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Adverse Selection and Private Health  
Insurance Coverage in India  
A Rational Behaviour Model of Insurance Agents  
under Asymmetric Information

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## Foreword

Financial barrier is still a dominant problem for access to necessary healthcare for majority of the Indians. To ensure universal and comprehensive healthcare to its citizens, alternative healthcare financing strategies like health insurance are being widely accepted. However, despite health insurance being an equitable and efficient solution, the health insurance coverage still remains at an infant stage in our country.

This study specifically addresses the issue of low level of health insurance coverage with special reference to private health insurance. The study analyses the rational behaviour of insurance agents in the scale-up process of health insurance in an imperfect market. Moreover, the study discusses the impact of such rational behaviour of insurance agents on inequity in health insurance coverage and adverse selection. This study will surely add to the existing body of literature on health insurance and has direct policy relevance.



**(Rajiv Kumar)**  
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February 18, 2009

## **Abstract**

In the backdrop of the low level of health insurance coverage in India, this study examines the determinants of the scaling-up process of health insurance by analyzing the rational behaviour of an insurance agent facing a trade-off between selling ‘health insurance’ and ‘other forms of insurance’ subject to his limited time and efforts, and the implications of such behaviour on adverse selection and equity. The paper presents various pre-conditions affecting the rational behaviour of insurance agents and also discusses two new concepts— ‘insurance habit’ and ‘asymmetric information on health insurance schemes’. Further, the study examines various strategies followed by insurance agents for maximizing their net incomes. The theoretical proposition is empirically validated by applying a binary Probit model and the primary data collected by the author is used in this context. The study concludes that given the existing incentive systems in the Indian insurance market for promoting various forms of insurance, the low level of insurance awareness among the general public, coupled with the dominant role of insurance agents in the market results in a situation of: 1. Low level of health insurance coverage, 2. No adverse selection and 3. Inequity in health insurance coverage.

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**JEL Classification:** *I11, D82*

# **Adverse Selection and Private Health Insurance Coverage in India**

## **A Rational Behaviour Model of Insurance Agents under Asymmetric Information**

**Sukumar Vellakkal\***

### **1 Motivation**

In India, out-of-pocket spending by households on healthcare occupies about 72 per cent of the total health expenditure (WHR 2006) and it pushes 2.2 per cent of the population below the poverty line each year (Peters et al. 2002). Health Insurance (HI) can be a viable and feasible financial solution [Churchill et.al 2006; O'Donnell et al. 2005] on both efficiency and equity grounds. However, HI coverage is very low in India. The existing public HI schemes such as the Central Government Health Scheme (CGHS) and the Ex-servicemen Contributory Health Scheme (ECHS) are limited to central government employees, retired army personnel and their eligible dependants. Similarly, the Employees State Insurance (ESI) schemes only cover workers in the organized sector. There are some micro health insurance schemes being operated by various civil society organizations for special target groups; however, these are limited to some specific geographical locations and their penetration is also still very low. Private Health Insurance (PHI) schemes by insurance companies seem to be another viable option for all segments of society, but these have covered only 1.4 per cent of the population until now (IRDA 2005). The underlying reasons for such low coverage are mostly unexplained.

It has to be recalled that India does not have a history of a high level of HI coverage at once upon a time and the coverage falling to the present level so that we have enough lessons to list out why the HI coverage is at very low level. In fact, so far there have been no significant studies that have addressed this particular issue. From a demand side perspective, several studies indicate that people are willing to pay for HI (Dror et al. 2007; Gumber and Kulkarni 2000; Mathiyazhagan 1998; Sodani 2001]. Moreover, the existence of a partially subsidized public healthcare system, absence of proper awareness on risk pooling forms of HI, poor trust in insurance companies and the inability of the people in the informal sector to deal with insurance companies are some

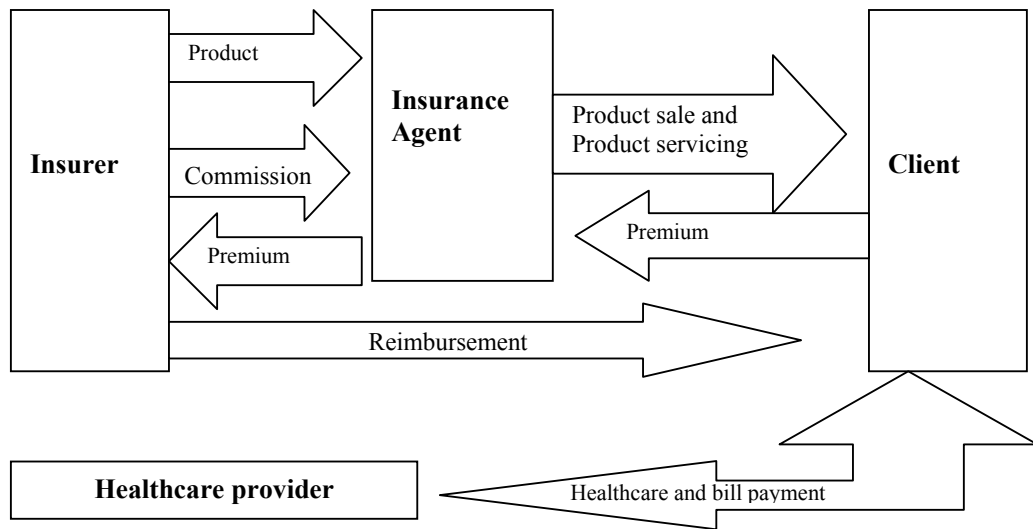
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of the other plausible reasons for the low level of HI intake in India (Vellakkal 2008). On the other hand, from a supply side perspective, the biggest challenge—and an opportunity as well—for insurers is converting the large out-of-pocket spending to a formal risk pooling mechanism which people have never been exposed to before. While performing this task, insurers also have to overcome various impediments such as absence of proper morbidity data and market failure issues such as adverse selection and moral hazard that would make insurance companies reluctant to sell HI. In these contexts, this paper makes an attempt to analyze some of the plausible reasons for the low level of HI coverage in India with special reference to private health insurance.

Private health insurance schemes fall under non-life (general) insurance categories and have a term of one year and can be renewed every year subject to the approval of the insurance company. On the other hand, life (non-general) insurance policies are long-term schemes, say for example, ranging from one to 15 years and more. Private health insurance in India is based on the partner-agent model (see Figure 1) and insurance agents are an important stakeholder between the insurer and the clients.

**Figure 1: Indian Private Health Insurance Model (Partner-Agent Model)**



Apart from their agency role, insurance agents also provide various other services to clients such as premium collection and assistance in claims. As per the law, insurance products can be sold or bought through a licensed insurance agent only. Earlier, an

insurance agent could have a license to sell general insurance as well as non-general insurance schemes, and he could also be affiliated to more than one insurance company. However, after the establishment of the Insurance Regulatory and Development Authority (IRDA) in 2000, an insurance agent can have a license for selling either life (non-general) insurance schemes or non-life (general) insurance schemes and can be affiliated to only one insurance company at a time. An insurance agent is monetarily rewarded by the insurance company in terms of a commission amount which may vary according to the type and volume of the insurance policy that he will be selling.

This paper is divided into seven sections: Section 2 discusses the data source and methodological aspects. Section 3 presents the conceptual and analytical framework and its theoretical significance as various pre-conditions affecting the rational income maximizing behaviour of insurance agents in the Indian health insurance market. Section 4 examines the nature of the problem of adverse selection with special relevance to the Indian context and Section 5 presents the model of rational behaviour of insurance agents and the various strategies that they follow for maximizing income. Section 6 discusses the empirical validation of the theoretical model and the final section discusses policy implications and provides a discussion and conclusion.

## **2 Data and Methodology**

The main source of data for this study is the primary survey conducted by the author among households and insurance agents. A household (family) is taken as the sample unit<sup>1</sup> to understand the factors determining the decision to buy HI; for this household heads (decision-makers) were interviewed. The total sample size is 400 households comprising of 200 insured and 200 un-insured households.

The study takes into consideration both types of households: 1. Households with private health insurance coverage (hereafter called insured or insured people) and 2. Households without any form of health insurance (hereafter called un-insured or un-

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<sup>1</sup> As argued by writers like Ngui, Burrow and Brown (1990), the health of one family member (income unit) may affect the utility of others. As income is likely to be shared between all members of the family, the financial costs associated with one member seeking treatment will also be shared. As such, the utility of all members of the family may decline in the event of one of the members falling ill.

insured people) from the state of Kerala, India. The insured households were identified as those having enrollment in the Mediclaim policy<sup>2</sup> of the four public sector insurance companies—the National Insurance Company (NIC), United Insurance Company (UIC), New India Assurance Company (NIAC) and the United India Insurance Company (UIIC) for at least one member of the family. The Mediclaim policy of the four public sector insurance companies was selected as the sample HI scheme because HI in India is generally equated with the Mediclaim policy. Moreover, the Mediclaim policy has been in the market since 1987 and holds the lion's share of the Indian HI market.

In this paper insured people refer to those who have bought the Mediclaim policy and un-insured people refer to those who do not have the Mediclaim policy, irrespective of their enrollment status with any of the other forms of insurance. The sample of un-insured households was selected from the same locations as the insured households. The households were selected from the districts of Kasargod (less developed) and Trivandrum (developed) in Kerala. Both the districts are characterized by the presence of urban, semi-urban and rural areas. Interviews and peer group discussions were also conducted with insurance officials including insurance agents with the help of a semi-structured interview schedule.

### **3 Conceptual and analytical framework**

I now discuss some of the concepts that have been used in this paper and their theoretical significance as pre-conditions for the rational behaviour of insurance agents. For the ease of discussion, the various concepts are organized under two heads: 1. Awareness about the insurance system and 2. Asymmetric information health status and health insurance schemes.

#### ***3.1 Awareness about the Insurance System***

Rational or purposeful choice among consumers is possible depending upon their disposable income and knowledge about their own preferences; when consumers have

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<sup>2</sup> Among the prevailing schemes, the Mediclaim policy is the oldest and is also relatively more popular.



trouble in gathering and understanding information on preferences, the ability to make informed decisions is compromised (Rice 1998). A key element for the smooth functioning of HI markets is the premise that all consumers have access to the same information as the providers and purchasers of HI and also they understand this information. If this condition is satisfied, individuals will be able to judge the value of the products offered in the HI market, like for instance, the HI package, its price, its quality and related customer services. Thus, one can expect that a well-informed consumer can make wise decisions in the market—whether to buy or not, what to buy, from whom to buy and how much to buy for.

Awareness or familiarity about insurance among the people is a broad and subjective concept. I classify and define it under two layers: 1. Basic awareness about various forms of insurance and 2. Joining status with various forms of insurance and term this as the ‘insurance habit’.

### **Basic Awareness**

Basic awareness on insurance is defined as a situation where people have at least heard about the various aspects of insurance. I consider this the first layer of awareness and measure it as: whether people have heard about insurance providers in terms of general insurers and non-general insurers as well as in terms of public and private sector ownerships and also whether they have heard about various insurance products. Further, I also measure whether the insured people had heard about other forms of HI at the time of buying the present one.

### **Insurance Habit**

‘Insurance habit’<sup>3</sup> is a new concept introduced in this paper to capture the awareness and familiarity that people have about the insurance system. ‘Insurance habit’ is defined as the enrollment status of people with various forms of insurance and this is considered the second layer of awareness.

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<sup>3</sup> The concept of the ‘insurance habit’ is developed by borrowing some ideas from a concept called ‘banking habit’ which has been defined as the familiarity of the people with banks by making various transactions like borrowing and depositing.

‘Insurance habit’ is measured by classifying insurance products into two types: 1. Non-general insurance schemes with both saving and risk components (S+R) and 2. General insurance schemes with only the risk component (R). Here, on the basis of the joining status to insurance the households can be classified into: 1. With only non-general insurance (S+R components), 2. With only general insurance (R component), 3. With both non-general insurance and general insurance and 4. With no insurance (except HI in the case of the insured sample).

I hypothesize that the lower the awareness or familiarity of the people with the insurance system, the higher will be the discretionary and influential role of an insurance agent in the market. Further, I also hypothesize that the higher the familiarity of people with various forms of insurance schemes, the higher will be their probability to join HI, keeping ‘other things’ constant. In fact, the insurance policies of the non-general insurance companies in India are viewed as schemes having both saving and risk components, whereas the general insurance schemes are seen as only having the risk component.<sup>4</sup> HI products are featured by pure risk component (risk pooling HI) alone. Obviously, it is quite possible that people who have bought insurance policies such as life, motor vehicles or any other forms of insurance would be more motivated to buy a HI policy than their counterparts because they will be more aware of the importance of insurance as well as the modalities involved in joining, making premium payments, renewal and making claims. Therefore, I further hypothesize that the level of awareness about both types of insurance products will have a positive influence on people about risk pooling HI products than among those without such awareness.

### ***3.2 Asymmetric Information on Health Status and Health Insurance Schemes***

Another issue that signifies the dominant role of insurance agents in the insurance market and hence affects their rational behaviour is their comparative informational advantage due to asymmetric information. Asymmetric information arises when one agent has relatively better information than the other agent about some parameters that

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<sup>4</sup> The Indian insurance market comprises of both the general (non-life) insurance and the non-general (life) insurance. Examples of general insurance products include fire insurance, marine insurance, motor vehicle insurance and HI; and non-general insurance products are mainly life insurance policies.

are relevant for the relationship (Akerlof 1970). In this study, I discuss asymmetric information on two parameters by three stakeholders, i.e., asymmetric information on health statuses (risk) of prospective clients and health insurance schemes by an insurance agent, insurer and client.

First I discuss the asymmetric information on the health status of prospective clients in the context of the above model. Among these three stakeholders, there is no doubt that the clients will know more about their health status as compared to the insurance agent and insurer. But, when it comes to an insurance agent and the insurer, the insurance agent would have relatively more information about the health status of prospective clients than the insurer. This is because insurance agents recruit their clients from the socio-economic and geographical locations that they are more familiar with; in this way, there is higher probability of their knowing the health status aspects of their prospective clients as compared to the insurers. To state it simply,  $IHR_i < IHR_a < IHR_c$ , where 'IHR<sub>i</sub>', 'IHR<sub>a</sub>' and 'IHR<sub>c</sub>' refer to the level of information about the health status (health risk) of prospective clients by insurer, insurance agent and client, respectively.

Similarly, there will be asymmetric information on HI schemes as well. If the people are not aware of the various aspects of the insurance market and insurance agents are the main source of information on HI schemes, it can be argued that insurance agents perhaps know more about various aspects of HI schemes than prospective clients but less than the insurers. Let us denote this as  $IHI_i \geq IHI_a > IHI_c$ , where 'IHI<sub>i</sub>', 'IHI<sub>a</sub>', and 'IHI<sub>c</sub>' refer to the level of information on HI scheme by insurer, insurance agent and client, respectively.

#### **4 Problem of Adverse Selection**

Adverse selection is perceived to be a major source of market failure in insurance markets and is present in all lines of insurance due to hidden information (Akerlof 1970; Knight and Coble 1997). Adverse selection is one of the major hurdles for insurance companies in selling their HI schemes to clients. It is a situation of high-risk people buying HI with the result that there is over-representation of such high-risk people in the risk pool. Individuals know more about their health conditions than the

insurance companies; people who insure themselves are those who are increasingly certain that they will need health insurance and buy more insurance (Akerlof 1970; Rothschild and Stiglitz 1976; WDR 1993). This situation would lead to higher than average premiums for the group and create an incentive for low-risk individuals to drop out of the group in search of lower cost coverage elsewhere. Finally, it would result in the collapse of such a risk pool.

Several theoretical and empirical studies have addressed the adverse selection problem in the insurance market and have also shown that it is in fact a serious problem for insurers. Theoretical works by Akerlof (1970), Miyazaki (1977), Rothschild and Stiglitz (1976) and Wilson (1977) describe separating equilibria, where high-risk consumers purchase policies with higher coverage than the policies that is purchased by low-risk consumers. Rothschild and Stiglitz (1976) examine the market equilibrium with and without full information on consumer health risks by insurers. In their model, when the insurers had full information about consumer risk characteristics, all risk-averse consumers offered to purchase full insurance at actuarially fair prices. Miyazaki (1977) extends the separating model to allow cross-policy subsidization, resulting in a wealth transfer from low-risks to high-risks. In addition to a separating equilibrium, Wilson (1977) describes a pooling model where high and low-risks purchase the same policy so that the low-risks actually subsidize the insurance purchases of the high-risks.

Studies by Browne and Doerpinhaus (1993), Cameron et al. (1988), Cardon and Hendel (1996), Ellis (1985), Juba et al. (1980), Marquis (1992), Marquis and Phelps (1987), Wrightson et al. (1987) and Van de Ven and Van Vlenit (1995) found evidence of the presence of adverse selection in HI markets. But, Phelps (1976) found no systematic relation between predicted illnesses of individuals and insurance choice. Dowd et al. (1991) also did not find any evidence of adverse selection in their Minnesota sample. Farley and Monheit (1985) reveal a kind of ‘ambiguous’ selection bias in the choice of HI.

Despite the fact that the Indian HI market is an emerging one, it is characterized by the availability of only a few products and the absence of distinctive HI plans like the more

generous plan and the less generous plan.<sup>5</sup> In this situation, people can decide to either buy HI and also for how much, but they do not have the option of selecting plans according to their own health status and morbidity conditions. Since all agents face the same (unit) price, other than the discrimination based on the age factor,<sup>6</sup> high-risk individuals are in fact subsidized, whereas low-risk agents are taxed. The latter are likely to buy no or less insurance, or those who have already bought may even leave the market. Thus, insurers can literally anticipate a huge adverse selection problem in India. In this context, I examine the role of insurance agents in adverse selection as well as in the scale-up of HI and equity.

## **5 Rational Behaviour of Insurance Agents**

I presume that the following conditions have to be fulfilled for determining the level of HI coverage, adverse selection and inequity in HI coverage by an insurance agent while maximizing his income:

1. An imperfect market where people are not completely aware of the various aspects of the insurance market and insurance agents are the main source of information on HI.
2. There is comparative informational advantage for insurance agents on important parameters like HI schemes as well as the health risk of prospective clients.

In general, an insurance agent faces a situation of promoting a high income or other forms of net profit oriented insurance policies (e.g. the life insurance policy) versus one or the other high-risk oriented, ‘after sales service’ oriented policies like HI. Under normal circumstances, giving his individual choice and rationality, an insurance agent may choose to only promote and sell ‘other forms of insurance’ policies. However, either because of official compulsions (due to the clause of a 5 per cent rural/social quota), social obligations and moral commitments he may choose to promote some HI policies. In short, an insurance agent tries to maximize his net income subject to the

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<sup>5</sup> The generousities of insurance plans are determined on the basis of healthcare benefits covered by the plans.

<sup>6</sup> In the Indian health insurance market, premiums are risk-rated based on the age factor.

fixed amount of time and effort (and energy) at his disposal in a situation of promoting both types of insurance schemes. Therefore, the following types of questions arise about his insurance promoting behaviour:

- a) What will he do if the net income from selling HI is negative but he is compelled to sell some?
- b) What will he do if the net income from selling HI is positive, just as that from the sale of other forms of insurance policies?

An attempt is made here to model the behaviour of a representative insurance agent under two different circumstances:

- a) When the net income from selling HI is negative and
- b) When income-wise, it is attractive to promote HI also.

Consider a possible hypothetical and a highly simplified situation. An agent spends a fixed amount of time and effort (and energy) on promoting one or the other insurance policy. Generally, it takes a lot more effort and time to promote a HI policy than the 'other forms of insurance' policies. Therefore, given his time or effort, there is a trade-off between selling health or 'other forms of insurance' or both in some mix. Stated with a simplified linear fashion, mathematically:

$$N_O = \alpha - \beta N_H \quad (1)$$

Where,  $N_H$  and  $N_O$  are the number of health and 'other forms of insurance' policies that can be sold using the insurance agent's entire time or effort. Since, as compared to the 'other forms of insurance' policies, it takes a lot more effort to sell one HI product, it is expected that  $\beta$  is positive and greater than unity, and  $\alpha$  is positive.

Let  $\pi_h$  and  $\pi_o$  be the net profits or income by selling a single health or 'other forms of insurance' products respectively. The net total profit or income for all efforts taken together can be stated as:

$$\pi = \pi_h N_H + \pi_o N_O \quad (2)$$

Using (1), the same can be restated as:

$$\pi = \alpha \pi_o + (\pi_h - \beta \pi_o) N_H \quad (3)$$

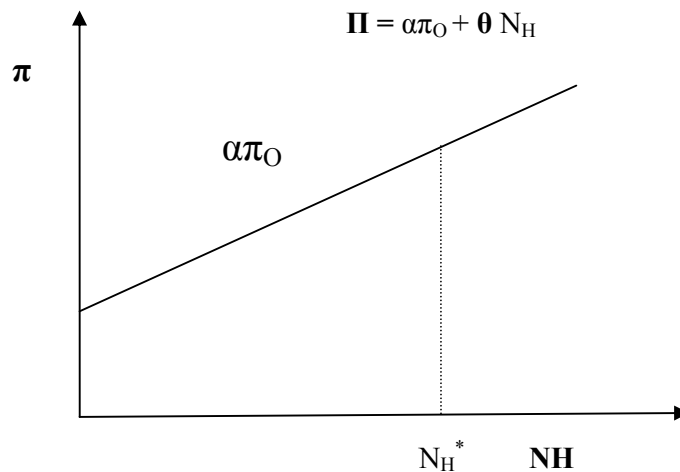
Briefly,  $(\pi_h - \beta \pi_o)$  is called  $\theta$ .

Therefore, an insurance agent will try to reduce the value of  $\beta$  in order to maximize his profits.

**Case 1:**  $\pi_h < 0$ : The net income per unit health product is negative. In other words, considering the effort (both immediate and after sale services taken together) it does not pay to promote this product. From the expression  $(\pi_h - \beta \pi_o) = \theta$ , it then follows that  $\theta$  is negative. From equation (3) it then follows that for any unconditional maximization of profits the agent would like to choose only 'other forms of insurance' policies and zero HI policies. That makes his total maximized profits  $\alpha\pi_o$ .

However, if there are any compulsions (social, administrative or legal) he can choose at best a maximum of  $N_H^*$  and not beyond (as shown in Figure 2). There are no incentives to sell HI policies otherwise.

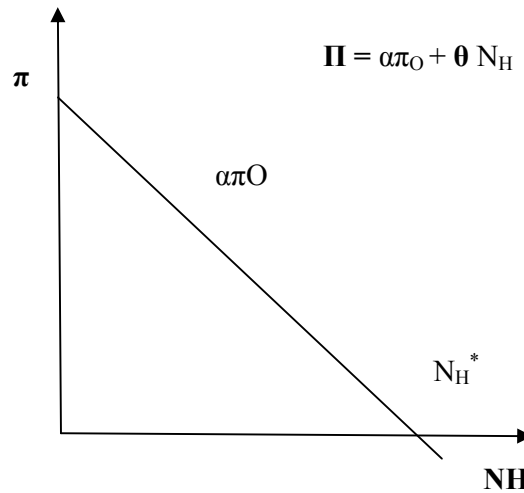
**Figure 2: Case 1:  $\pi_h < 0$**



**Case 2:**  $\pi_h > 0$ : In this situation there is some incentive to promote HI policies as there are net positive gains. However, even in this situation, there are two possibilities:

a)  $\theta > 0$  : This will imply that  $\pi_h$ , the net profits from sale of HI is much higher than  $\pi_0$  (that from selling ‘other forms of insurance’), which is only a hypothetical case. Then, it pays fully to promote only HI policies as can be seen from Figure 3.

**Figure 3: Case 2:  $\pi_h > 0$**



b)  $\theta < 0$ : This is a strong possibility, as the net profits from sale of ‘other forms of insurance’ is likely to be more than that from HI, and  $\beta$  is greater than unity. Then, with  $\theta < 0$ , once again, as in Case 1, the profit maximizing strategy would be to use all effort and time to only sell ‘other forms of insurance’ and not any HI policies. However, if there are any compulsions, the agents can choose to sell HI up to a maximum of  $N_H^*$ . In summary, a rational insurance agent in general, tries to avoid HI schemes, unless compelled.

In an attempt to maximize his income, an insurance agent will use various strategies centered on how to reduce the value of  $\beta$ . We have observed that an ideal strategy for an insurance agent is to sell ‘other forms of insurance’ policies and similar schemes rather than selling HI. However, due to compulsions and competition from other insurance agents, some insurance agents would prefer to sell HI schemes also. In this context, let us consider the situation where our representative insurance agent sells HI schemes apart from ‘other forms of insurance’ schemes and other similar schemes.



Here, the insurance agent will use various optimum strategies, which in turn would have implications on adverse selection and inequity in HI coverage.

### **Strategy 1: Minimize Adverse Selection**

There is high probability that an insurance agent will incur some costs in the form of time and effort, and even monetary costs while helping his clients make insurance claims (though they can directly make claims, the clients expect the assistance of insurance agents in reimbursement procedures). As the high-risk clients are more likely to (and often) make claims, it would take a lot of time and effort on the part of an insurance agent to help such clients in the claims procedure. It may increase  $\beta$  and thereby reduce the net income from health insurance  $\pi_h$  of the insurance agent. So he may try to sell HI mainly to low-risk people and thereby avoid adverse selection. We have already observed that insurance agents are the main intermediaries of information about HI for the people. In fact, health insurance policies are sold to clients on the basis of 'good faith' rather than on the basis of any rigorous medical tests; an insurance agent can sell a HI policy to only those he prefers to. Even though the final decision for issuing and renewing insurance policies (the insurance contract is generally for one year) to people is at the discretion of the insurance company, an insurance agent plays a crucial role in selecting clients for HI. In this situation, insurance agents utilize their comparative advantage about information asymmetry for both health risk and HI policies. Thus, it is up to the discretion of the insurance agents whether to supply information about a particular insurance policy to the clients and hence motivate them to buy HI policy packages. In short, an insurance agent would sell HI to low-risk people.

Many insurance companies would appreciate their agents for selling insurance policies to low-risk people to reduce insurance claims; otherwise agents may face a loss of reputation in their insurance companies. Therefore, selling HI to low-risk people will not only reduce the costs incurred by an insurance agent for helping clients to make insurance claims but it will also enhance his reputation with insurance companies. In summary, an insurance agent prefers to reduce adverse selection for maximizing his net income.

## **Strategy 2: Selling HI to high ‘Insurance Habit’ clients**

We can consider the following three propositions:

- 1) Selling HI to those who have a high ‘insurance habit’ may reduce the average cost of selling HI for insurance agents. This is possible because very less time and effort will be required for selling a HI policy to those who are familiar with the insurance system. Therefore, insurance agents sell HI as a complementary product to those who buy life and other forms of insurance.
- 2) Clients with a high ‘insurance habit’ may be representative of the average health risk of the general population which in turn means that they are not high-risk people. Therefore, it will not result in adverse selection.
- 3) If awareness about HI is very low, there may be a tendency among the general public of expecting a sure return after buying HI. Those who have a high ‘insurance habit’ perhaps have a good understanding of the risk pooling nature of insurance and hence have a perception of not expecting the money back once they buy HI if they do not fall sick.

Moreover, it is a widely accepted fact in India that ‘insurance is sold not bought’, i.e., a majority of the people buy insurance due to rigorous marketing strategies followed by insurance agents. In fact, due to the low level of awareness about insurance among the people and the wide popularity of life insurance schemes (saving plus risk insurance) where the insured people get back a fixed amount even if the insured event does not happen, people perhaps have the misconception of expecting their premium back even if the insured event does not occur. Thus, an insurance agent will prefer to sell HI to those who do not have such misconceptions; hence, he would prefer to sell HI to those who have a high ‘insurance habit’.

### **Strategy 3: Selling HI to High Income Clients**

An insurance agent would promote an inequitable form of HI coverage while maximizing his net income due to the following factors:

- 1) One can expect a high income household to buy a higher amount of HI than a low income household. As the income for an insurance agent is proportional to the insurance amount sold and as high income people are more likely to buy high amount insurance, for an insurance agent this means a high return per business deal with minimum time and effort spent.
  
- 2) As revealed by several studies (e.g., Deaton 2006; Preston 1975; Pritchett and Summers 1996) health status is influenced by the level of income because a higher level of income leads to a greater ability to afford better medical attention, nutrition, sanitation, housing and healthcare. Thus, it can be expected that high income people will be healthier than low income people; hence, selling HI to high income household means that HI is sold to low health risk people. Therefore, an insurance agent can reduce adverse selection by selling HI to high income households.

## **6 Empirical Estimation**

One of the issues discussed in this article is awareness about insurance among the public. Let us now examine the level of awareness by both insured and un-insured people.

### **Basic Awareness**

Table 1 presents the status of basic awareness about insurance providers in terms of general insurers and non-general insurers and also in terms of public and private sector ownerships and also about various insurance products among insured and un-insured people.

**Table 1: Basic awareness about Insurance providers by the Insured and Un-insured (%)**

<b>Heard about</b>	<b>Insured (N=200)</b>	<b>Un-insured (N=200)</b>
General insurance companies (any of)	100	29.5
Non-general insurance companies (any of)	100	99
General public sector insurance companies (any of )	100	29.5
General private sector insurance companies (any of )	13	2.5
Non-general public sector insurance companies (any of )	100	99
Non-general private sector insurance companies (any of )	12	2
Motor vehicle insurance	87	78
Life insurance	100	92

*Source: Primary survey.*

It is obvious from Table 1 that all the insured people had heard about general insurance.<sup>7</sup> However, a majority of them had not heard about private sector general insurance companies, which may be due to the fact that private insurance companies are a recent entry in the Indian insurance market. Further, we can observe that the insured people are not fully aware of other insurance schemes in the market. For instance, only 87 per cent, 51 per cent and 32 per cent of the insured people had heard about motor vehicle insurance, shop insurance and fire/house insurance respectively.

Similarly, the un-insured people were also not aware of the various insurance companies and insurance products<sup>8</sup> available in the market. However, as is obvious from Table 1, their awareness levels are relatively lower than those of the insured people.

The story is similar when it comes to other HI products (see Table 2). It is interesting to observe that though they have Mediclaim policy coverage, a majority of the insured were not aware of other HI schemes at the time of buying the Mediclaim policy. Only 15 per cent and 22 per cent of the insured were aware of the Jan Arogya policy and the Universal Health Insurance Scheme respectively. Moreover, only 7 per cent of the insured people were aware of HI products provided by non-general insurance

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<sup>7</sup> This is due to the fact that the selected sample of insured people has HI products from general insurance companies.

<sup>8</sup> Both the insured and un-insured people are familiar with non-general insurance schemes (life insurance) and this is mainly because of the rigorous marketing strategies followed by the Life Insurance Corporation of India.

companies. In short, we can see that only 22 per cent of the insured people had heard about other prevailing HI schemes at the time of buying the Mediclaim policy.

**Table 2: Awareness about various health insurance products (%)**

<b>Heard about</b>	<b>Insured (N=200)</b>	<b>Un-insured (N=200)</b>
HI by general insurance companies		
1) Mediclaim policy	100	14
2) Jan Arogya policy	15	2
3) Universal health insurance	22	12
HI by non-general insurance companies	7	4
HI provided by community organizations	2	1.5
HI provided by hospitals	11	8

*Source: Primary survey.*

The main inference from this discussion is that people are not fully aware of the insurance market and the prevailing schemes. Moreover, it is interesting to observe that a majority among those who bought the Mediclaim policy were not aware of the other prevailing HI schemes in the market at the time of buying this policy. This means that they were not well-informed consumers.

### **Insurance Habit**

Table 3 explains the ‘other forms of insurance’ joining status (‘insurance habit’) of both the insured and un-insured. In the case of insured people, we take into account the joining status in ‘other forms of insurance’ of only those insurance schemes (other than HI) bought on or before buying the Mediclaim policy.

**Table 3: ‘Other forms of insurance’ joining status of insured and un-insured people (%)**

<b>Types of Insurance Coverage</b>	<b>Insured (N=200)</b>	<b>Un-insured (N=200)</b>
Risk insurance	55	8
Risk plus saving insurance	68	28
Both risk insurance and risk plus saving insurance	37	6

*Source: Primary survey.*

It can be seen from Table 3 that among the insured, around 55 per cent had risk insurance and 68 per cent had risk plus saving insurance. When it comes to the un-insured people, only 11 per cent were with risk insurance but around 44 per cent were with risk plus saving insurance. Further, the insured and un-insured households with both types of insurance were 37 per cent and 9 per cent respectively. From this it is clear that the insured people are characterized with the status of more risk insurance than the un-insured, which means that there is a positive impact of the ‘insurance habit’ on the decision to buy HI.

### **Sources of information**

Another thing that signifies the role of insurance agents in the insurance market is the source of information on HI. In Table 4 it is obvious that insurance agents are the main source of information about the Mediclaim policy as compared to other sources such as media, offices of insurance companies, friends and workplaces. Thus, we can say that insurance agents are an important information dissemination channel about the Mediclaim policy in the Indian insurance market.

**Table 4: Main source of information on health insurance (Mediclaim Policy) scheme for both Insured and Un-insured (%)**

<b>Main source of information</b>	<b>Insured (N=200)</b>	<b>Un-insured (N=200)</b>
Insurance agents	76	7
Media	2	1.5
Friends, workplace etc.	12	4
Offices of insurance companies	10	1.5
Total	100	14

*Source: Primary survey.*

It is interesting to note that despite HI being a commercial product for insurance companies, they are not giving sufficient publicity to it through the media that can reach all sections of society. Another aspect is that even if insurance companies are giving sufficient publicity to HI products, it is not powerful enough to reach the people because the concept of HI itself is much broader and more distinctive as compared to other market products. This observation has more relevance in the Indian scenario as majorities of the people are not only illiterate but are also not aware of the various

aspects of insurance. Therefore, insurance agents emerge as the main source of information on HI for the people.

### **Econometric Estimation**

The main objective of the econometric estimation is to measure the significance of various factors on buying private health insurance.

### **Model specification**

I undertake a maximum likelihood estimation of the binary Probit model on the probability of buying HI.

The response variable  $y^*_i = \beta'x_i + \mu_i$  (4)

Where  $y^*_i$  is unobservable. What we observed is a dummy variable  $y$  defined by  $y = 1$ , if  $y^*_i > 0$  (have health insurance)  $y = 0$  otherwise (have no HI).

As  $\beta'x$  is  $E(y^*_i / x_i)$ , we get

$\text{Prob}(y_i=1) = \text{Prob}(\mu_i > -\beta'x_i)$

$= 1 - F(-\beta'x_i)$ , where  $F$  is the cumulative distribution function for  $\mu$ .

The dependent variable is the status of having health insurance, whether at least one member of the household has private health insurance coverage or not. If a household has HI, the revealed probability of having HI is 1; hence the dependent variable is equal to one, and the variable is zero if otherwise.

### **Definition and measurement of explanatory variables**

I use the following variables as explanatory variables: Health risk, income, education, household size, risk insurance, risk plus saving insurance and information. Let us discuss how each variable is defined and its expected relationship with the probability of having HI.

**Health Risk:** By health risk, we identify whether the household members are healthy or not (i.e., high-risk or not). However, the measurement of health risk is not easy and straight forward. Health risk is a multidimensional phenomenon and is determined by many observable and non-observable factors. The current health status of individuals can be considered as one form of measurement of health risk. Several studies have used

self-reported health status by respondents as an indicator for health risk. Self-reported health status is measured on a scale ranging from 1 to 5 where (1) is very good, (2) is good, (3) is average, (4) is bad and (5) is very bad. Thus, people reporting 'very good', 'good' and 'average' health are categorized as low-risks and those reporting 'bad' and 'very bad' health are categorized as high-risks. Self-reported health status is highly subjective as it may vary according to the perceptions and understanding of the respondents. During the primary survey, the author observed that this way of revealing the health status was both highly subjective and biased. In some cases, those who looked healthy liked to report their health as 'average' or 'bad' while some who had 'bad' health liked to report their health as 'average' or 'good'. Self-reporting is also highly influenced by socio-cultural factors. In short, self-reported health status seems to be an inconsistent estimate of health risk.

In search of some alternative indicators that can objectively measure health risk, the feasibility of using various indicators such as age, gender and working conditions were considered. For example, presence of an elderly population and the presence of women members in the family, and people working under high-risk conditions can be considered as indicators of high health risk. As a household is the unit of analysis in this study, we find that the elderly and women population are evenly distributed between both types of the households irrespective of whether they are insured or un-insured. Therefore, it is not appropriate to consider age or gender to measure the health risk of the people for the present analysis. Yet another measure of health risk is revealed information on healthcare expenditures. Therefore, the actual healthcare expenditure of the household can be considered as an indicator for measuring health risk. A household with higher health expenditure is considered as high-risk as compared to a household with low health expenditure. However, this measurement has some serious limitations. Literature reveals that health expenditure is positively income elastic and also varies according to the healthcare seeking behaviour.<sup>9</sup> Moreover, as our study is dealing with insured and un-insured households in a comparative perspective, we anticipate that the health expenditure of the insured households may increase due to the moral hazard effect (over utilization of healthcare due to HI coverage). Hence it is

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<sup>9</sup> Empirical evidence shows that the demand for medical care is more income elastic in the poorer, developing countries than in the richer, industrialized countries.



not feasible to take healthcare expenditure as an indicator for measuring the health risk of the households either.

Another indicator for measuring health risk is whether members of a household have any ‘bad health or bad medical situation’ in the form of permanent health problems, the same illness recurring and a chronic health situation. We found this way of measuring health to be more reliable and more objectively focused as compared to the other forms of measurement. Hence, we used the ‘bad health or bad medical situation’ in the past one year as an indicator of the health risk of the family. Therefore, to test the issue of adverse selection for the present analysis, at least one family member reporting ‘bad health or bad medical situation’ is coded as a ‘high-risk’, and coded as 1 and 0 otherwise.<sup>10</sup>

**Income:** Literature on health insurance predicts that there is a positive relationship between income and demand for HI. We considered the annual reported income and converted it into per capita income to adjust for differences in household size between insured and un-insured households.

**Education:** Like income, literature also predicts a positive relationship between the level of education and demand for HI, based on the premise that the level of education and awareness about the importance of healthcare has a positive relationship. An educated person will be more likely to know and understand the importance of HI and also how to and where from to get insurance and hence will be more motivated to buy HI. As the present study uses the household as a unit of analysis, we assume that the highest level of education attained by any family member will have a positive externality on the decision- making process of that family. So we use the highest level of education attained by any household member in the family for the present analysis. We measure the level of education in terms of years of schooling.

**Household Size:** Larger families are expected to purchase more insurance because their use of medical services would be greater. However, there are no strong theoretical

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<sup>10</sup> Moreover, some members are excluded in the family of PHI insured from health insurance coverage and hence are un-insured, and therefore we have omitted them from our measurement.

propositions that explain the impact of household size on the demand for HI. Empirical evidence in literature is ambiguous as well.

**Risk Insurance:** We expect that people with enrollment in risk pooling insurance will be more likely to buy HI than their counterparts. We use a dummy to measure this variable, those household with risk-insurance is coded as 1 and otherwise as 0.

**Risk Plus Insurance:** Similarly, we also expect that people having enrollment in risk plus savings insurance will be more likely to buy HI than their counterparts. The variable is measured by using a dummy where those households with risk plus insurance are coded as 1 and otherwise as 0.

**Information:** The source of information on HI scheme (Mediclaim policy) is measured with a dummy variable. If any of the household members had been approached by an insurance agent to talk about health insurance, we code it as 1 and 0 otherwise. We expect a positive relationship between information and demand for HI (see Table 5 for definitions of variables).

**Table 5: Definitions of variables**

<b>Variables</b>	<b>Definition</b>
Health Insurance (Dependent Variable)	1= if the household has health insurance (Mediclaim); 0= otherwise
Income	Per capita annual household income of the household
Education	Years of schooling (highest education of any of the family member)
Household size	Total family size of the household
Risk insurance	1= If any of the household members have risk insurance; 0= otherwise
Risk plus insurance	1= If any of the household members have risk plus saving insurance; 0=otherwise
Health risk	1= If any of the household members has had a bad health situation in the past year; 0= otherwise
Information	1= If any of the household members had been approached by an insurance agent to discuss health insurance; 0 = otherwise

**Table 6: Marginal Effects of Probit model**

<b>Variables</b>	<b>Marginal Effect</b>
Income	.00002 (2.13)**
Education	.02685(1.73)***
Household size	-.02241(-0.46)
Health risk	-.18300(-1.76)***
Risk insurance	.44072(5.18)*
Risk plus insurance	.17872(2.19)**
Information	.66124(9.18)*
y = Pr(insured) (predict)	.50
Log likelihood	-91.3371
LR chi2 (7)	371.84
Pseudo R2	0.6706
Number of observations	400

*Note: Values in the parentheses refer to the 'Z' statistics  
Level of statistical significance: \* = 1%; \*\* = 5%; \*\*\* = 10%*

Before interpreting the results, let us bear in mind that the results should not be generalized to the all-India level mainly because the un-insured sample households were selected from the same locations from where the insured households were selected. The primary survey indicated that 98 per cent of the insured households were from urban locations rather than from semi-urban or rural locations. Moreover, we know that people in urban areas have high incomes and are also more educated as compared to those from rural areas.

From the Probit model (see Table 6) it can be seen that as against the general theoretical expectation as well as in contrast to prevailing empirical evidence—but in par with our theoretical model—there is an indication of households with low health risk demanding HI. If there was an adverse selection problem, the risk pool would be over-represented by high health risk people. But the results of the Probit model indicate that there is a statistically significant but negative difference between the health risk statuses of both groups. Hence, there is no evidence of adverse selection in the HI market. Nevertheless, in support of this finding, we have evidence from the primary survey that 12 per cent of the sick members of the insured families had been excluded from the HI coverage mainly because they were high-risk. Thus, we can infer that there is no adverse selection problem, but perhaps cream selection in the HI market.

Further, household income has a statistically significant role in demand for HI. However, the practical significance of this is not very large. This means that the higher income of households is an important variable but it is not highly significant when it comes to deciding to go in for HI. As already mentioned earlier, the study sample of un-insured households was selected from the same location from where the insured households were selected, both type of samples were from urban locations and were hence also high income as compared to the all-India scenario. This may be one of the reasons why there are no practically significant differences between insured and un-insured households on the income. In short, we can see that the risk pool is composed mainly of the high income class, which is nothing but inequity in HI coverage. Thus, it can be inferred that the market is over-represented by high income people resulting in horizontal cross subsidization instead of vertical cross subsidization, where the rich pay for the healthcare costs of the rich. Nevertheless, at par with our theoretical expectation, the model reveals that the educational qualifications of the households have a positive impact on the probability of having HI. However, the practical significance of this is negligible.

It can be seen that risk insurance and risk plus insurance enrollment status of the people (i.e., the ‘insurance habit’) have a positive and practical significance on their decision to opt for HI, which is a clear indication that ‘the higher the familiarity of the people with the various forms of insurance, the higher will be the probability of their joining the HI scheme, keeping other things constant’. Further, the results of the Probit model also reveal that insurance agents being the main the source of information about the Mediclaim policy have a positive impact on the probability of having HI.

## **7 Discussions and Conclusion**

It was observed during peer group discussions with insurance agents that HI schemes are a less profit but high-risk oriented business for them as compared to ‘other forms of insurance’ schemes including life insurance schemes. We found that insurance agents are a significant entity in the Indian HI market, which is characterized by a low level of public awareness about various aspects of the insurance market and the partner-agent model of HI. Moreover, insurance agents are the main source of information about HI schemes. Our theoretical model argued that the rational behaviour of insurance agents

would result not only in low levels of HI coverage but also in inequity and no adverse selection. We empirically tested the validity of these theoretical propositions and the empirical model revealed that there is inequity in HI coverage and no adverse selection in the HI market.

In contrast to the existing theoretical and empirical evidence where income and education have a positive and economically significant impact on demand for HI, our findings reveal that income and education have a very limited positive impact on the demand for HI. This may be the reason for HI coverage being at an infant stage even though we have many high income and highly educated people. Why do our results differ from the general theoretical expectations? This may be because of the dominant role played by insurance agents in the insurance market and their rational behaviour. This proposition is synonymous to the saying that ‘in India, insurance is sold not bought’.

However, the scale-up of HI is not only determined by the rational behaviour of insurance agents but also by the ‘insurance habit’ of the people. Our empirical estimation also reveals that those with a high ‘insurance habit’ are more likely to buy HI.

In summary, we can see that the demand for HI is determined by the rational behaviour of insurance agents on the one hand and the ‘insurance habit’ of the people on the other. In fact, we can consider income and education as necessary conditions, but the significant conditions are mainly the net-income maximizing behaviour of insurance agents and the ‘insurance habit’ of the people.<sup>11</sup>

It is clear from the above discussion that the current market structure cannot ensure universal and equitable HI coverage. The monetary reward as well as other incentives for selling HI must be attractive enough to ensure that there are sufficient incentives for insurance agents to promote the sale of HI. IRDA should force insurance companies to provide special incentives to insurance agents for selling HI and also for selling HI to

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<sup>11</sup> This may be one reason why some of the recent HI schemes targeted at low income households have not reached the target beneficiaries.

low income households. Apart from this, participation of non-profit entities like self-help groups should also be encouraged for selling HI.

We found that the ‘insurance habit’ of the people results in a kind of intrinsic insurance education in the form of familiarity with various forms of insurance which in turn has a positive externality on the probability to going in for HI. This also implies that the people should be given an opportunity to experience various forms of insurance so that they understand what insurance is all about. Free or subsidized HI to low and middle income households should be given to make them familiar with HI; after a point, the subsidy can be withdrawn gradually. Further, education about insurance in the school curriculum and insurance awareness campaigns for the public are highly recommended.

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