\text{Illness} \\ & \text{expenditure})_i + \varepsilon_i \end{aligned}$$

Equation 2 (Outcome Equation)

$$\begin{aligned} (\text{Extent of Insurance Purchase})_i = & \beta_0 + \beta_1*(\text{Income})_i + \beta_2*(\text{Income}2)_i + \beta_3*(\text{Income}3)_i + \\ & \beta_4*(\text{Health expenditure/Total Expenditure})_i + \\ & \beta_5*(\text{Age1})_i + \beta_6*(\text{Age2})_i + \beta_7*(\text{Age3})_i + \beta_8*(\text{Age4})_i + \\ & \beta_9*(\text{Gender})_i + \beta_{10}*(\text{Child})_i + \beta_{11}*(\text{Hospitalisation} \\ & \text{Cost})_i + \beta_{12}*(\text{Other Health Costs})_i + \beta_{13}*(\text{Cost})_i \\ & + \beta_{14}*(\text{Quality of Care})_i + \beta_{15}*(\text{Accessibility})_i + \\ & \beta_{16}*(\text{coverage of illnesses})_i + \beta_{17}*(\text{coverage of services})_i \\ & + \beta_{18}*(\text{Trust})_i + \beta_{19}*(\text{Illness expenditure})_i + \\ & \beta_{20}*(\text{lamda}^6)_i + \gamma_i \end{aligned}$$

We attempt to find the factors determining the probability of health insurance purchase, and at the same time we are trying to find that, once it is decided to buy health insurance, which factors will affect the extent of insurance purchase. For this we are using two separate equations to answer these two questions. As mentioned in the above section, it is a case of sample selection bias and we are using Heckman two-step method to take care of this bias. In this model, the first equation is a discrete choice model using probit which is related to probability of buying health insurance, and second equation is a simple OLS where the extents of health insurance purchase has been analysed.

IV. Data Analysis and Results

Descriptive Results

Descriptive analysis of data tells us basic distribution characteristics. We get important insights from descriptive analysis. Descriptive results for the study related to private health insurance and healthcare expenditure gives an interesting picture of the sample.

⁶ Lamda here denotes Inverse Mills Ratio

The sample size taken for this study is 301 households, out of which 101 households have not bought health insurance and 200 have bought health insurance. Following table gives basic characteristics of the main variables:

Variable	N	Mean	Median	Std Dev	Range
Total Income	301	50623.26	36000	34101.37	228000
Total Expenditure	301	43275.75	36000	25678.11	141600
Total Health Expenditure	301	3562.39	2000	7326.21	87000
Health Expenditure/Total Expenditure	301	0.11	0.0417	0.35	4.83333
AGE	301	40.43	39	11.68	51
Members in the Family	301	4.85	5	2.00	13
Children in the family	300	1.46	1	1.33	8
Old people in the family	300	0.25	0	0.53	3
Number of earning members in family	299	1.24	1	0.57	4
Hospitalisation	295	1.85	2	0.35	1
Total Premium Paid	301	102.91	90	143.56	1350
Health Insurance Premium/Total Expenditure	301	0.00	0.0015	0.01	0.0375
Hospitalisation Cost	301	1039.87	0	3255.01	25000
Other Health Cost	301	2522.52	1200	6032.52	72000

From the above table we can see that in the sample average annual income of the household is around Rs.50,000 and average yearly healthcare expenditure is Rs. 3,562. On an average a household is spending around 11 per cent of its total expenditure on health. In addition a household is spending Rs. 1039 as hospitalisation expenditure per year. Other than hospitalisation costs, other health costs are around Rs. 2,522 per family. Similarly, family size of an average household is a little less than 5 and number of children per household on an average is around 1.5. We can also see that average hospitalisation figure is 1.85, which means that on an average a household needs hospitalisation around two times in a year. Another interesting phenomenon here is that average number of earning members is 1.24 per household, which indicates that in one out of every five houses, two people are earning.

In the sample households can be categorised in two broad parts based on their purchase of health insurance status viz., households which have purchased health insurance and households which have not purchased health insurance. As mentioned above there are 200 households which have bought health insurance and 101 households are of the type which have not bought health insurance. Following tables give descriptive statistics of households after segregating them on the basis of insurance status.

From the following two tables we can see that there is a distinct difference between the two groups. It is observed that households which have bought insurance have higher annual income than that of non-insured households. One reason for this can be the number of earning members, which is higher in the case of insured households. Also if the income of the household is higher it will have more money to buy health insurance and pay the premium. Total healthcare expenditure of non-insured households is lower than insured households. Healthcare expenditure as a percentage of total expenditure is also higher for insured households. This means that households which spend more of their expenditure on healthcare have more probability of buying health insurance. Another very important figure

which we can see here is hospitalisation cost. There is not much difference between the average hospitalisation cost of non-insured households (Rs. 1034) and insured households (Rs. 1042).

Table 5: Descriptive Statistics – Non-Insured Households

Variable	N	Mean	Median	Std Dev	Range
Total Income	101	42190.10	36000	22431.81	102000
Total Expenditure	101	37770.30	36000	21196.63	111600
Total Health Expenditure	101	3115.84	1200	5885.91	32000
Health Expenditure/Total Expenditure	101	0.09	0.0238	0.16	0.88889
AGE	101	39.16	35	12.59	50
Members in the Family	101	4.47	4	1.84	10
Children in the family	100	1.27	1	1.31	6
Old people in the family	100	0.22	0	0.48	2
Number of earning members in family	100	1.18	1	0.44	3
Hospitalisation	100	1.86	2	0.35	1
Total Premium Paid	101	0.00	0	0.00	0
Health Insurance Premium/Total Expenditure	101	0.00	0	0.00	0
Hospitalisation Cost	101	1034.65	0	3216.56	20000
Other Health Cost	101	2081.19	400	4881.33	32000

Table 6: Descriptive Statistics – Purchased Insurance

Variable	N	Mean	Median	Std Dev	Range
Total Income	200	54882.00	36000	38025.53	228000
Total Expenditure	200	46056.00	36000	27296.31	141600
Total Health Expenditure	200	3787.90	2000	7959.47	87000
Health Expenditure/Total Expenditure	200	0.13	0.0512	0.41	4.83333
AGE	200	41.07	40	11.17	49
Members in the Family	200	5.05	5	2.05	13
Children in the family	200	1.56	1	1.34	8
Old people in the family	200	0.27	0	0.56	3
Number of earning members in family	199	1.28	1	0.63	4
Hospitalisation	195	1.85	2	0.36	1
Total Premium Paid	200	154.88	90	151.59	1330
Health Insurance Premium/Total Expenditure	200	0.00	0.0025	0.01	0.03717
Hospitalisation Cost	200	1042.50	0	3282.27	25000
Other Health Cost	200	2745.40	1200	6537.50	72000

On average we can see that insured households have bigger family size than non-insured household ones. Similarly insured households have more children than non-insured households. Also, hospitalisation cost is more for insured households indicating insured households consuming more hospital services. Since the present health insurance schemes only cover hospitalisation cost, it is expected that households with high hospitalisation cost will have higher probability of buying health insurance.

Results of the Data Analysis

Household income has been found as one important determinant of health insurance purchase decision. Health expenditure also is expected to have positive association with health insurance purchase decision. There are other variables having a role in determining probability of health insurance purchase and we have incorporated them in our model estimation. Based on the discussion with customers, insurance provider and insurance agents we also introduce additional set of ordinal variables in our estimation. These variables are on five point scale, and when we are using them in the model we are treating these ordinal variables as interval variables. It means that difference between 1 and 2 is same as difference between 2 and 3.

Use of ordinal variables such as 5-point Likert scales with interval assumption has been used in contemporary social science research. Jaccard and Wan (1996) suggest that for many statistical tests assumption of non-interval do not seem to affect Type I and Type II errors dramatically. Standard citations to literature showing the robustness of correlation and other parametric coefficients with respect to ordinal distortion are Labovitz (1967, 1970), Kim (1975), Zumbo and Zimmerman (1993).

Test for Multicollinearity

Before running the model it is important to see here that whether the independent variables have problem of multicollinearity. The presence of multicollinearity leads to estimation problems leading to large variances of the OLS estimates of the parameters of the collinear variables⁷. The inverse of the correlation matrix is used in detecting multicollinearity. The diagonal elements of this matrix are also called Variance Inflation Factors, VIF_i . They are given by $(1-R_i^2)^{-1}$ where R_i^2 is the R^2 from regressing the i^{th} independent variable on all other independent variables. A high VIF indicates a R_i^2 near unity and hence suggests collinearity. As a rule of thumb, for standardised data a $VIF_i > 10$ indicates harmful collinearity. We found that VIF for all the independent variables in both the equations are quite low. Therefore, we can safely assume that data does not have problem of multicollinearity.

Model Estimation

We have used SAS (Version 9.1) software for econometric analysis of data. A special SAS programme macro was used to estimate Heckman two-step model parameters⁸. This program uses PROC PROBIT, and PROC REG to consistently estimate the parameters and their standard errors in a Heckman selection-correction model. The result of the estimation for first equation is given in the following table:

⁷ Peter Kennedy, A Guide to Econometrics (Fifth Edition), Blackwell Publishing, pp 206

⁸ This programme has been developed by Mr. David A. Jaeger, from University of Michigan

Table 7: Results of Probit Model

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Intercept	-3.30072	1.000958	-3.298	0.001
INC**	6.04E-05	3.61E-05	1.672	0.095
INC2	-1.05E-09	6.79E-10	-1.549	0.121
INC3	5.94E-15	3.75E-15	1.585	0.113
HE_TE***	2.136817	1.22566	1.743	0.081
EDUCATION	-0.00481	0.096323	-0.050	0.960
GENDER	-0.35887	0.30696	-1.169	0.242
HOSP_COST	-7.36E-05	4.84E-05	-1.519	0.129
OTHER_HEALTH_COST	-4.16E-05	3.53E-05	-1.179	0.239
AGE1	0.822803	0.600505	1.370	0.171
AGE2	0.798716	0.529398	1.509	0.131
AGE3***	1.000168	0.527803	1.895	0.058
AGE4**	1.112671	0.5714	1.947	0.052
COST	-0.02478	0.132259	-0.187	0.851
COVERAGE_OF_ILLNESSES**	0.232682	0.121444	1.916	0.055
COVERAGE_OF_SERVICES	0.055466	0.112395	0.493	0.622
HEALTH_ILLNESS_EXP*	0.27861	0.108994	2.556	0.011
NEARBY	-0.04261	0.101977	-0.418	0.676
QUALITY_OF_CARE	0.045143	0.107824	0.419	0.676
TRUST_IN_INSURER	-0.13966	0.120621	-1.158	0.247
KNOWLEDGE_ABOUT_INSURANCE**	0.244945	0.108633	2.255	0.024

* Significant at 1%, ** Significant at 5%, *** Significant at 10%

The results suggest that health expenditure variable in the forms of health expenditure as a percentage of total expenditure is statistically significant.

Total Income variable is also significant and have positive sign. This means that higher the income of the household, higher is the probability of buying health insurance of the households. Income was expected also to come significant and positively associated with probability of purchasing health insurance. Most of the studies which have analysed health insurance purchase decision have found income as a significant factor (Scotton 1969, Propper 1989, Savage 1999).

In other variables, dummy variable for age is coming significant for higher age groups. This shows that in higher age groups people have more probability of purchasing health insurance while in lower age groups, age is not statistically significant. Here age signifies more risk and also may be more maturity to understand risk and try to minimize it by purchasing health insurance.

In the case of perception variables three of the eight variables are statistically significant and positively associated with purchase of health insurance. These variables are coverage of illnesses, knowledge about insurance and health/illness expenditure. From the discussion and interviews it came out that knowledge about insurance is very important and one of the important reasons for buying health insurance and in the results this factor came significant and positive which indicates that building more awareness about health insurance will influence the probability of buying health insurance. Another factor which is significant is that of coverage of illnesses, which indicates that if the policy is better designed in terms of the illnesses which are covered, there is higher chance of people buying it. Last but very important factor which is statistically significant and positive is that of health/illness

expenditure. Here it shows that if households perceive that they will have higher health expenditure in the future there is more chance that they will buy health insurance.

From the results we can see that health expenditure is statistically significant factor affecting health insurance purchase decision as both quantitative and qualitative variables. This indicates that present healthcare expenditure (which is reflected by health expenditure variable) and their perception about future healthcare risks and expenditure (reflected by qualitative perceptual health/illness variable), both plays an important role in affecting the health insurance purchase decision. Higher the present health care expenditure higher will be the probability of buying health insurance and also the higher the perception about future healthcare expenditure, greater will be the probability of purchasing health insurance.

After analyzing the decision to purchase health insurance, the second equation which is also called outcome equation analyses the extent of health insurance purchase decision. Extent of health insurance has been defined as percentage of total expenditure which is paid as premium. Other than regular variables as independent variables one independent variable here is IMR (Inverse Mills Ratio) which has been estimated from the first equation. When added to the outcome equation as an additional regressor, it measures the sample selection effect due to lack of observations on the non-health insurance purchasers. Its addition results in the consistent estimation of the remaining coefficients of the equation (Dolton and Makepeace 1986). This variable should be statistically significant to justify the use of Heckman two-step method. If this does not come significant then there may not be sample selection problem in the data and we do not need to use Heckman method.

Results of second equation are given in the following table:

Important Statistics			
R-squared	0.3597	Mean dependent var	0.0047
Adjusted R-squared	0.2855	S.D. dependent var	0.0057
S.E. of regression	0.0048	F-statistic	4.8490
Sum squared resid	0.0038	Prob (F-statistic)	0

Value of parameter estimates of the variables is given in the following table:

Table 8: Results of OLS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.0062	0.006464	-0.9597	0.3386
TI*	-3.73E-07	9.76E-08	-3.8167	0.0002
INC2*	3.51E-12	1.03E-12	3.4147	0.0008
INC3*	-8.98E-18	2.76E-18	-3.2473	0.0014
HE_TE	0.0068	0.0053	1.2672	0.2069
GENDER	-2.08E-05	0.000978	-0.0213	0.9830
AGE1*	0.0068	0.0024	2.8402	0.0051
AGE2*	0.0079	0.0025	3.1447	0.0020
AGE3*	0.0084	0.0026	3.2035	0.0016
AGE4*	0.0093	0.0028	3.3341	0.0011
HOSP_COST	1.86E-08	2.16E-07	0.0859	0.9317
OTHER_HEALTH_COST	-2.47E-07	1.62E-07	-1.5266	0.1288
COST	8.12E-05	0.0004	0.1907	0.8490
QUALITY_OF_CARE	-0.0003	0.0005	-0.5133	0.6085
NEARBY	-0.0005	0.0005	-1.0168	0.3108
COVERAGE_OF_ILLNESSES***	0.0012	0.0007	1.7927	0.0749
COVERAGE_OF_SERVICES	3.54E-05	0.0005	0.0709	0.9436
HEALTH_ILLNESS_EXP**	0.0015	0.0006	2.3983	0.0176
CHILD**	0.0008	0.0004	2.2960	0.0229
LAMBDA**	0.0086	0.0035	2.4469	0.0155

White Heteroskedasticity-Consistent Standard Errors & Covariance

* Significant at 1%, ** Significant at 5%, *** Significant at 10%

While estimating the second equation we hypothesised that income may not be linearly related to extent of health insurance purchase. This is based on the premise that though income is an important factor, it is used for many purposes and importance of insurance premium will change with the level of income and therefore, may have a non-linear relationship. We have included income square and income cube to explore the behaviour of insurance coverage at different levels of income and hence test the non-linearity behaviour. The results indicate that unadjusted Income is statistically significant but negative, income square is significant and positive and income cube is significant but again negative. This kind of behaviour validates our hypothesis that income variable is behaving in a non-linear manner indicating income varies negatively with increase in extent of health insurance purchase but after a point it starts increasing and varies positively with extent of health insurance purchase. In the end it again changes direction and start varying negatively with extent of health insurance purchase (indicating S-shaped behaviour). The explanation of this kind of behaviour is intuitive which indicates that up to a certain point of income increase household allocate resources to other uses and purchase less health insurance, after that point income increase will result in more purchase of health insurance as people now can afford to buy more health insurance and it will save them from future potential risk. At higher levels of income household purchase of insurance decreases with increase in income as households are willing to retain the risk.

Number of children in the family variable is also statistically significant and positive indicating that higher the number of children in the family, the household are likely to buy more health insurance. This result is according to the expectations and also similar to few other studies. Age as dummy variable is significant and positive for all age groups. This means that age is an important variable in deciding the extent of insurance and people in higher age groups relatively spend more on insurance. This is indicated by increasing coefficient of variable as age group increases.

Two other variables, coverage of illnesses and health/illness expenditure, which are significant in the first equation, are also significant here. This indicates that higher the perception of coverage of illnesses in the policy, more will be the extent of insurance purchase. Similarly, perception about the future healthcare expenditure influences higher expenditure on health insurance. These two variables show that illnesses coverage perception and future expectation about the healthcare expenditure are important for the health insurance purchase decision and also for the extent of health insurance purchase decision.

The results also indicate that the IMR (Inverse Mills Ratio) variable estimated from first equation is statistically significant. The significance of IMR suggests that use of Heckman two-step method estimation was correct in this case and if we would have used only one equation model we would have lost some valuable information in the analysis. When we run second equation without IMR then we can see that results are different and it would have given us biased results therefore, it was important to use Heckman method to take care of sample selection bias.

The key results of this study can be summarised as follows:

- In the literature income has been found to be important factor. This study confirms this result. Higher income increases the probability of purchasing health insurance.
- Health care expenditure as per cent of total expenditure has significant influence on insurance purchase decision. Another variable reflecting individual's perception regarding the expected healthcare expenditure has been found to be significant.
- The perception about the design and coverage of illness in health insurance policy is significant and determines the decision to purchase the insurance and also influences the amount of spending on insurance. The information and awareness to consumers plays important role in insurance buying process. This suggests that in a country like India awareness about health insurance and its benefits is a very important factor which affects its purchase decision. If more people can be made aware about health insurance and its benefits then there is high probability that more people will be buying health insurance policies. Also more knowledge about health insurance will help them in making an informed choice about their purchase
- This paper analyses the determinants of decision to purchase the insurance and the extent of purchase in two stages. Income level has been found significant in affecting the probability of decision to buy. The extent of purchase is related to income in a non-linear fashion indicating that household spends more on health insurance only after certain level of income. At higher level of income the spending on health insurance is less suggesting retention of risk at household level and ability to pay for healthcare costs.
- The number of children in family is another significant factor which affects the extent of health insurance purchase. This result is intuitive and shows that households with more children spend more on health insurance.

V. Conclusion

The insurance sector in India was liberalised with the opening up of health insurance to private players. Given the need and health financing situation in India it was expected that health insurance will emerge as significant component of the non-life insurance sector and experience a significant growth because of the huge potential of the market coupled with the new products and efficiency which the private players will bring. Though health insurance market did grow at around 40 per cent per annum, it is much less than the expected and even

after a decade of opening up of the sector, only less than 2 per cent of people are covered by private health insurance. A large section of people belonging to lower income groups cannot afford insurance. Several micro health insurance schemes have been developed and implemented by CBOs and NGOs in the country. Despite their affordability and access, a large segment of population remains uninsured in most of these schemes. This raises important questions focusing on what determines the purchase of insurance in the first place and what influences the amount of insurance purchase.

This paper makes an attempt to understand the factors affecting health insurance purchase decision. The subsequent question which we analyse is what factors determine the amount of money spent on insurance i.e., extent of insurance purchase. Results of this paper have important implications not only for the insurers but also for the government, healthcare providers and policy makers.

For insurance companies results of this study provide some important suggestions. The results show that a very important factor in India for customers to buy health insurance is related to their awareness and knowledge about insurance. Therefore, it is imperative for companies to educate people about the concept of health insurance and its benefits. Right now the awareness level and knowledge about health insurance is abysmally low even in urban people. This factor becomes all the more important in the case of micro insurance because micro insurance schemes would not have adequate funds to spend on marketing of products and building on awareness. Also, potential buyers of micro insurance schemes would be belonging to a profile having low paying capacity, low education level and geographically distributed. Having these as customers is challenge. Building awareness among these groups about the health insurance is critical. CBOs offering micro insurance products generally would have low margins and very low budget for promotion and communication, therefore, it becomes very important issue to achieve higher knowledge and awareness among customers about health insurance with less spending. The need here is to find more innovative and economical methods for spreading awareness about health insurance by involving community based workers and developing appropriate incentive scheme for them to promote micro insurance. Policy makers and regulators having development role also have to involve in building awareness and educations about micro insurance products.

The results also suggest that health insurance purchase decision is positively related to income of the household. This means that households belonging to lower income groups would have lesser probability of buying health insurance. The objective of micro insurance schemes is to protect the poor from catastrophic costs by offering products at affordable premiums. If income is an important determinant here then people belonging to lower income groups have less probability of purchasing health insurance and therefore they will be left out. There is need to develop interventions which would ensure that poor people are covered and become members of micro insurance schemes. This may be done by partly subsidising the premiums by the government. Subsidising for the premium has its own issues that what percent of premium should be covered by subsidy and till how long subsidy should be provided. Appropriate subsidy may be worked out based on the local conditions and income distribution of community. Another important issue related to subsidy is that for whom and on which criteria(s) this subsidy should be provided.

The results indicate that health expenditure and expectations about the health expenditure are significant variables which positively determine the health insurance purchase decision. Both health expenditure amount and perceptions about health expenditure variables are coming as significant in the study which has significant implications for insurance providers.

These results indicate that micro insurance schemes may be vulnerable to significant adverse selection problem. Adverse selection has been found to be serious problem with health insurance in general as reflected by high claim ratios. In case of micro health insurance it is all the more important because this problem will make these schemes further vulnerable. The micro insurance schemes would have lesser option to reduce this vulnerability as number of member and community willing to buy the insurance are limited in number. This makes risk pool small and adverse selection problem will get manifested in major way. Micro insurance schemes need to work in this area to reduce these risks. Some methods which have been used in other countries to tackle problem of adverse selection are segmenting customers using risk categories, increasing the risk pool and/or insure the whole family instead of an individual. Since these methods have been developed elsewhere, there is need to pilot some method(s) keeping in mind the unique issues associated in Indian micro insurance schemes.

Emanating from the discussion above another related issue here is financial management of micro insurance schemes. Most of the micro insurance and community based health insurance schemes are managed by the NGOs or CBOs. Fund management for these schemes are also being done at local level. The experience of Mediciam suggest that claim ratio of health insurance schemes is high in the range of 120-130 percent. Given the above discussion the micro insurance schemes are vulnerable to high claim ratios. This suggests that these schemes need to be managed professionally. The micro insurance will require this expertise and this should be made available for sustenance of these schemes. Given the cost it may not be possible for all micro insurance to acquire this expertise. In the absence of good financial management of the scheme, it will be vulnerable to high claim ratio, increase in premium, and in both of these situation in the end pushing these schemes to become unaffordable. One way to bring professional management to the fund is to tie-up with an existing health insurance company and collaborates with them. Alternatively, IRDA may consider creating a technical support organisation for these micro insurance schemes.

This study has identified several issues and challenges from the insurer point of view. These also have broader implications at policy level. IRDA needs to take definitive steps to not only promote and develop private insurance sector but also it should give special attention to micro insurance and community based health insurance schemes. In a diverse country like India, a good mix of health insurance mechanisms is needed to cater to different groups of population. This study also raises some important issues which can be studied in future. Adverse selection related issues can be analysed empirically using micro health insurance data. Since health insurance policies are renewed every year. It may be important to study what factors determine the renewal of policies in micro insurance environment.

Appendix 1

Health Indicators in comparison to few other countries			
	India	Brazil	China
Total population (in'000)	1,065,462	178,470	1,311,709
GDP per capita (Intl \$, 2002)	1,568	7,762	4,460
Life expectancy at birth m/f (years)	60.0/63.0	66.0/73.0	70.0/73.0
Healthy life expectancy at birth m/f (years, 2002)	53.3/53.6	57.2/62.4	63.1/65.2
Child mortality m/f (per 1000)	85/90	39/32	32/43
Adult mortality m/f (per 1000)	283/213	240/129	164/103
Total health expenditure per capita (Intl \$, 2002)	96	611	261
Total health expenditure as % of GDP (2002)	6.1	7.9	5.8

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