

MICROINSURANCE OF HEALTH : THEORY AND EMPIRICS

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**BY
SOUVIK DASGUPTA
Registration No.: AOOECO100414 of 2014-15**

**DEPARTMENT OF ECONOMICS
JADAVPUR UNIVERSITY
KOLKATA-700032
WEST BENGAL, INDIA**

Certified that the thesis entitled

MICROINSURANCE OF HEALTH: THEORY AND EMPIRICS submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my work carried out under the supervision of Dr. Amit Kundu, Professor, Department of Economics, Jadavpur University and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere /elsewhere.

Countersigned by the
Supervisor:

Candidate:
Dated:

Dated:

In memory of

Baba

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SOUVIK DASGUPTA
Department of Economics
Jadavpur University
Kolkata-700032

Executive Summary of the Thesis

The main objective of the present thesis is to investigate the various issues related to microinsurance of health (hereafter MHI). MHI is a financial provision which aims primarily at informal sector. ILO (2010) regarded it as an instrument that improves the risk-management capacity of poor households engaged in informal sector. People working in informal sector are often belong to low-income class as they are deprived of getting higher than survival wage and any type of social security from the employer. Due to their low income these people cannot afford the private insurance available. In this scenario risk-hedging provision in the form of MHI is highly recommended and urgently required. MHI is a financial arrangement to protect the low-income individuals working in the informal sector against the health risk. A typical MHI scheme offers limited coverage at a low premium. MHI scheme is distinct from the health insurance in many ways such as (1) in case of MHI, the size or the extent of insurance coverage is not a choice variable. Individuals are offered a simple contract (package) that includes price, benefits and defines the method of paying premium and settling claims) and on the basis of it all that they decide is whether or not to buy the scheme; (2) premium of MHI scheme is based on community rating and not on individual rating and (3) MHI is generally a group contract/ individual contract initiated or managed by a nodal agency. In order to accomplish the objective, the thesis focuses on mainly three aspects: informal sector households' financial risk coping mechanism with health shocks, financial sustainability of MHI scheme and demand for MHI among informal sector workers. The first and third issues mentioned are addressed empirically whereas the second issue is analysed theoretically. The first three chapters of the present thesis contains introduction, literature review and research objectives respectively.

In chapter-4, we focused on the issue of distress healthcare financing among the informal sector households in West Bengal (a state in India). On the basis of a micro-level field investigation in Purulia district of West Bengal, we initially examined the determinants of out-of-pocket (hence after OOP) average monthly healthcare expenditure of the sample households; and next we investigated the factors influencing incidence of distress healthcare financing of those sample households. Distress healthcare financing is defined as a situation

when a household required to borrow money with interest and/or sell assets/livestock for its healthcare expenditure. In our micro-level study, the households were selected based on a two-stage random sampling method. At the first stage, three blocks (viz. Purulia-I, Purulia-II and Hura) were selected randomly under Purulia Sadar sub-division. Then from each block, two villages were selected randomly and finally eighty households were selected from each village through random sampling procedure. we identified 30 households that did not seek any healthcare at least once during the reference period. We did not consider them in our analysis; so, the sample size of our study was 450. In our study sample the principal working member in most of the households were involved in casual wage employment. The monthly average healthcare expenditure incurred by sample households was around Rs 800 which represent nearly 11.20 per cent of average monthly household income and 35.59 per cent households resorted to distress healthcare financing. To examine the determinants of monthly average OOP healthcare expenditure of sample households, we used an IV (2SLS) regression where logarithm of household's average OOP monthly healthcare expenditure was dependent variable and logarithm of average monthly income of household, incidence of outpatient care, incidence of hospitalisation, size of the vulnerable age group (total number of children aged five or less than five and number of members aged fifty-five or more), healthcare seeking from private provider(including traditional healer), principal earning member's activity status and education of household-head were the explanatory variables. The family income was treated as endogenous regressor and total number of working-members in a household was considered as an instrument for it. The Wu-Hausman test for endogeneity validates the use of IV(2SLS) regression. The results of IV(2SLS) estimation showed that signs of the parameter estimates were as expected and except incidence of outpatient care, regular salaried activity status and formal education level of household head, the remaining explanatory variables had significant impact on average monthly healthcare expenditure of sample households. Next, to investigate the factor(s) influencing distress healthcare financing of sample households we fitted a seemingly unrelated (SUR) Bivariate Probit model in which distress healthcare financing was outcome variable (binary in nature; coded as 1 if a household faced distress financing) and catastrophic healthcare expenditure, self-help group membership, total number of working-members, principal earning member's activity status and education of household-head were the explanatory variables. We considered any OOP healthcare spending exceeding 10 per cent of household's expenditure as catastrophic. The dummy variable catastrophic healthcare expenditure (it was coded 1 if a household's share of healthcare expenditure in total expenditure exceeded 10 per cent) was treated as endogenous and incidence of

hospitalisation, size of the vulnerable age group and healthcare seeking from private provider (including traditional healer) were found as valid instruments. The ML estimation results showed that households that incurred CHE were more likely to face distress healthcare financing. If principal earning member of household was in regular-salaried job, the family had a lower risk of borrowing (with interest) to finance healthcare compared to the households with self-employed principal earning member. The probability of distress financing was low for the households that had considerably higher working members' size.

In chapter-5, we shall develop a simple theoretical model of MHI scheme which was initiated by a commercial insurance firm and managed in collaboration with a local NGO. Against this analytical framework, we analysed the financial sustainability of a for-profit insurance firm and derived the optimal incentive contracts between firm and NGO. We considered a risk-neutral insurance firm, naïve of rural community preferences aimed to provide MHI to risk-averse individuals with identical level of initial wealth and risk type (so, there was no adverse selection in the present framework). The potential beneficiaries faced risk of income loss due to health shock(s) which was(were) covered under MHI scheme offered. The level of preventive care (or effort) taken by the individual influenced only the probability of illness, but not the absolute size of income loss due to illness. To operate the scheme the insurance firm hires a risk-neutral NGO which is working among the low-income households of that locality for sometimes. Such an NGO usually enjoys the trust of the local households and has better local information. The NGO was assigned (by firm) to execute two tasks: enrolling potential beneficiaries in the scheme (in stage-1) and encouraging and monitoring their preventive efforts (in stage-2). Enrolment under the scheme was dependent on NGO's effort in creating awareness of individuals and improving the insurer's familiarity with the preferences and behaviour of them. In addition, the NGO had the access to local informal network and also used to enjoy the trust of the local people. So, it could encourage and monitor preventive effort of beneficiaries. The firm cannot monitor the NGO's effort level in both stages. The NGO was altruist such that it put weight on a utility gain of an individual joining the scheme. In the stage-1, firm offered a linear contract (with a fixed and variable compensation component) to NGO. Assuming that the limited-liability constraint of NGO binds, from the firm's optimal contracting problem in Stage-1 we found that:

(i) variable compensation component and the enrolment go down when NGO's cost of effort goes up,

- (ii) optimal bonus decreases with the higher altruism of NGO and
- (iii) optimal effort increases with the altruism of the NGO.

Moreover, we also derive the condition under which net-income of the scheme at its commencement (stage-1) will increase following an upsurge in bonus incentive. When both the limited liability and participatory constraints of NGO bind, we found:

- (i) variable compensation component and the enrolment go down when NGO's cost of effort goes up, and
- (ii) optimal bonus decreases with the higher altruism of NGO but optimal effort does not depend on the altruism of the NGO.

Next, we discussed the stage-2's interaction between firm and NGO. Here we first focused on the issue of aggregate claim analysis. The firm could not design a compensation scheme for a beneficiary based on occurrence of an illness episode, since even taking the maximum possible prevention, a beneficiary may face a health shock. Moreover, the firm could not monitor his/her preventive action. Hence, the MHI scheme was at risk of moral hazard which has an implication on scheme's financial sustainability. But the NGO can encourage and monitor the preventive effort of a beneficiary. The model assumed that probability of an MHI beneficiary would exert high effort depends on effort put by the NGO in motivating and monitoring preventive care of community. This assumption suggested that presence of an NGO reduced the average probability of illness. On the basis of this lemma, we arrived to another important result: if the individual claims are independent and identically distributed random variables, for any fixed level of coverage the level of aggregate expected claims is decreasing in the NGO's effort level. At the end of stage-2 the scheme yielded a binary output to the firm: high or low. The output was considered 'high' if firm earns a non-negative financial profit; otherwise, its output was considered 'low'. In case of high output, the firm gets a non-negative utility, otherwise it gets zero utility. The firm in our framework could financially sustain if its expected payoff was non-negative. The NGO's effort, stochastically improves the probability of making non-negative financial profit of firm. The insurance firm offered a state contingent contract to the NGO. We assumed NGO's income in any state of the world must be above a certain minimum level. In this situation insurance firm's optimal contracting problem yielded the optimal effort level and optimal bonus payment of NGO for which insurance firm remained financially sustainable. In this situation insurance firm's optimal contracting problem yielded the optimal effort level and optimal bonus payment of

NGO for which insurance firm remained financially sustainable. We also showed that the insurance firm prefers the NGO which has a much lower outside option. Finally, we made an enquiry on the role of firm-NGO collaboration in risk loading. We found that the firm can set a lower threshold level of risk-loading with the higher monitoring effort of the NGO. threshold level implies the minimum level of risk loading that an insurance firm will use to remain solvent in the business.

In chapter-6, we addressed the question of demand for MHI. The MHI as a product is quite different from the commercial health insurance. The proper designing of an MHI scheme is immensely crucial to encourage participation of target group. The MHI scheme must be designed based on target group's preference. None of the revealed preference method or contingent valuation method investigate the effect of characteristics of the health insurance schemes while estimating the demand for it. The characteristics of an MHI scheme (i.e., premium level and benefit package) could have a significant impact on its demand among the target group. Hence the method of Discrete Choice Experiment (DCE) was applied in our study to elicit the preferences for MHI scheme of sample households. In any DCE application we can determine the characteristics that describe a product and to what extent the respondent is willing to trade-off one characteristic to another. In the absence of actual MHI scheme in the market, the demand for insurance can be estimated by using a DCE. The study area of DCE exercise was Purulia district of West Bengal. The experiment was undertaken along with the household survey mentioned in the chapter-4. We considered the households without any health insurance as our sample for the DCE. The MHI schemes had not penetrate in our study area at the time of our survey (implying dearth of real market data) which ruled out the use of revealed preference method to investigate the preference for (any existing) MHI scheme. In the present study five attributes with three levels for each were identified on the basis of literature as well as from the pilot survey and focus group discussion in the study area. These were as follows:

Attribute-1: Unit of Enrolment; with levels: (i) individual, (ii) maximum 3 members, (iii) maximum 5 members.

Attribute-2: Premium(quarterly); with levels: (i) 150, (ii) 250, (iii) 300.

Attribute-3: Coverage (in Rs p.a.); with levels: (i) 25000, (ii) 45000, (iii) 60000.

Attribute-4: Benefit; with levels: (i) Drug, Free consultation, (ii) Drug, Lab test, 50per cent of Transportation cost, (iii) Drug, Lab test (including one preventive test), Transportation cost, less-costly in-patient surgical.

Attribute-5: Cash-back; with levels: (i) No, (ii) 25 per cent in case of claim less than 5000 p.a., (iii) 50 per cent in case of claim less than 5000 p.a.

The five attributes with three levels each, resulted in 3^5 i.e., 243 possible combinations (choice sets) of MHI products. However, it was impractical to consider 243 combinations for our study. So, we used orthogonal design of experiment (by SPSS 20 software) and found that 16 combinations were required to estimate the main effects of five attributes. These 16 alternatives were used to make eight choice sets of two alternatives each. In addition, an opt-out alternative was also included to control overestimation of preference. So, in the final design we had eight choice sets with two alternatives and one opt-out option. But given five attributes and different levels, choosing eight alternatives would be burdensome on the respondents. So, each respondent was asked to choose only one alternative from the only choice set shown to him/her. The choice sets were randomly assigned to them. Then the question asked was ‘What will you do?’ All the qualitative attributes were dummy-coded to allow for non-linear effects in the levels of attributes. Our empirical strategy relied on estimation taking help of conditional logit model. The estimation results suggested that the respondents preferred an MHI scheme which gives family coverage, covers transport, diagnostics and a cash-back of the total premium deposited in case of no claim. In addition, their willingness to join the scheme increased with the lower premium and higher coverage amount. Again, to allow the heterogeneity of preferences among the sample respondents, we included interactions of case-specific regressors (which do not vary with alternatives) such as monthly income of household, average monthly healthcare expenditure, dependency (defined as household size divided by its total working members), awareness about insurance with the alternative-specific attributes in the utility function and estimated a conditional logit model with interactions. Since the household characteristics remained constant across the MHI alternatives, they were multiplied with the monetary value, (in our case premium). The result showed that choice of an MHI scheme was influenced by most of the household’s

characteristics. The dependency of family members on its working-members was found to be insignificant in the choice of MHI scheme.

In chapter 7, we summarized the major findings of the thesis and had drawn conclusions. In chapter 8, we tried to delve into policy implications particularly with respect to some recent government health insurance schemes and for future development of MHI as an instrument(option) for informal sector. In chapter 9, we listed the references that we followed and cited for this thesis.

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CHAPTER-1

Introduction

The out-of-pocket (hence after, OOP) payment is the principal source of healthcare financing among major proportion of households in LMICs¹ where majority of the population are engaged in the informal sector. In the developing countries, the informal sector encompasses small-scale, self-employed activities, typically unrecorded, unregistered and conducted without proper integration with the administrative machinery responsible for enforcing laws and regulations (Dror and Firtha, 2014). People working in informal sector are often belong to the low-income class as they are deprived of getting higher than survival wage and any type of social security from the employer. A large number of informal workers are illiterate, poor and vulnerable. They are exposed to informal sector is exposed to various health hazards due to their works and life style. The healthcare financing challenges are more acute in low and middle-income countries (hence after, LMICs), where the need for healthcare is greatest and resources are most scarce. In the low-income countries public healthcare expenditure represents less than 30 per cent of total healthcare expenditure, whereas, it was around 80 per cent in case of high-income countries (WHO, 2018). The low level of government expenditure on health as a percentage of GDP leads to high dependence on the private health care sector, which results in high levels of OOP spending on health. Estimates of Wagstaff (2018) reveals that worldwide nearly 11.7 per cent households devote more than 10 per cent of their non-food spending on healthcare. The high OOP healthcare expenditure exposes households to face substantial financial risk and often push them below the poverty line (Shahrawat and Rao, 2011; Berman et al., 2010; van Doorslaer et al., 2006; Garg and Karan, 2009).

Health and poverty are closely related. Poor are more vulnerable to health risks. In the event of illness, the poor not only has to spend money (and sometimes also its assets) on healthcare but also forgo the wage earning. In addition, there is a relatively higher burden of indirect costs such as expenses on transport, food/stay, lost wages of the accompanying person, etc. During the period of serious illness households often reduce consumption level to bear the burden of medical cost (Townsend, 1994; Gretler and Gruber, 2002). In addition, they/ poor sometimes cannot afford treatment cost and ends up forgoing treatment. Peters et al. (2002) estimated that in India the poorest quintile is 2.6 times more likely than the richest to forgo medical treatment when ill. Due to their low-income level these people cannot afford private

¹ OOP healthcare expenditure was estimated as 36.62 per cent of current health expenditure in LMICs (World Bank, 2018).

insurance schemes available in the market. In low-income countries, innovative and affordable health financing systems are key for achieving universal health coverage. The WHO (2014) recommends moving away from direct, OOP payments to using prepaid mechanisms to raise funds.

For the informal sector households, microinsurance of health² (hence after MHI) has been considered as an important instrument to cope with impoverishing effects of large OOP healthcare expenditure. ILO (2010) regarded it as an instrument that improves the risk-management capacity of poor households engaged in informal sector activities. A typical MHI scheme offers moderate protection at a low contribution scheme offers moderate protection at a low contribution (Churchill, 2007). MHI scheme is different from the health insurance in several aspects. According to, Ahuja (2005), (1) in case of MHI, the size or the extent of insurance coverage is not a choice variable. They are offered a simple contract (package) that includes price, benefits and defines the method of paying premium and settling claims) and on the basis of it all that they decide is whether or not to buy the scheme; (2) Premium is based on community rating and not on individual rating and (3) MHI is generally a group contract/ individual contract initiated or managed by a nodal agency. The properly designed and implemented MHI schemes have positive impact in mobilizing resources to finance healthcare needs of the low-income groups across world (Jakab and Krishnan 2001, Preker et al. 2002, Ekman 2004, Wagstaff et al. 2009). For the informal sector households MHI is increasingly being recognized as an important instrument of poverty reduction. [The development organisations have increasingly recognised the role that MHI can play as a poverty reduction instrument (ILO, 2006; UNDP, 2007), and.] Several empirical studies confirm that MHI leads to reduction in financial burden of medical expenses and poverty reduction (Hamid et al., 2011; Dror et al., 2016). The WHO (2010) mentioned that MHI schemes can complement a publicly funded healthcare system within a specific local context. The study of Kimball et al. (2013) revealed that MHI schemes in several developing countries were supplementing the existing benefits under public facilities by including additional services, such as outpatient benefits, coverage for additional expenses such as transportation, lost wages, or child care etc.

² For rest of the thesis, we will use microinsurance of health and micro health insurance interchangeably and the abbreviation MHI stands for both of these. Community-based health insurance (CBHI) is one form of MHI. In the present study we will denote it as community-based MHI scheme.

The MHI schemes had emerged in the late 1980s in Africa and in the late 1990s in Asia to offer financial protection against high medical expenditure (Kimball et al., 2013). Such schemes often developed in countries where government financing mechanisms to cover health risks were non-existent or inadequate in terms of quality, access or cost. Various volunteer organizations have initiated and tried various models of MHI in many countries, including Brazil, India, Philippines, Ghana, Burkina Faso, Nigeria, Tanzania etc. The organisational particulars/characteristics of MHI schemes use to vary across countries (and even within a country) but around the world they have some common features like voluntary participation by the community members, pooling of resources by them through prepayment of community-rated premiums and not-for-profit objective for organizing the scheme. The majority of MHI products are delivered through microfinance institutions, community organizations, cooperatives, non-governmental organizations (NGOs).

MHI schemes around the world use to operate either by linking the poor households with local organized groups (for example, NGO, MFIs etc) or by conducting door-to-door enrolment. In Nigeria, Hygeia Community Health Care (HCHC) places their agents in markets throughout Lagos to conduct enrolment and premium collection, Uplift Mutuals in India, offers health coverage to microfinance clients (Hygeia Community Health Care, 2013; Uplift India Association, 2013), in Guinea 's Union des Mutuelles de Santé de Guinée Forestière, the premium collection is done during the harvest time (CIDR, 2012). There are some MHI schemes provide value-added services, either for preventive or therapeutic care. For example, the Swayam Shikshan Prayog, an Indian NGO, offers discounted access to outpatient consultations and medicines, SAJIDA Foundation in Bangladesh, offers access to a dial-a-doctor service (Pott et al., 2013). Many MHI schemes are offering cashless mechanism for their clients in which the clients do not require to make OOP payments to the health-care provider.

In India MHI is not a new phenomenon. Since the 1950s, NGOs have executed local risk-pooling mechanisms to improve the access to quality care and to protect households from high health expenses. Devadasan et al. (2004) categorised the MHI schemes of India into three types: (1)schemes in which a voluntary organization (like NGO, MFI etc) is itself the insurer, while purchasing care from independent healthcare providers (Mutual model) (2) schemes where the voluntary organization plays the role of an agent, purchasing insurance

from insurance company and care from health providers (Partner- Agent model) and (3) schemes in which the a healthcare provider plays the dual role of providing health care and running the insurance scheme (provider model).

The main objective of the present thesis is to investigate the various issues related to MHI. In order to accomplish the objective, the thesis focuses on mainly three aspects: informal sector households' financial risk coping mechanism with health shocks, financial sustainability of MHI scheme and demand for MHI among informal sector workers. The first objective of the thesis is to investigate how do the informal sector households cope with effects of economic vulnerability emanating from health shocks or not. Next, I will analyse whether a for-profit insurance firm can sustain financially from providing MHI to low-income households. Finally, in the third objective the thesis will attempt to investigate the demand for MHI among the informal sector workers in West Bengal, India. The first and third issues mentioned will be addressed empirically whereas the second research objective will be addressed through a theoretical model.

CHAPTER-2

Literature Review

The present study takes into account the issues related to MHI. In the present chapter we will briefly discuss some existing research works relevant to our main objective. Findings of existing studies on a field are extremely valuable for any research study initiated in that area. A survey of literature gives proper direction to enhance the quality of research. It helps to identify areas or questions in which we can motivate for further research. Thus, we can frame our specific research objectives on the basis of a literature review.

Practically it is not possible to consider all the previous research works done on this topic in a brief literature review. Therefore, we will discuss some important studies, both theoretical as well as empirical, related to our study. The review of existing literature is classified into three broad areas:

1. Studies focused on demand for health microinsurance
2. Studies focused on financial sustainability of health microinsurance
3. Studies focused on impact of health microinsurance

Now, we will briefly review the previous works based on this classification of literature.

1. Studies focused on demand for MHI

We will review some previous empirical research works which addressed the demand aspect of health microinsurance or micro health insurance and also community based micro health insurance schemes in LMICs.

Mathiyazhagan (1998) estimated the willingness to pay for a viable community-based micro health insurance scheme in rural Karnataka, India. The study found that out of the total 918 households (sample size was 1000) willing to join, around 87 per cent were willing to pay (premium) for the proposed health insurance. It estimated the average maximum willingness to pay for the proposed MHI scheme (through community participation) as Rs.163.48 per year

The study did not find much regional variation in the willingness to pay for this proposed scheme. The results indicated that family size, number of hospitalisation episodes, working days lost due to illness and physical accessibility to healthcare provider are significant factors influencing willingness to join and pay for the scheme.

The study of Dong et al. (2003) examined the willingness to pay for a proposed community-based health insurance scheme in Burkina Faso and identified factors influencing the willingness to pay. Both the ‘take-it-or-leave-it’ and bidding game methods were used to elicit the willingness to pay for the health insurance. The study found that household ability-to-pay, household and individual characteristics, such as age, sex and education were significantly influencing willingness to pay.

Using household survey data conducted in a rural area (Thiès region) in Senegal, Jütting (2003) identified the factors influencing participation of households in MHI schemes. The study found that the schemes reach the “poor” but, the “poorest of the poor” within the surveyed villages remained largely excluded as they could not afford the premium. The analysis revealed that the probability of participation among the sample households was significantly influenced by the factors: household income, religion, village characteristics and the belonging to a certain ethnic group.

Asfaw and Von Barun (2004) explored the prospect of community-based MHI schemes to protect the poor and socially excluded section of population against direct and indirect negative consequences of economic reforms in Ethiopia. The study was based on a household survey conducted in seven villages or peasant associations (PAs) of Ethiopia during 2000-2001. The sample size was 550 and it was selected based on a three-stage sampling method. The respondents were described a hypothetical MHI scheme and asked whether they were willing to join or not if such a scheme was initiated locally. The hypothetical scheme offered was expected to cover both the outpatient and inpatient care costs of all household members during illness or injury. It was assumed to be a community-based scheme with some administrative support from government (at district level). Respondents willing to join, were further queried about their willingness to pay in double-bounded dichotomous choice format. To estimate the average WTP of sample households for potential CBHI it relied on a non-parametric approach. The study found that nearly 95 per cent of households with complete

response were willing to join and pay for the proposed scheme. 87.5 per cent of them were willing to contribute in labour (number of man-days any household was willing to work per month). Income was found to be an important factor influencing households' preference to join the scheme. However, households showed relatively higher willingness to contribute in terms of labour than mean money willingness to pay. The health status of household head, healthcare financing history and access to credit markets had no significant influence on the sample households' willingness to pay.

Based on a household survey conducted in the Anand District of Gujarat in India, Bhat and Jain (2006) investigated the factors influencing demand for micro health insurance scheme (called Krupa) and estimated the extent of coverage demanded by the households enrolled in the insurance scheme. The study applied Heckman two-stage method to address the self-selection problem. Findings of the study revealed that factors like income, household healthcare expenditure, perception related to coverage of illnesses and expectation regarding future healthcare expenditure, knowledge about health insurance were significant in the purchase decision of MHI among the sample households. In the case of extent of coverage purchase, age of the household-head and number of children in household were found to be significant. Like in the case of health insurance purchase decision, the study indicated that illnesses coverage perception and future expectation about the healthcare expenditure were important factors affecting extent of purchase decision. In addition, the study found income was significant factor but had a non-linear relation with extent of coverage demanded. Up to a certain income level, the purchase of health insurance was very low but it increased as income crossed a certain threshold and at higher income levels, purchase of insurance decreased.

According to the study of Dror et al. (2006), about half of the households surveyed in seven rural locations (in four Indian states viz. Tamil Nadu, Karnataka, Maharashtra and Bihar) were willing to pay at least 1.35 per cent and around two-thirds was willing to pay at least 1 per cent of annual total income per annum as premium for health insurance. HH size is found to be the most dominant determinant influencing willingness to pay levels. There was also a positive association of willingness to pay with education. The willingness to pay values reported here are higher than previous reports in the literature.

Basaza et al. (2007) examined the reasons for low up-take in two community-based MHI schemes (Ishaka and SHU³) of Uganda. To explain this, it used a case study research design. The study revealed that factors such as ability to pay premium, restrained community participation, lack of trust in managers, inadequate scheme related information and dearth of understanding were identified as the main issues contributing to the low participation in the schemes.

The study of Ito and Kono (2010) had given focus on the participation decision of Yeshasvini scheme. To investigate the determinants of enrolment they conducted a village-level household survey in Bangalore, Karnataka (India). The study found that take-up decision was strongly influenced by hyperbolic preference of households. In addition, the result revealed households with relatively higher number of sick members were more likely to enrol in the scheme.

Onwujekwe et al. (2010) tried to explore the determinants of willingness to pay for a community-based health insurance scheme in Nigeria. The study was based on a household survey, where the contingent valuation method (bidding game format) was used to elicit willingness to pay of respondents. The results showed that factors such as household's economic status, place of residence, gender, education and prior experience with health insurance mechanism influenced the respondents' willingness to pay for the MHI scheme.

Binnendijk et al. (2013) analysed the data from household surveys conducted in six rural locations of three Indian states (Andhra Pradesh, Orissa and Bihar) and found that willingness to pay for micro health insurance and household income were positively related. The study estimated average willingness to pay for MHI at around 4.5 per cent of food expenditure.

Noubiap et al. (2013) aimed to identify factors influencing informal sector workers to participate in MHI scheme in the Bonassama health district (BHD) of Douala, Cameroon. Their micro-level study found a very low level of participation in community-based health insurance scheme among the respondents. The analysis suggested that lack of awareness and

³ SHU stands for Save for Health Uganda

paucity of knowledge regarding community-based health insurance were leading to the low enrolment in the scheme

Chaudhuri et al. (2014) conducted a household survey in Mumbai slums and its periphery to assess the demand for health insurance among the economically weaker sections of society. They also examined the status of health insurance (Rajiv Gandhi Jeevandayee Arogya Yojana) coverage among the respondents. The study found a very low penetration of the public health insurance; only 15 per cent of the sample households reported to be enrolled under RGJAY scheme. To investigate the willingness to pay for health insurance schemes, consumers were asked to choose a scheme among the two different schemes (with respect to coverage and the premium) being offered to them. The choices were made considering the low-income level of the target group. Hence the proposed schemes involved low premium and a low coverage level: i) Rs.1500 premium for Rs. 50,000 coverage and ii) Rs.2500 premium for a coverage of Rs. 100,000. The results of the study revealed that 17.6 per cent of the surveyed households preferred to buy insurance for an annual coverage of Rs.50, 000 at premium of Rs.1500, while only 4.8 per cent of them were willing to pay the premium of Rs, 2500 for annual coverage of Rs. 100,000. On an average 63.6 per cent of the households preferred out of pocket expenses to finance their healthcare needs. It was also found that out of 85 per cent of the uninsured (in RGJAY) households, 22 per cent were willing to pay for either of these two health insurance schemes. The affordability and awareness were appeared to be the key determining factors of demand for MHI in this study.

Panda et al. (2014) analysed factors that catalysed enrolment in three community-based micro health insurance schemes offered (through women's self-help groups) in three rural locations of two Indian states viz. Uttar Pradesh (in Pratapgarg and Kanpur Dehat) and Bihar (in Vaishali). The findings suggested that financial liability of a household influenced insurance uptake whereas recent episodes of illness and self-assessed health status did not. Social category of a household was not found to be deterring enrolment considerably. The public health insurance scheme Rashtriya Swasthya Bima Yojana did not inhibit the demand for the micro health insurance scheme.

In case of Bangladesh, Ahsan et al. (2016) estimated the willingness to join and the willingness to pay for an expanded version of the existing MHI scheme of Grameen Kalyan.

The analysis was based on a household survey conducted in 120 villages of seven districts and it applied a modified bidding game with the open-ended questions to elicit willingness to pay among the respondents. The study found that around 54 per cent households were willing to join the MHI scheme and the average willingness to pay was only 8 per cent of annual healthcare expenditure. The important determinants of willingness to join were non-land asset, household income, age, gender of respondent, size, location of household and distance to healthcare provider(s). In case of willingness to pay, result showed the significant factors were per capita annual household expenditure, amount of agricultural land currently under cultivation, a wealth proxy, non-land asset, gender, knowledge about insurance, an episode of child delivery during the last 12 months, and location of the household, flood. However, age, household size, education, past health shock, MFI membership did not influence willingness to pay of the sample households.

In Nigeria the National Insurance Scheme proposed a national premium for community-based MHI schemes. Against this backdrop, Udeh et al. (2016) aimed to evaluate the maximum premium affordable by the households for a community-based MHI scheme. The premium level usually influences the sustainability of scheme, and at the same time the target group of the scheme must afford it. Hence, the study analysed the issue of sustainability in terms of affordable premium. It modelled hypothetical health insurance scenarios and examined the probable impact of different premium levels on enrolment across socio-economic status quintiles. Finally, they estimated the maximum level of premium affordable to households. The result suggested that ability to afford premium is linearly related to socio-economic status of households so, lowest quintile reported worst affected due to high premium. To improve the affordability of premium, the study recommended that national health insurance scheme should be separated into rural and urban.

Ahmed et al. (2016) investigated the demand for MHI among the informal workers in urban Bangladesh. The target group consisted of three categories of urban informal workers namely shopkeepers, rickshaw-pullers and restaurant workers. The survey was conducted in three locations (Dhaka, Chandpur and Nobinagar) and sample size was 557. The contingent valuation method (bidding game) was used to elicit the willingness to pay for MHI among the respondents. Nearly 87 per cent of sample respondents were found willing to join the scheme. Regarding the mode of payment, nearly two-third of them preferred to pay premium on

weekly basis. The average willingness to pay was estimated as 22.8 BDT per week and it was the highest among rickshaw-pullers. The study found income, education level, locations and activity groups significantly influenced the willingness to pay among the sample respondents. The relation between willingness to pay with income was found positive but that with education level was found negative.

Dror et al. (2018) examined the determinants of demand for community based micro health insurance (MHI) schemes and analysed the effect of peer (group consensus) on the enrolment decision in case of such voluntary health insurance schemes. The study was based on a household survey (of 3,685 households) conducted in two states of India viz. Uttar Pradesh (rural Pratapgarh and Kanpur Dehat districts) and Bihar (Vaishali district). During March–May 2010 a total of 3,685 households were surveyed; in which respondents were asked about the socio-demographic and economic profile of the household, self-reported incidence of illness, hospitalization events and healthcare expenditure. In 2011, out of 3685, 1335 households were offered to join a CBHI scheme, 525 households enrolled in the scheme by paying a premium. The findings suggested that the household's demand for the MHI scheme is significantly influenced by factors such as the income of the household, its social category, its income, intra-household income- sharing (pooling), formal education status of household head, number of children and adults in the household but these household characteristics could not fully explain the probability of joining the insurance scheme. Following this based on further econometric analysis the study found that decision of joining CBHI scheme was influenced by group consensus on number of issues, like the insurance premium, perceptions about exposure to health shocks, and service quality of local healthcare providers.

2. Studies focused on financial sustainability of MHI

Dror (2001) investigated the financial stabilization of MHI schemes based on field data (from Philippines and Uganda) and simulation exercises. The study found that factors like small client base, low volume of transactions, underestimation of risks influenced the financial instability of the schemes. The analysis suggested that reinsurance⁴ would be a better

⁴ Reinsurance is the transfer of liability from primary insurer (here MHI unit) to other insurance company(reinsurer).

alternative compared to external subsidies in controlling the ruin risk exposure of MHI schemes.

Bonnevay et al. (2002) examined the effectiveness of reinsurance in maintaining the financial sustainability of multiple MHI units. Findings from the simulation exercise undertaken in the study showed that in absence of reinsurance, only 20 per cent of the insurers were able to remain solvent within five accounting periods timeframe; even with the assumption that insurers were able to bear their mean cost of benefit expenditure. The MHI schemes operating on their own failed to stabilize financial sustainability with the low claim loading or high cost-variance. Moreover, the simulation results indicated that insolvency risk of small schemes rises over time and that could not be refrained by higher premium of the beneficiaries.

Fairbank (2003) explored the design and implementation of social reinsurance desirable in maintaining financial viability of community based micro health insurance schemes. The simulation results suggested that CBHI schemes required considerable amount of subsidy to upgrade their technical and management capabilities essential for reinsurance coverage. The study explained that due to the paucity of real-world data (which makes the estimation of quantum and duration of subsidies required difficult), potential reinsurers most of the time would not accept the risk of financing required in a social reinsurance program specially for the CBHI schemes with small client-base.

Ahuja and Jütting (2003) discussed the issues of adverse selection, moral hazard and scheme-manager's incentive in the context of sustainability of MHI schemes. The problems of adverse selection and moral hazard are widespread in existing MHI schemes and often impede the sustainability of them. The study showed that household as a unit of insurance would be relatively better than individual as membership unit in controlling the adverse selection problem only when the proportion of high-risk individuals was not large enough. Regarding moral hazard, they specified the conditions under which the ex-ante moral hazard problem could be addressed through a group insurance contract. They showed that an individual could be better off making preventive effort and having full insurance than full insurance at unreduced probability of illness. Lastly, the study analysed the incentive issue of MHI scheme managers. It proposed an incentive scheme for managers in which a manager's

payoff involved two parts: i) fixed amount per member to encourage them to expand membership (risk pool) and ii) an incentive such as if the actual claims exceed expected claims, the manager would be paid based on actual claims and vice-versa.

With the help of a simulated exercise Dror and Armstrong (2006) analysed the role of capital in ensuring financial sustainability of micro health insurance schemes. They used an Irish large health insurer's 2001 data set, containing 1.3 million insureds. At first this original data set was split into 535 "virtual microinsurance units (MIUs)". Next, they ran 1,005 iterations to obtain a data of 537,675 virtual MIUs. The study showed that the insolvency risk was substantial for the MIUs operating with inadequate (low) or no capital. Findings also suggested that capital loading levels increased sharply with decreasing group size and higher confidence levels. The study also examined the two alternatives to maintaining capital for financial sustainability of MIUs viz. reinsurance and government subsidy. It concluded that reinsurance is cheaper than capital loading and a better solution for governments relative to other options like introducing a social health insurance.

Kyomugisha et al. (2009) examined the sustainability of community based MHI schemes in Uganda. They conducted eight focus group discussions with scheme members and seven focus group discussions with scheme non-members. Beside that twelve Key informant interviews were also held with scheme managers, officials. The study found that community based MHI schemes were not sustainable. According to the study, this was due to fact that schemes were functioning on small budgets, had low enrolment and lack government support.

Muchabaiwa et al. (2017) investigated the feasibility and sustainability of MHI scheme (community-based) in rural Zimbabwe. In its first phase, the study estimated the willingness to pay for the scheme (issue of feasibility). In the next phase it examined sustainability of the scheme. For this an MHI scheme was offered (and followed up for 3 years) to 121 families from 14 villages at a premium estimated from the WTP study of phase one and with a maximum cover of \$100 per month. The study measured scheme's sustainability by the extent to which it could cover the medical expenditure of sample participants. Hence, the MHI scheme offered was financially sustainable if its contribution matched or exceeded the healthcare expenditure incurred by the participant-members. The study found that there was a demand for MHI among rural households. Regarding sustainability the findings revealed that

the gap resulted from scheme's compensation falling short of participants' actual healthcare expenditures showed a downward trend and by the end of study both became equivalent. So, it suggested that MHI scheme in general had a potential to survive financially.

Yao (2013) investigated the sustainability of an MHI scheme operated by the Aga Khan Agency for Microfinance in Pakistan. The study had analysed the sustainability issue by examining the relationship between claim experience and households' policy renewal decisions. It had estimated three econometric models to i) examine the effect of current period claim experience on a household's next period policy renewal decision and ii) measure the difference in claim experience between newly insured households and renewed households. In the study claim experience was measured by claim frequency, claim severity and total claim amount (which equals the product of first two). The results showed that households that demanded larger claims were more likely to renew their policies. However, the study found that compared to the newly insured households, these households subsequently had lower claim frequency and lower total claim amounts. So, the micro insurer actually had an improved risk portfolio implying a possibility of a long-term development of sustainable/viable MHI scheme.

Weilant et al. (2015) examined the sustainability of five South Asian MHI schemes on the basis of four dimensions- membership, claim cost, expenditure management and use of subsidies. The study categorised the schemes under five groups- i) profitable with explicit subsidy, ii) profitable with implicit subsidy, iii) profitable but unsubsidized and self-sustaining, iv) unprofitable, unsubsidized and unsustainable and, v) unprofitable with losses subsidized. The financial information of them was assessed over the period 2008 to 2012. It was found that if sustainability is defined as financial profitability without subsidy involvement, none of the schemes was sustainable.

3. Studies focused on impact of MHI

Jütting (2001) investigated the impact of CBHI scheme membership on financial protection in rural Senegal exploring two aspects- probability of healthcare seeking and out-of-pocket

expenditure borne by households. The scheme beneficiaries were found to have a higher probability of using hospitalization services than to non-beneficiaries and in case of availing healthcare services out-of-pocket expenditure reduced substantially for the beneficiaries compared to non-beneficiaries.

Ranson (2002) studied the impact of an Indian CBHI scheme, Self Employed Women's Association's Medical Insurance Fund (in Gujarat) on health-related indebtedness of the member households. The findings of the study revealed that CBHI scheme was effective in protecting the member households from financial burden of healthcare expenses.

Devadasan et al. (2004) analysed the impact of a community based micro health insurance scheme of Tamil Nadu (India), named ACCORD-AMS-ASHWINI (AAA) on utilization of health services. The study found a higher incidence of access to hospital care for the member households compared to the uninsured households.

Aggarwal (2009) assessed the impact of India's Yeshasvini community-based health insurance scheme on healthcare utilisation and health related financial risks using a household survey covering 4109 households in 82 villages across 16 districts of Karnataka. The study classified outcome variables into four groups: utilization of healthcare, financial protection, outcome of treatment and economic wellbeing. In this study the Propensity score matching technique was used for evaluating the impact of the scheme. From the analysis it was found that although impact of health insurance scheme showed a variation across socio-economic groups, in general it had reduced out-of-pocket expenditure, increased healthcare utilization and ensured better economic outcomes.

Hamid et al. (2011) investigated the impact of MHI on poverty reduction in rural Bangladesh. Their specific research objective was to evaluate the impact of adding MHI to microcredit programme of Grameen Bank on the poverty status of households. For this the study considered four outcome measures such as household income, its food sufficiency, asset ownership and probability of being above or below the poverty line. The study found evidence of positive association between availability micro health insurance and all these outcome measures suggesting MHI could lead to poverty reduction. However, it was statistically significant only for food sufficiency (income stability parameter).

Dror et al. (2016) evaluated the impact of community-based MHI on insured households' financial burden of medical expenses in rural Bihar and Uttar Pradesh states of India. The study noticed a fall in borrowing to finance healthcare expenditure among insured households, which was not visible in case of uninsured households. Households that were insured under CBHI scheme for two years were found to have higher chances of economic improvement. In addition, insured households were found less prone in practicing less self-medication.

CHAPTER-3

Research Objectives

We have already mentioned that the main objective of the present thesis is to investigate the various issues related to MHI. From the review of existing literature on MHI, we identify three aspects to delve in the thesis. These are issue of distress healthcare financing among the informal sector workers, question of financial sustainability of MHI scheme and demand for MHI. We will now discuss in detail the research objectives and provide justification. In this thesis I will make a humble attempt to address these objectives:

1. The first objective of the thesis is to analyse whether the informal sector households can cope with health shocks or not. There are mainly two measures frequently used to capture the economic hardship associated with health payments; namely catastrophic OOP spending and impoverishment due to health expenditure. Both these measures generally bypass indirect healthcare costs incurred by households like, transportation, loss of work etc. which can be a substantial proportion of healthcare expenditure. The coping strategies of a household provides important insight on how it responds to health shocks. So, the thesis lay emphasis on coping mechanism to access the vulnerability of households from healthcare payments. The study sheds light on a hitherto not-much studied dimension of OOP healthcare expenditure of informal sector workers. To address this objective, on the basis of a micro-level field investigation in West Bengal, the study concentrates on two issues. These are,

- i) The study will examine the major factors responsible for OOP average monthly healthcare expenditure of sample households.

- ii) Next it will investigate the factors influencing incidence of distress healthcare financing of those sample households.

2. While the MHI schemes often face the risk of insolvency⁵ (due to various causes), the literature on financial sustainability of MHI is rather thin. The survey of relevant literature revealed that previous research works mainly emphasized on the role of reinsurance of MHI units and capital loading in maintaining financial sustainability of such schemes. We found that impact of the presence of a nodal agency (any local

⁵ For example, see Shaw (2002), Basaza et al. (2007), Kyomugisha et al. (2009) and Weilant et al. (2015)

organization) in this issue remain still largely unexplored. So, in the second objective, we will investigate whether a for-profit insurance firm can sustain financially from providing MHI to low-income households. To be more specific, we want to delve whether collaborating with a local NGO proves beneficial for the insurance firm in its business. The objective of the study is to provide an analytical model of MHI dealing with this issue which is absent in the existing literature of MHI.

3. Case studies of existing MHI schemes confirm that these schemes have succeeded in enrolling a small proportion of their target population. Hence, in its third objective the study attempts to investigate the demand for MHI among the informal sector workers in West Bengal, India. The review of literature on demand for MHI suggests that previous empirical works were either based on the existing MHI schemes or used Contingent valuation Method to elicit the demand for a proposed (hypothetical) MHI scheme. In the context of India existing studies did not take into account the effect of scheme-characteristics (except premium) on its demand. The MHI as a product is quite different from the commercial health insurance. The proper designing of an MHI scheme is immensely crucial to encourage participation of target group. The characteristics of an MHI scheme (i.e., premium level and benefit package) could have a significant impact on its demand among the target group. Therefore, to examine the extent to which scheme characteristics influence the choice of decision-maker the study will apply Discrete Choice Experiment (DCE). In a DCE exercise we can determine to what extent the respondent is willing to trade-off one characteristic of a product to its another characteristic. To our knowledge there was no such study done on demand for MHI in India using DCE.

CHAPTER-4

Distress Financing of Healthcare among Informal Workers: An Investigation in West Bengal

4.1. Introduction

The healthcare financing system in LMICs are weak and at the same time due to low level of per-capita income, savings of the major portion of population are also low. As a result, to meet their healthcare expenses, the poor households have to sell assets, take loans, borrow money or have to accept contributions from friends and relatives⁶. Estimates of Kruk et al. (2009) suggests that 25.9 percent households across forty LMICs (comprising 58 per cent of world population) borrowed money or sold assets to finance for healthcare. Out-of-pocket healthcare payments financed through borrowings with interest or selling of household assets are referred as distress healthcare financing. Although coping strategies such as disposing assets and borrowing with interest from local informal sources may help households to ensure coverage of their healthcare needs in the short run, the long-term consequences of these coping strategies can be substantial (Flores et al.,2008). Borrowing from informal money lender, selling of assets or livestock can potentially push the households into a vicious circle of economic vulnerability in the long run since poor health exhausts merge savings, assets and resort to borrowing; while low levels of assets lead to worsening health and an inability to cope with future illness. Loans from moneylenders in developing countries often carry high rate of interest rates causing household to carry the burden of debt for a long period (Banerjee and Duflo, 2007). Households also have to adopt some other riskier coping strategies, such as taking more work or reducing expenditure to finance healthcare payments. The former involves household members working overtime or sending children to work while the latter involves reducing expenditure on food⁷ or education⁸ of the household.

The burden of OOP healthcare expenditure in India is very high among the Asian countries (van Doorslaer et al., 2006). The public health expenditure as a per cent of total health expenditure was 29 per cent whereas the OOP expenditure as per cent of total health

⁶Cross-country studies like Leive and Xu (2008), Kruk et al. (2009), Bonfrera and Gustafsson-Wright (2015), and Mitra et al. (2016) examined sources of financing health expenditure in LMICs.

⁷Gretler and Gruber (2002) found that serious illness had reduced household consumption by 38 percent in Indonesia.

⁸ Children can be pulled out of school to enter the labour force and therefore fail to advance in school which can lead to long-term negative outcomes such as low educational attainment and lower future earnings (Duryea, Lam, and Levison, 2007).

expenditure was 62.6 per cent in 2014-15 (NHSRC, 2017). The public spending on health⁹ in India was only 1.02 per cent of GDP in 2015-16 (CBHI, 2018)¹⁰. The high OOP expenditure leads the poor households to resort to distress financing. Binnendijk et al. (2012) estimated that about 25 per cent of households in Orissa had to incur hardship financing on healthcare. Among households that experienced hospitalization, this percentage was nearly 40 per cent and among households with outpatient or maternity-related care it was 25 per cent. Joe (2015) found that, in India over 60 per cent and 40 per cent of hospitalization cases from rural and urban areas respectively, used coping strategies like borrowing, selling household assets and seeking contributions from friends and relatives. The study also showed significant socioeconomic gradient in the distribution of distressed financing. Dhanraj (2014) found that economic vulnerability due to health shocks and coping strategies are high among households in low-income strata poorer, with elderly, chronically ill or disabled members and belongs to Scheduled Castes (SC) in Andhra Pradesh. The study also reported that the state insurance scheme failed to provide adequate protection against health-related financial shocks. The study of Quintussi et al. (2015) had found that households in Bihar and Uttar Pradesh frequently resorted to utilising savings, borrowing and selling assets to meet their healthcare expenditures. Few households also reported to reduce food consumption in response to medical expenses. John and Kumar (2017) estimated that about 14.9 per cent of the total households surveyed in the four blocks of Rajnandgaon district in Chhattisgarh were exposed to hardship financing related to OOP expenses for healthcare. Using the NSSO 71st round data, Kastor and Mohanty (2018) found all those who resorted to distress financing, 76 per cent had catastrophic health expenditure. From the NHFS-4 data, Mishra and Mohanty (2019), estimated one in four mothers resorted to borrowing or selling to meet the OOP expenditure on institutional delivery. Their study also showed the extent of distress financing was higher among less educated, poor and in private health centres.

The target group of the present study is informal workforce. A large number of informal workers in both rural and urban areas are illiterate, poor and vulnerable to many infectious and chronic diseases. Moreover, they are usually deprived from receiving different types of social security benefits including health care protection. In India, the informal workforce

⁹ The benefit of which accrues mostly to the poor.

¹⁰Except Rajasthan the public health expenditure for all other major states is less than 2 percent of their respective GSDPs in 2014-15 (Srinath et al. 2018).

constitutes more than 90 per cent of total workforce (National Statistical Commission, 2012; Government of India, 2019) and the sector contributes about 50 per cent of the national product (National Statistical Commission, 2012). Due to unhygienic living and/or working conditions, they are often exposed to various kinds of health problems which in turn reduce their productivity and income. A vast majority of the informal sector population has no fixed employer-employee relationships and are mainly deprived from social security benefits including healthcare protection. Against this backdrop, the present study attempted to explore the issue of OOP healthcare expenditure among the informal sector households in West Bengal (a state in India). Purulia (a district in West Bengal) was chosen as the zone of survey. Purulia is an economically backward district¹¹. On the basis of a micro-level field investigation, we initially examined the determinants of OOP average monthly healthcare expenditure of the sample households; and next we investigated the factors influencing incidence of distress healthcare financing of those sample households. Distress healthcare financing is defined as a situation when a household required to borrow money with interest and/or sell assets/livestock for its healthcare expenditure. Analysing the first research question will determine the factors affecting the monthly average OOP healthcare expenditure of the sample households but it will not shed light on the risk coping mechanism adopted by the households against health shocks. The coping strategies provide important information on how households respond to health shocks. To our knowledge there is a dearth of studies on distress healthcare financing of informal households in case of West Bengal. Thus, the present study is an attempt in that direction to complement the existing literature of OOP healthcare expenditure. In addition, the literature of healthcare financing at a large ignores the issue of endogeneity, while the parameter estimates of such regression will be biased if at least one regressor becomes endogenous. The present study addresses the research objectives after considering the endogeneity problem. It adopts instrumental variable estimation technique in which income is considered as endogenous variable (in the first research question) and the health expenditure variable is allowed to be endogenously determined in the distress healthcare financing probability equation (in the second research question). The present study sheds light on a hitherto not-much studied aspect of OOP healthcare expenditure incurred by informal sector households.

¹¹ According to the India Rural Development Report 2013-14 districts of West Bengal are segregated into two groups – relatively developed and relatively less developed. Among 19 districts of West Bengal eight are relatively developed and rest are relatively less developed.

The rest of chapter is organised as follows. The section 4.2. describes sample selection and survey details of the study. The descriptive statistics of the sample data is given in the section 4.3. The section 4.4 specifies the econometric models, empirical findings and provides the analysis of results. Finally, we draw the conclusion.

4.2. Sample Selection

The present study is based on a household survey conducted (in Purulia) during January to June of 2018. As per the Census 2011, total population of Purulia is 2930115, out of which 87.26 per cent are residing in rural areas and 12.74 per cent are in urban areas. About 51.09 per cent of the populations are males and 48.91 per cent are female. The percentage of Scheduled Caste and Scheduled Tribes are 19.38 per cent and 18.45 per cent respectively. Total number of households in SECC Census 2011 is 536972 out of which 149983 households (i.e., around 28 per cent) are landless and deriving major part of their income from manual casual labour. Main working class has been decreased from 25.43 per cent in Census 2001 to 20.93 per cent in Census-2011 whereas Marginal working class has increased from 19.03 per cent in 2001 to 21.71 per cent in 2011 census. It is observed that a section of cultivators has shifted to other working classes.

The selection of households was based on a two-stage random sampling method. At the first stage, three blocks (viz. Purulia-I, Purulia-II and Hura) were selected randomly under Purulia Sadar sub-division. Then from each block, two villages were selected randomly and finally eighty households were selected from each village through random sampling procedure¹². We found that 30 households (representing 6.25 per cent of total selected households) did not seek any healthcare between January 2017 to December 2017 (reference period). For the analysis we considered the households which sought healthcare at least once during the reference period. Thus, the present study is based on 450 households.

¹²We met the respective village Panchayats for identification of informal-sector households. The sample for our study consisted of farmers, landless labourers, vendors; toto drivers, rickshaw pullers, security guards etc.

From each household, the head of family was questioned. The survey questionnaire accommodated questions on healthcare utilization and cost, household income, expenditure on food and fuel, household size, total working members, education level of the head, age of head, working status of members etc. The head was asked whether there was any incidence of outpatient care seeking, hospitalisation for any member during reference period. Hospital admittances reflect cases with inpatient stay exceeding 24 hours. Stays in hospital less than 24 hours together with consultations with a healthcare practitioner, and payment for medicines or tests in an outpatient setting were counted under outpatient care. Respondents were asked to estimate total medical expenditures of the household period and also asked about the sources of healthcare financing during the entire reference period.

4.3. Data Description

The summary statistics of all the variables (both dependent and independent) are given in the Appendix. Average monthly income of the sample households was around Rs. 7144. The households consisted on average of 5.08 members. The mean size of the vulnerable age group (i.e., members with age ≤ 5 and ≥ 55 years) was 3. The average years of schooling of household heads was 5 years with 10.14 per cent had no formal schooling. We found that principal working member in most of the households were involved in casual wage employment.

The monthly average healthcare expenditure incurred by sample households was around Rs 800 which represent nearly 11.20 per cent of average monthly household income. We found that less than 9 per cent of households had health insurance (RSBY). During reference period, 30.86 per cent households experienced at least one hospitalisation episode while 54.05 percent households faced at least one illness episode without hospitalisation. Around 44 per cent households sought healthcare from private provider along with public provider. In our study sample 35.59 per cent households resorted to distress healthcare financing and around 45 per cent households incurred catastrophic OOP payments for healthcare. Among the households that incurred catastrophic health payments nearly 57 per cent faced distress financing. So, no one to one correspondence is observed between incidence of catastrophic health expenditure and incidence of distress financing.

4.4. Econometric Specification and Empirical Findings

The study develops two distinct models to address the research questions. The Model-I investigates the factors determining households' average monthly OOP healthcare expenditure and the Model-II examines the factors responsible for incidence of distress healthcare financing among sample households.

4.4.1. Specification of Model-I

To address the first research objective, we consider the following regression model:

$$\begin{aligned} \text{LOGHCE}_i = & \gamma_0 + \gamma_1 \text{LOGINCOME}_i + \gamma_2 \text{OUTPATIENT}_i + \gamma_3 \text{HOSP}_i + \gamma_4 \text{VULNERSIZE}_i \\ & + \gamma_5 \text{PROVIDER}_i + \gamma_6 \text{CASUAL}_i + \gamma_7 \text{REGULAR}_i + \gamma_8 \text{EDUC}_i + \varepsilon_i \quad \dots (1) \end{aligned}$$

The variables considered in (1) are narrated below with theoretical justification and expected signs:

- **LOGHCE:** It is the dependent variable of Model-I, which denotes the logarithm of household *i*'s average OOP monthly healthcare expenditure. From every households we collected annual health expenditure data on medicines, consultation fees, hospital bed charges, transportation costs and expenditure incurred on food, lodging for companion(s) of ailing household member(s) during the reference period¹³. The annual OOP healthcare expenditure figure of every household is then divided by 12 to obtain the corresponding average OOP monthly healthcare expenditure
- **LOGINCOME:** It denotes the logarithm of average monthly income of a household. For any household we consider the earnings of all its working members from different sources during reference period and then aggregate them to reach annual income of the household. Thereafter dividing that by 12 we got average monthly income of the household. It is

¹³ If a household had taken medical loan(s) (either from informal lender or SHG or from both sources) during reference period and also repay that with interest – either full or partial during the same period, then that particular amount is also included in its OOP health expenditure. Repayment of any earlier medical-loan during January-December, 2017 period is not considered in OOP health expenditure calculation. Likewise, if a loan taken during January-December, 2017 period but not repaid (full or partial), then also the loan capital and interest is not considered as components of OOP health expenditure in our estimation.

expected that households with higher income are more capable of making higher expenditure in healthcare need of its ailing member(s).

- **OUTPATIENT:** It is here treated as binary in nature. We define $OUTPATIENT = 1$, if household incurred at least one incidence of consultation with a healthcare provider, payment for medicines and/or tests in an outpatient setting and hospital-stay only for day-care treatment during the reference period; otherwise $OUTPATIENT = 0$. Here we consider the situation where any type of illness did not require hospitalization with overnight stay.
- **HOSP:** It is also considered as dummy variable where it will take the value 1 if a household experienced at least one hospitalisation episode¹⁴ i.e., an inpatient stay exceeding 24 hours at any time during the reference period and otherwise it is coded as 0.
- **VULNERSIZE:** It represents total number of children aged five or less than five and number of members aged fifty-five or more in a household. The healthcare expenditure of a household is likely to increase with the presence of children and old age members since these two age categories mainly suffer from health shocks.
- **PROVIDER:** It is a dummy regressor, which is coded as '1' if the household seeks medical care for any purpose (inpatient care/ outpatient care/ chronic disease) from private healthcare provider including traditional healer along with public provider during reference year, and 0 otherwise. Since many times medical facilities given by public providers is not sufficient, people have to seek medical care from private sources. This variable is expected to increase average healthcare expenditure of the household.
- **CASUAL:** It is a dummy explanatory variable and it is equal to 1 if the principal earning member of a household is casual worker or 0 otherwise.
- **REGULAR:** It is also a dummy regressor, coded 1 if the principal earning member is regular salaried worker and coded 0 otherwise¹⁵.

¹⁴The correlation between the variables $OUTPATIENT$ and $HOSP$ is very low (around 7.37%).

- EDUC: It denotes years of education of the household-head. We account for the characteristic of the household-head since, usually the head is responsible for taking vital decisions like getting healthcare and consequently making healthcare expenditure.

Since the proportion of households with health insurance is very low in our sample, it is not considered as an explanatory variable in Model-I.

4.4.2. Estimation Results of Model-I and Discussion

To investigate the factors influencing monthly average OOP healthcare expenditure of households, we can do an OLS estimation of equation (1). But the OLS estimates of parameters will be biased if at least one explanatory variable becomes endogenous. In first model we treat the family income (i.e., LOGINCOME) as an endogenous regressor to allow for the possibility that the unobserved determinants of LOGHCS and the unobserved determinants of LOGINCOME are correlated. To address the (probable) endogeneity problem, total number of working-members in a household, (denoted as ‘WORKINGSIZE’) is considered as an instrument for LOGINCOME . Further the Wu-Hausman test for endogeneity is done to check whether LOGINCOME can be treated as exogenous variable.

Table 4.b reports the parameter estimates of IV (2SLS) regression of model-I and result of Wu-Hausman test for endogeneity. The overall fit of the model is highly significant. The null hypothesis of the Durbin and Wu–Hausman test is that the variable under consideration (here, LOGINCOME) can be treated as exogenous. Here the test statistic is highly significant, so we reject the null hypothesis of exogeneity; and consequently, have to treat LOGINCOME as endogenous explanatory variable in Model-I. This suggests the OLS estimation is not consistent; and an IV estimation is required to have unbiased estimates of parameters.

¹⁵ We have considered usual activity status during the reference period: broadly classified as casual labourer, self-employed and salaried worker in informal sector. To avoid dummy variable trap, we have not taken all the three categories as dummy regressors in equation 1.

Table-4.a: Determinants of Average OOP expenditure

	Coefficient	Robust Std. Err.	P value
Log of average monthly OOP health expenditure	<i>(dependent variable)</i>		
Log of family income	2.187***	0.853	0.010
Outpatient care (incidence)	0.109	0.123	0.374
Hospitalisation episode (incidence)	0.322**	0.141	0.022
Vulnerable member size	0.182***	0.038	0.000
Private Provider	0.257**	0.125	0.040
Casual worker	0.326**	0.155	0.036
Regular salaried	0.323	0.226	0.153
Education of head	-0.003	0.017	0.876
constant	-14.061**	7.525	0.062
Number of observations = 450	Wald chi2(7) = 56.56	Prob > chi2 = 0.0000	

Tests of endogeneity

Ho: variables are exogenous

Robust regression: $F(1,434) = 7.85214$ ($p = 0.0053$)

Note: ***=> Significant at 1 per cent or less than 1per cent, ** =>Significant at less than 5per cent.

Table 4.a shows except incidence of outpatient care, regular salaried activity status and formal education level of household head, the remaining explanatory variables had significant impact on average monthly healthcare expenditure of sample households. The signs of the parameter estimates were also as expected. The results show that during reference period, average monthly OOP healthcare expenditure was highly significant in size of vulnerable age group in household. This implies that children and elderly group in our sample tend to suffer more often from vulnerable health status. The healthcare seeking source was also proved to be a very significant regressor. Due to high user cost, the incidence of healthcare seeking from private provider increased the average OOP healthcare expenditure of households quite significantly. Lastly for informal households another important factor emerged in our study was average monthly income. Actually, a household can spend more on healthcare for the ailing members if its income supports.

4.4.3. Specification of Model-II

During the period of illness, a household not only has to spend money (and sometimes also its assets) on healthcare but also forgo the wage earning. Often, to meet their healthcare expenses, the poor households have to rely on expensive coping mechanisms like borrowing money with interest, selling of assets and getting contributions from friends and relatives. As a result, health crisis rapidly becomes financial crisis. So, we need to investigate the impact of high OOP healthcare expenditure on incidence of expensive coping mechanism among informal-sector households. The Model-II focuses on this very question¹⁶.

The outcome variable of Model-II is distress healthcare financing. In the present study it is defined as a situation when a household required to borrow money with interest and/or sell assets/livestock¹⁷. In the household survey, we found that during the reference period the main sources of household healthcare financing were (the then) current period income, savings, money borrowed with interest, financial help received from relatives/ neighbour and health insurance¹⁸. To investigate the factor(s) influencing distress healthcare financing of sample households the following functional relationship is defined:

$$\text{DHF}_i = \beta_0 + \beta_1 \text{CHE}_i + \beta_2 \text{CASUAL}_i + \beta_3 \text{REGULAR}_i + \beta_4 \text{SHG}_i + \beta_5 \text{WORKINGSIZE}_i + \beta_6 \text{EDUC}_i + u_i \quad \dots (2)$$

The regressors included in (2) are narrated below with theoretical justification and expected sign:

¹⁶ There are few studies which also addressed the issue of distress financing but the literature at a large ignores presence of endogeneity problem in this context. Most of these previous studies (Binnendijk et al., 2012; John and Kumar, 2017; Mishra and Mohanty, 2019) applied the Binary Logistic regression to identify determinants of distress health financing. They considered morbidity parameters and health expenditure as explanatory factors (along with other socio-economic factors) in their empirical frameworks.

¹⁷The borrowing from relative/ friends for healthcare payment is not considered as distress financing since it usually does not entail interest and thus is less burdensome.

¹⁸ We found only around 10 % of the sample households had RSBY card during the reference period.

- DHF: It is the outcome variable of model-II which is here treated binary in nature. DHF is coded as 1 if the household incurred distress financing and 0 otherwise.
- CHE: It is a binary regressor denoting catastrophic healthcare expenditure incurred by a household. An OOP healthcare payment is considered catastrophic when the expenditure exceeds certain threshold proportion of total household expenditure or capacity to pay (Wagstaff and Doorslaer, 2003; Xu et al., 2003). In literature, the threshold level is set arbitrarily. We have used the non-food expenditure as a proxy measure for a household's capacity to pay and consider any OOP healthcare spending exceeding 10 per cent of household's non-food consumption expenditure including interest payment on loan taken for medical purposes in the entire reference period¹⁹ as catastrophic. The share of healthcare expenditure in non-food expenditure (S_i) was derived as follows: $S_i = \frac{HCE_i}{NFE_i} \times 100$, where, NFE denotes the average monthly non-food expenditure²⁰. This implies the household i ($i = 1, 2, \dots, 450$) would have been faced catastrophic healthcare expenditure during the reference period if $S_i > 10$. So, $CHE_i = \begin{cases} 1, & \text{and } S_i > 10 \\ 0, & \text{and } S_i \leq 10 \end{cases}$.
- SHG: This is a dummy regressor and is taking value 1 if at least one person in the household was a member of a Self-Help Group (SHG) and 0 otherwise. Binnendijk et al. (2012) found households where someone is a member of an SHG have a higher propensity to face distress financing.

¹⁹The household survey was conducted during January to June of 2018 in which respondents were asked about total medical expenditures of the household and sources of healthcare financing in the year preceding the survey i.e., from January 2017 to December 2017. If a household has taken loan(s) (either from informal lender or SHG or from both sources) during this period and also repay that with interest – either full or partial during the same period, then that particular amount is also included in its OOP health expenditure. Repayment of any earlier medical-loan during January-December, 2017 period is not considered in OOP health expenditure calculation. Likewise, if a loan taken during January-December, 2017 period but not repaid (full or partial), then also the loan capital and interest is not considered as components of OOP health expenditure in our estimation.

²⁰ We have collected data for food, clothing, medical and other expenditures. Reference period for food expenditure was last one month and that for all other expenditures was last one year. Dividing the annual data by 12 we got monthly data. Adding up all monthly expenditure except expenditure on food we get average monthly non-food expenditure.

- **WORKINGSIZE:** This regressor denotes the number of total working members in a household. For a household it is expected that probability of distress financing will be negatively influenced by its working member size.
- **EDUC:** As mentioned earlier, it denotes years of education of the household-head. Since, mostly head is the key decision maker, we expect his/ her level of education can influence decisions like provider choice for treatment, borrowing/ selling assets for financing healthcare of members etc.
- The variables **CASUAL** and **REGULAR** are included as regressors²¹ to check whether there is any influence of activity status on probability of distress healthcare financing. For casual wage labourers and self-employed, sufficient seasonality and irregularity is observed in their income stream which is almost absent among regular salaried workers. Hence former two groups are likely to be more vulnerable to health shocks than regular salaried group.

4.4.4. Estimation Results of Model-II and Discussion

Since the outcome variable of Model-II, DHF, is binary in nature, the empirical strategy can rely on estimating a Probit model. However, parameter estimates of Probit regression will be biased if at least one explanatory variable becomes endogenous. We suspect that for a household unobservable factors influencing the incidence of distress financing also affect the probability of incurring catastrophic healthcare expenditure. Therefore, catastrophic healthcare expenditure is treated as endogenous. The variables **HOSP**, **VULNERSIZE** and **PROVIDER** are possible factors which may influence CHE. We have already narrated these variables in model-I's specification part.

If **HOSP**, **VULNERSIZE** and **PROVIDER** are valid instruments, then (1) they must be determinants of incidence of CHE, but (2) they must not influence the incidence of DHF. In a

²¹ We have already defined these variables in Model-I specification part. Like the previous model, to avoid the dummy variable trap, we have not included **SELF** as a separate dummy regressor in equation (2).

Probit model which explains the probability of incurring CHE, the regression coefficients (robust standard errors) of HOSP, VULNERSIZE and PROVIDER are 0.278(0.139), 0.298(0.041) and 0.503 (0.128) respectively. This suggests a statistically significant (all at less than 1per cent) relation between CHE and all of its three instrumental variables. In a simple Probit model where DHF is regressed on HOSP, VULNERSIZE and PROVIDER, the regression coefficients (robust standard errors) are 0.144(0.134), 0.057 (.038) and 0.147 (0.126) respectively implying all three are statistically insignificant. So, the instruments for CHE (viz. HOSP, VULNERSIZE and PROVIDER)are not influencing the distress financing incidence but plays an important role in determining incidence of catastrophic healthcare expenditure among sample households. We assume that CHE is defined as

$$CHE_i = \delta_0 + \delta_1 HOSP_i + \delta_2 VULNERSIZE_i + \delta_3 PROVIDER_i + v_i \quad \dots (3)$$

Since both the outcome variable (DHF) and endogenous explanatory variable (CHE) are dichotomous, we estimate a Seemingly Unrelated Bivariate Probit model. In the present study equations (2) and (3) define the Seemingly unrelated Bivariate Probit model²², where(u,v)is distributed as $E(u) = E(v) = 0, \text{var}(u) = \text{var}(v) = 1$, and $\text{Corr}(\mu, \eta) = \rho_2$ ²³.The model is properly identified if there is at least one variable that is correlated with whether or not a household incurred catastrophic healthcare expenditure but is uncorrelated with its chances of facing distress financing. So, our Seemingly unrelated Bivariate Probit model is identified. Table 4.b summarised the maximum likelihood (ML) estimation results of Seemingly unrelated Bivariate Probit model which treats the catastrophic healthcare expenditure as an endogenous variable.

²²We can ignore the simultaneity of this model and the endogenous nature of CHE does not require special consideration in formulating the log likelihood as the terms in the log likelihood function are: $P(DHF = 1, CHE = 1), P(DHF = 1, CHE = 0), P(DHF = 0, CHE = 1)$ and $P(DHF = 0, CHE = 0)$ (Greene, 2018)

²³When $\rho_2 = 0$, u and v are uncorrelated; so, CHE becomes exogenous in the equation (2) of this model.

Table-4.b Determinants of probability of distress healthcare financing

	Coef.	Robust Std. Err.	P value	ME
Distress healthcare financing	<i>(Dependant variable)</i>			
Catastrophic healthcare expenditure	0.680**	0.299	0.023	0.221
Casual worker	-0.258	0.158	0.103	-0.084
Regular salaried	-1.992***	0.527	0.000	-0.648
SHG membership	0.071	0.141	0.617	0.023
Number of working members	-0.210***	0.067	0.002	-0.068
Education of head	-0.012	0.019	0.530	-0.004
constant	-0.060***	0.251	0.812	
$\hat{\rho}_2$	0.352	0.197	0.044	
Wald test of $\rho_2 = 0$:	$\chi^2(1) = 3.21331$	Prob > $\chi^2(1) = 0.0730$		
Number of observations	450			
Wald chi2(8)	96.49			
Prob > chi2	0.0000			
Log pseudolikelihood	-492.54376			

Note: *** => Significant at less than 1per cent, ** => Significant at less than 5 per cent; ME => Marginal Effects

Table 4.b shows that the χ^2 statistic corresponding to Wald test of exogeneity (i.e., null hypothesis of $\rho_2 = 0$) is significant at less than 10 per cent level (precisely at 7.30per cent). Thus, the null hypothesis of no endogeneity is rejected. This proves the simple probit analysis is inapplicable here and validates our choice of estimating the Seemingly unrelated Bivariate Probit model. The overall fit of the model is highly significant. The ML estimation result suggests following factors significantly affect the likelihood of distress healthcare financing among sample households:

First, the households that incurred CHE were more likely to face distress healthcare financing. The estimated marginal effect shows that probability of distress healthcare financing was more than 22 per cent higher for households that incurred catastrophic healthcare expenses compared to households that did not incurred such expenses.

Secondly, if we consider the activity status of principal earning member, it is evident that REGULAR was significantly negative with reference to the base category of SELF i.e.,

self-employment. This suggests if principal earning member of household was in regular-salaried job, the family had a lower risk of borrowing (with interest) to finance healthcare compared to the households with self-employed principal earning member. From the estimated marginal effect, we see households whose principal earning member were regularly salaried employment, had around 65 per cent lower chance of facing distress financing compared to households in which principal earning member was self-employed.

Third, the total number of working members in household is found to be highly significant in determining the probability of incurring distress healthcare financing. The negative coefficient of this regressor suggests that the probability of distress financing was low for the households that had considerably higher working members' size. The estimated marginal effect indicates that if the size of working members was raised by one unit, the likelihood of incurring distress financing decreased by 68 per cent.

The table 4.c also suggests that there was no statistically significant difference in probability of distress healthcare financing due to presence of SHG membership among the household members and with education level of household-head.

4.5. Conclusions and Policy Implications

On the basis of a micro-level field investigation, we have investigated the determinants of out of pocket (OOP) healthcare expenditure and the factors influencing incidence of distress healthcare financing of the informal-sector households in Purulia district of West Bengal, India. We defined “distress healthcare financing” as borrowing with interest and/or selling assets to pay healthcare needs. Our study highlights that factors like incidence of hospitalisation, healthcare seeking from private sources, total number of children aged five or less than five and number of members aged fifty-five or above in household were significantly increased the OOP health expenditure of sample households. Consequently, factors like incidence of hospitalization, size of vulnerable group and incidence of healthcare seeking from private provider increased the probability of incurring catastrophic health expenditure. Our result also highlights that probability of distress financing was strongly influenced by the incidence of catastrophic healthcare expenditure. Households that incurred

catastrophic healthcare spending experienced higher chances of using expensive (health) risk coping mechanisms. The other factors influenced the likelihood of distress healthcare financing are: size of working members in household and occupation of principal earning member. These two factors are self-explanatory. Regular salaried employment gives a stable income contrast to the seasonality and irregularity of self-employment, so it is comparatively easier to address expenses. On the other hand, the household income tends to rise with the size of its earning members and consequently higher income may abstain the household from using the riskier coping strategies like borrowing and/or selling assets. It is also found that education of the household head and membership in SHG did not influence the probability to have distress financing.

During the reference period, a substantial number of our sample households (more than 35 per cent) had to rely on coping mechanism such as borrowing with interest and/or selling assets to meet their OOP healthcare expenditure. To avoid the distress financing of informal households, it is required to address high OOP healthcare expenditure (catastrophic healthcare expenditure). The most useful instrument to protect informal sector households against health-risk led hardship is health insurance. It helps to smooth household expenditures, reduces the dependence on borrowing/ selling assets and also increase the quantity of care sought leading to better health outcomes. Microinsurance of health (MHI) is recognised as an important instrument to cope with effect of economic vulnerability instigating from large OOP health expenditure. For the informal sector workers and their dependants, if there exists a health insurance with low premium and considerable coverage, which will be designed on the basis of their preference and also by taking into account their income and savings problems it will definitely possible to hedge their health risk.

Besides, the coverage of public health facilities must be increased and if there is a shortfall in such facilities, that must be addressed. As care seeking from private provider tend to increase OOP health expenditure and probability of catastrophic payments, public healthcare facilities can be an important instrument for reducing borrowing/ selling assets among the informal sector households.

APPENDIX

Summary Statistics

Variables	Mean	Std. Dev.	Min	Max
Average monthly income (INR)	7144.511	3451.733	2000	20000
Household size	5.08	1.56	3	14
Household size in age groups ≤ 5 and ≥ 55	3	1.633	0	7
Total working-members in household	1.694	0.983	1	8
Education of head (in years)	5.331	3.480	0	11
Average monthly OOP health expenditure (INR)	800.987	622.998	35	9000
In terms of total households (per cent)				
Household with outpatient care	54.05			
Household with hospitalisation	30.86			
Households seeks care from private provider	43.92			
Households incurred catastrophic health expenditure	44.82			
Households faced distress health financing	35.59			
Household having health insurance	8.78			
Working status (principal earning member)				
Regular wage earner	10.13			
Casual wage labour	67.57			
Self employed	22.30			

Source: Own calculation

CHAPTER-5

A Model of Microinsurance of Health

5.1. Introduction

The MHI schemes often face the risk of insolvency. Weilant et al. (2015) examined the sustainability of five South Asian MHI schemes and concluded that if sustainability was regarded as unsubsidized financial profitability, none of the scheme was found sustainable. For the MHI schemes of Africa also, financial support from government was reported to have a positive influence on schemes' sustainability (Shaw, 2002; Basaza et al., 2007; Kyomugisha et al., 2009). The MHI schemes across LMICs are mainly initiated by NGOs, trust hospitals, MFIs, and social organisation like women group, informal trade unions etc. the present chapter concentrates. Realizing there is a large untapped market of low-income households, the commercial insurers are becoming interested to provide health insurance to informal-sector households (Churchill, 2007). However, commercial insurers are likely to face challenges in this initiative. Firstly, MHI cannot be considered just as a scaled down version of existing health insurance schemes. Since the target group of MHI is informal sector, it should be designed so as to match the requirements of the local poor households. Hence, the insurer aspiring to serve the informal sector households must undertake the scheme design from the ground up instead of offering a scaled down version of existing schemes. Mebratie et al. (2013) conducted a systematic review of evidence about the impact of MHI schemes and found that there are clear links between scheme design and effectiveness. Secondly, evidences confirm the presence of asymmetric information problems (Ahuja and Jütting, 2003) in MHI schemes. Both of these have implications on the financial sustainability of an MHI scheme. We posit that in this context role of a local voluntary organization is substantial for providing health insurance to the poor. The present chapter offers some insights into whether collaborating with a local NGO proves beneficial for the insurance firm in its endeavour.

There are mainly three reasons for which a collaboration between an insurance firm and a local NGO can be recommended. First, to design an appropriate scheme, the firm requires local community specific information, which the NGO can provide better due to its relatively greater access of local informal network. Secondly, appointing a local organisation proves to be beneficial in lowering the average administrative expenses. Lastly, a local NGO can monitor the beneficiaries which for the insurance firm is either impossible or very costly. This chapter gives an analytical framework of a commercial (health)insurer serving poor

household: The present paper investigates whether a for-profit insurance firms can sustain financially from providing health insurance to low-income households of informal sector.

The literature on financial sustainability issue of MHI schemes is rather thin with most of those emphasised mainly the role of reinsurance of MHI units, capital loading in maintaining the financial sustainability. Bonnevey et al. (2002) examined the theoretical basis for the long-term viability of micro-insurance units and concluded that they need reinsurance. Ahuja and Jütting (2003) examined the incentive issues in MHI schemes. Dror and Armstrong (2006) suggested to maintain the financial sustainability MHI scheme must add a capital loading to the premium. They also investigated the impact of other alternatives like reinsurance, government subsidies on financial sustainability. But, the role of nodal agency in maintaining the financial sustainability of MHI schemes was not examined. We think presence of a nodal agency may be an important factor for the sustainability of such schemes. We have come across two major studies, Dror and Jacquier (199) and Ahuja and Jütting (2003), that examined group insurance contract as a potential solution to moral hazard problem which has implication on financial sustainability of MHI. In contrast, we work with the individual- contract framework and examine whether a collaboration between for-profit firm and a local NGO proves beneficial for the former in providing MHI to poor people.

The rest of the chapter is arranged in the following manner. In Section 5.2 we discuss the baseline model of MHI scheme. In Section 5.3, we consider the first stage interaction between insurance firm and NGO, in Section 5.4 we discuss Firm-NGO interaction of Stage-2, ultimately, we draw the conclusions.

5.2. Baseline Model of MHI scheme

Consider a single-period model in which a risk-neutral insurance firm initiates an MHI scheme for the low-income informal-sector workers living in a geographically proximate area²⁴. The scheme provides a maximum loss-cover of D for a set of illness²⁵ at a premium

²⁴ The MHI schemes across the world are operating to serve a local clientele

²⁵ MHI schemes are designed based on local health related requirements. They typically include outpatient benefits, coverage for transportation, low-cost surgeries etc.

$\pi(< D)$. An individual joins the MHI scheme if post-insurance payoff exceeds his reservation utility i.e., the best payoff he gets without health insurance or with any publicly sponsored health insurance. Without health insurance, the individual has to bear the entire healthcare expenses from his own pocket. The target group for most of the publicly sponsored health insurance schemes is the bottom of the income-pyramid. The population in ‘near-poor’ income set is usually remained excluded from the domain of all health insurance schemes²⁶. Thus, the outside option of the target group is usually very low²⁷.

To operate the scheme the insurance firm hires a risk-neutral NGO which is working among the low-income households of that locality for sometimes. Such an NGO usually enjoys the trust of the local households and has better local information. The NGO was assigned (by firm) to execute two tasks: enrolling potential beneficiaries in the scheme (in stage-1) and encouraging and monitoring their preventive efforts (in stage-2).

Individuals of the target group are supposed to be risk averse with same level of initial wealth ($W > 0$) and identical risk type. This suggests there is no adverse selection in the present framework. Any MHI scheme serves a local clientele, and premium is usually fixed at community risk level. So, this particular assumption is acceptable²⁸. The representative individual faces a possible loss, D , due to health shock(s), covered under the MHI scheme. So, wealth lottery of the individual is: $(W - D)$ with probability $p(< 1)$ (denote as bad state) and W with probability $1 - p$, (denote as good state). In this framework, the probability of illness, $p \in (0,1)$, is decreasing in individual’s preventive effort $e \in \{e^*, e_*\}$, $0 \leq e_* < e^* < 1$. At the same time, individual has an endowed probability of facing health shock so, without exerting any effort, he can still be in good state and at the same time after taking the maximum possible prevention he may face the bad state. Without loss of generality assume,

²⁶ In India, MHI schemes like VimoSEWA, Yeshasvini, Uplift is providing the health insurance to the poor individuals, who fall outside the target group of government health insurance schemes (Kimball et al., 2013; Jain, 2017).

²⁷ Suppose there are no informal risk (health) sharing arrangements available among the individuals.

²⁸ Lahkar and Sundaram-Stukel (2010) also assumed away the adverse selection problem from their analysis based on similar type of reason.

$e_* = 0$. The level of preventive care (or effort²⁹) taken by the individual influences only the probability of illness, but not the absolute size of income loss due to illness.

At the 1st stage, the firm aims to increase its scale, which is a prerequisite for the scheme's sustainability. To accomplish the task assigned, in stage1, the NGO (i) works to create awareness regarding MHI among the target group³⁰ and (ii) provides inputs (information) to the firm regarding community preferences and affordability (willingness to pay), based on which the firm can design a customised MHI product. So, enrolment under the scheme depends on NGO's effort in creating awareness among target group and improving the insurer's familiarity with the preferences and behaviour of them. We assume that enrolment (N) is a linear function of NGO's effort in stage-1, $z \in [0,1]$, such as³¹, $N = \beta z$, $\beta \in (0,1)$. The NGO incurs a cost of $\frac{1}{2} \delta z^2$ for exerting an effort, $\delta \in (0,1)$.

In the second stage, the firm's objective is to cope with moral hazard on the part of beneficiaries. The moral hazard problem is of two kinds: ex ante and ex post. The ex-ante moral hazard problem arises due to reduced care of health after joining a scheme. The ex post moral hazard problem arises due to over-consumption of medical services. It is the ex-ante rather than ex post moral hazard problem that is dominant in case of providing health insurance to the low-income people through micro-insurance (Ahuja & Jutting, 2003). The problem for the firm is that, it cannot design a compensation scheme for any beneficiary based on occurrence of an illness episode, since even taking the maximum possible prevention, a beneficiary may face a health shock. The NGO can influence the preventive effort level of beneficiaries under the scheme (which again influence the number of claims) through monitoring. Again, the firm cannot monitor NGO's effort level in both stages. The NGO managed the MHI scheme initiated by insurance firm. The firm determines the MHI

²⁹ For rest of the chapter, we will use preventive care and preventive effort of the individual interchangeably.

³⁰ In literature, very often unfamiliarity with insurance is cited as a reason for low take-up rates of MHI (Ito and Kono, 2010)

³¹ Thus, the maximum enrolment possible is unity.

contract³² (D, π) , so for NGO, (D, π) is exogenous. In the next two sections we will try to derive the optimal incentive contracts between firm and NGO.

5.3. Firm-NGO interaction: Stage-1

In the stage-1(enrolment stage), the firm offers NGO a linear incentive contract: $w = t + \alpha N$, $\alpha \in (0,1)$ is the performance related component of compensation and t is the fixed compensation level. Suppose the firm invests an initial capital of K at commencement of the scheme.

In this situation the expected payoff of insurance firm will be:

$$K + N\pi - t - \alpha N$$

Setting, $N = \beta z$, this becomes as follows

$$K + \beta z\pi - t - \alpha\beta z$$

Suppose, the reservation utility or outside option to NGO is $\bar{y} (> 0)$. We assume that the NGO is altruist in a sense that it is concerned about the utility gain of an individual from joining the scheme, which is denoted as v . Usually, v is decreasing in π ; $v'(\pi) < 0$. If the intensity of altruism of NGO is $\lambda \in (0,1)$, its expected payoff can be defined as follows:

$$\lambda vN + w - \frac{1}{2}\delta z^2 = \lambda v\beta z + t + \alpha\beta z - \frac{1}{2}\delta z^2$$

The NGO's objective in the stage-1 is

³² The scheme provides a maximum loss-cover of $D \in [\underline{D}, \bar{D}]$ for a set of illness at a premium $\pi(< D)$, where $\pi \in [\underline{\pi}, \bar{\pi}]$. $\bar{\pi}$ is the level of premium beyond which there will be no demand for the scheme and $\underline{\pi}$ that is required to charge per unit cost incurred by the firm.

$$\max_z \left[\lambda v \beta z + t + \alpha \beta z - \frac{1}{2} \delta z^2 \right]$$

which yields,

$$z = \frac{\beta}{\delta} (\lambda v + \alpha)$$

So³³, the firm's optimal contracting problem in stage-1 solves

$$\max_{\alpha} [K + \beta z \pi - t - \alpha \beta z]$$

subject to

Participation constraint (PC) of NGO:

$$\lambda v \beta z + t + \alpha \beta z - \frac{1}{2} \delta z^2 \geq \bar{y}$$

Incentive-compatibility constraint (IC) of NGO:

$$z = \frac{\beta}{\delta} (\lambda v + \alpha)$$

Limited-liability constraint (LL) of NGO: $t \geq 0$

Now, we will consider the case when the outside option to NGO is relatively unattractive so that the participation constraint doesn't bind. In this situation, it is optimal for the firm to set $t = 0$

The optimum α , can be found by solving

$$\max_{\alpha} \left[K + \frac{\beta^2 \pi}{\delta} (\lambda v + \alpha) - \alpha \frac{\beta^2}{\delta} (\lambda v + \alpha) \right]$$

which gives,

³³ It is evident that the S.O.C. for maximization holds at $z = \frac{\beta}{\delta} (\lambda v + \alpha)$

$$\alpha^* = \frac{(\pi - \lambda v)}{2}$$

Evidently, to make a sense, we must have $\pi > \lambda v$, which is assumed to be held throughout in the present analysis.

From the optimum bonus incentive, we can get the optimum effort of NGO as:

$$z^* = \frac{\beta}{2\delta}(\pi + \lambda v)$$

Therefore, at the compensation, $\frac{(\pi - \lambda v)}{2}$, NGO will exert the effort $\frac{\beta}{2\delta}(\pi + \lambda v)$.

Since, the participation constraint of NGO doesn't bind we get the following condition:

$$\begin{aligned} \lambda v \beta \frac{\beta}{2\delta}(\pi + \lambda v) + \frac{(\pi - \lambda v)}{2} \beta \frac{\beta}{2\delta}(\pi + \lambda v) - \frac{1}{2} \delta \left[\frac{\beta}{2\delta}(\pi + \lambda v) \right]^2 &> \bar{y} \\ \Rightarrow \bar{y} &< \frac{\beta^2}{8\delta}(\pi + \lambda v)^2 \end{aligned}$$

The optimum enrolment in the MHI scheme will be:

$$\begin{aligned} N^* &= \beta z^* \\ \Rightarrow N^* &= \frac{\beta^2}{2\delta}[\pi + \lambda v(\pi)] \end{aligned}$$

Evidently, we must have³⁴, $\frac{\beta^2}{\lambda\delta} < 2v'(\pi)$. We assume this condition holds true.

From this part of analysis, we get our first proposition as stated below:

³⁴ N^* must be decreasing in π , hence, $\frac{\partial N^*}{\partial \pi} = \frac{\beta^2}{2\delta} + \lambda v'(\pi) < 0 \Rightarrow \frac{\beta^2}{\lambda\delta} < 2v'(\pi)$

PROPOSITION-1: Suppose the outside option to NGO is low such that $\bar{y} < \frac{\beta^2}{8\delta}(\pi + \lambda v)^2$. Then the incentive bonus offered to NGO is $\alpha^* = \frac{(\pi - \lambda v)}{2}$ (money equivalent) per enrolment under the scheme. The optimum effort of the NGO at stage-1 will be $z^* = \frac{\beta}{2\delta}(\pi + \lambda v)$. The total enrolment will be $\frac{\beta^2}{2\delta}(\pi + \lambda v)$. For a fixed (D, π) ,

- i) Variable compensation component and the enrolment thus go down when NGO's cost of effort goes up.
- ii) Optimal bonus decreases with the higher altruism of NGO.
- iii) Optimal effort increases with the altruism of the NGO.

Proof: Follows from the above discussion. QED.

Now, suppose the reservation utility or outside option to NGO is such that both of its participation constraint and limited-liability constraint bind. In this case, using the fact $t = 0$, its participation constraint becomes:

$$\lambda v \beta z + \alpha \beta z - \frac{1}{2} \delta z^2 = \bar{y}$$

$$\Rightarrow \alpha^{**} = \frac{\sqrt{2\delta \bar{y}}}{\beta} - \lambda v$$

Where, α^{**} is the optimum incentive bonus when both participation constraint and limited-liability constraint of NGO bind.

Therefore, the optimum effort of NGO at α^{**} level of incentive bonus will be:

$$z^{**} = \frac{\beta}{\delta}(\lambda v + \alpha^{**}) = \sqrt{\frac{2\bar{y}}{\delta}}$$

Now, since, $0 < \alpha^{**} < 1$, we get,

$$\bar{y} \in \left(\frac{\beta^2 \lambda^2 v^2}{2\delta}, \frac{\beta^2 (1 + \lambda v)^2}{2\delta} \right)$$

From this part of analysis, we get the second proposition as stated below:

PROPOSITION-2: Suppose the outside option to NGO is such that $\bar{y} \in \left(\frac{\beta^2 \lambda^2 v^2}{2\delta}, \frac{\beta^2 (1 + \lambda v)^2}{2\delta} \right)$.

Then the incentive bonus offered to NGO is $\alpha^{**} = \frac{\sqrt{2\delta \bar{y}}}{\beta} - \lambda v$ (money equivalent) per

enrolment under the scheme. The optimum effort of the NGO at stage-1 will be $z^{**} = \sqrt{\frac{2\bar{y}}{\delta}}$.

The total enrolment will be $\beta \sqrt{\frac{2\bar{y}}{\delta}}$. For a fixed (D, π) ,

- i) Variable compensation component and the enrolment thus go down when NGO's cost of effort goes up.
- ii) Optimal bonus decreases with the higher altruism of NGO but optimal effort does not depend on the altruism of the NGO.

Proof: Follows from the above discussion. QED.

Surplus fund at stage-1: If, A is the administrative expenses of the firm, its total cost at the end of stage-1 will be as follows

$$C_1 = A + 0 + \alpha^* N^*$$

$$\Rightarrow C_1 = A + \alpha^* \beta z^*$$

Therefore, the surplus fund with the firm at the end of stage-1 is:

$$S_1 = K + N^* \pi - A - \alpha^* \beta z^*$$

$$\Rightarrow S_1 = K - A + \beta z^*(\pi - \alpha^*)$$

This amount of fund is available with the firm in the stage-2 for managing the scheme (coverage etc.).

PROPOSITION-3: *Let, $\bar{y} < \frac{\beta^2}{8\delta}(\pi + \lambda v)^2$. At the stage-1 the firm's surplus earnings will increase with incentive bonus offered to NGO if*

$$\eta > \frac{\pi - \lambda v}{\pi + \lambda v}$$

where, $\eta \left(\equiv \frac{\alpha^*}{z^*} \frac{dz^*}{d\alpha^*} \right)$ is the incentive bonus elasticity of effort.

Proof- See Appendix

The incentive bonus has two opposite effects on surplus. As it increases, the cost will increase but concurrently NGO will exert more effort; leading to an increase in scheme membership and thus total premium earnings (revenue). We found that the net-income of the scheme at its commencement (enrolment stage) will increase following an upsurge in bonus incentive (which itself may be due to a low altruism intensity of NGO) if the condition mentioned in the proposition-3 holds. Incentive bonus elasticity of effort is defined as the percentage change in NGO's effort to a percentage change in optimal bonus incentive.

5.4. Firm-NGO interaction: Stage-2

5.4.1. Aggregate Claim Analysis

At the end of stage-2 the scheme yielded a binary output to the firm: high or low. The firm considers its output as 'high' if it earns a non-negative financial profit; otherwise, its output was considered 'low'. In case of high output, the firm gets a non-negative utility ($\theta_H \geq 0$), otherwise it gets zero utility. The firm can financially sustain if its expected payoff is non-

negative ($\theta \geq 0$). In stage-2, the NGO is assigned to encourage the beneficiaries to practice preventive measures and overall monitor their preventive efforts. It is important since practicing preventive measures usually reduce the risk of illness. The NGO has an information-advantage since it has the access to local informal network and also enjoys the trust of the local people. It can monitor and encourage the preventive effort of beneficiary with some cost. As a result, NGO's effort, $a \in [\underline{a}, \bar{a}]$, such that, $0 < \underline{a} < \bar{a} < 1$, stochastically improves the probability of high output, $\gamma(a)$. Without loss of generality we assume, $\gamma(a) = a$. The disutility cost of NGO is $\frac{1}{2}a^2$ for exerting an effort a . NGO's income in any state of the world must be above a certain minimum level, $F (> 0)$.

We assume that the NGO can encourage the preventive efforts of beneficiaries in the following manner: $\Pr(e = e^*) = a$. The assumption suggests probability that a beneficiary will exert high effort depends on NGO's monitoring effort. The lemma 1 follows directly from this assumption.

LEMMA-1: The presence of an NGO reduces the average probability of illness.

Proof- See Appendix.

Given this lemma we can state the third proposition of the model.

PROPOSITION-4: For any fixed level of coverage ($D > 0$), the level of aggregate expected claims is decreasing in the NGO's effort level.

Proof- See Appendix.

5.4.2. Optimal Contract

The insurance firm offers a state contingent contract to the NGO, such that, firm will pay $\bar{q}$ if the outcome is 'high' and, will pay $\underline{q}$ if it is 'low'. The expected payoff of the insurance firm is

$$\theta = (\theta_H - \bar{q})a + (1 - a)(0 - \underline{q})$$

$$\Rightarrow \Theta = \left[\theta_H - (\bar{q} - \underline{q}) \right] a - \underline{q}$$

The expected payoff of the NGO is

$$\Lambda = a\bar{q} + (1 - a)\underline{q} - \frac{a^2}{2}$$

$$\Rightarrow \Lambda = a(\bar{q} - \underline{q}) + \underline{q} - \frac{a^2}{2}$$

The insurance firm's optimal contracting problem under moral hazard solves:

$$\max_{\bar{q}, \underline{q}} \left\{ \left[\theta_H - (\bar{q} - \underline{q}) \right] a - \underline{q} \right\}$$

subject to

$$\text{PC of the NGO: } a(\bar{q} - \underline{q}) + \underline{q} - \frac{a^2}{2} \geq \bar{y}$$

$$\text{IC of the NGO: } a^* = \arg\max_a \left\{ a(\bar{q} - \underline{q}) + \underline{q} - \frac{a^2}{2} \right\}$$

$$\Rightarrow a^* = (\bar{q} - \underline{q})$$

$$\text{LL of the NGO: } \bar{q} \geq F, \underline{q} \geq F$$

Incorporating the IC constraint, the optimal contracting problem becomes:

$$\max_{\bar{q}, \underline{q}} \left\{ \left[\theta_H - (\bar{q} - \underline{q}) \right] (\bar{q} - \underline{q}) - \underline{q} \right\}$$

subject to

$$\frac{1}{2}(\bar{q} - \underline{q})^2 + \underline{q} \geq \bar{y}$$

$$\underline{q} \geq F$$

In this framework, there are two possible cases in which the firm can get non-negative expected payoff (Besley and Ghatak, 2005) viz. Case-I: limited-liability constraint binds but participatory constraint does not bind and Case-II: Both limited-liability constraint and participatory constraint bind.

Case 1: only LL constraint of NGO binds

First, we will consider that only the limited-liability constraint of NGO binds.

Since the LL of NGO binds, $\underline{q} = F$.

Let, $b \equiv (\bar{q} - \underline{q})$.

The optimum bonus-pay, b , can be found by

$$\max_b [(\theta_H - b)b - \underline{q}]$$

which yields

$$b^* = \frac{\theta_H}{2}$$

The optimum effort of the NGO under this situation is:

$$a^* = b^* = \frac{\theta_H}{2}$$

From the participation constraint we get:

$$\bar{y} < \frac{\theta_H^2}{8}$$

Finally, the firm's optimum level of expected payoff will be:

$$\theta^I = \frac{\theta_H^2}{4} > 0$$

Case 2: both the LL and PC constraints of NGO bind

If both the limited-liability constraint and participatory constraint of NGO bind, we get, $\underline{q} = F$. Again, from the participation constraint we get

$$\frac{1}{2}b^2 + F = \bar{y}$$

$$\Rightarrow b^{**} = \sqrt{2(\bar{y} - F)}$$

b^{**} is the optimum incentive bonus in this situation.

The optimum effort of the NGO at b^{**} is:

$$a^{**} = \sqrt{2(\bar{y} - F)}$$

Now, as, $0 < b < \theta_H$, we have:

$$0 < \sqrt{2(\bar{y} - F)} < \theta_H$$

$$\Rightarrow \bar{y} - F \in \left(0, \frac{\theta_H^2}{2}\right)$$

Therefore, the expected payoff of insurance firm in this case will be:

$$\Theta^{\text{II}} = \left[\theta_H - \sqrt{2(\bar{y} - F)}\right] \sqrt{2(\bar{y} - F)} - F$$

The firm will maximize its expected payoff to determine the optimal contract which can be stated in the following proposition.

PROPOSITION-5: *The optimal effort level and optimal bonus payment of NGO are:*

$$\{a, b\} = \left\{\frac{\theta_H}{2}, \frac{\theta_H}{2}\right\} \text{ if } \bar{y} - F < \frac{\theta_H^2}{8} \text{ and}$$

$$\{a, b\} = \left\{ \sqrt{2(\bar{y} - F)}, \sqrt{2(\bar{y} - F)} \right\} \text{ if } \bar{y} - F \in \left(0, \frac{\theta_H^2}{2} \right)$$

Proof: Follows from the above discussion. QED.

Hence, the optimal compensation depends on firm's output if NGO's outside option is very low, whereas it depends on NGO's level of outside option and limited liability if the outside option is moderately low. The insurance firm can remain financially sustainable in both these cases.

COROLLARY-1: The insurance firm prefers the NGO which has a much lower outside option.

Proof: See appendix

5.4.3. Risk loading

The insurance firm has to reimburse the beneficiaries' insured-loss amount from the collected premiums. Thus, in case the premium earnings fall short of total claims, insurer has to pay that out of its own capital. Dror and Armstrong (2006) showed that any MHI scheme operating with an insufficient or no capital is exposed to a substantial insolvency risk. But adding a capital loading to premiums also represents a risk that clients might consider the premiums unaffordable or unfairly high. Hence, the insurer offering MHI requires a risk loading as a cushion against insolvency.

Suppose, in the present analysis, insurance firm uses a risk loading r in the MHI scheme. So that, the premium is defined as: $\pi = (1 + r)p(e)D$. Moreover, we assume that at the end of stage-2, total number of claims is $n (< N)$. In our model, it is evident that ' n ' is decreasing in NGO's monitoring effort. This is due to the lemma 1. Now, suppose that the outside option to NGO is such that: $\bar{y} - F < \frac{\theta_H^2}{8}$. We know that in this situation, the maximum payoff of the firm is: $\frac{\theta_H^2}{4}$.

Again, we know the firm gets a non-negative utility ($\theta_H \geq 0$) in case of non-negative financial profit (high output). The ‘high’ output of insurance firm can be expressed as:

$$S_1 - n(a)D - b \geq 0$$

which yields,

$$r \geq \frac{1}{pD} \left[\frac{n(a)D + b - (K - A)}{N} + \alpha \right] - 1$$

We define,

$$\underline{r} = \frac{1}{pD} \left[\frac{n(a)D + b - (K - A)}{N} + \alpha \right] - 1$$

$\underline{r}$ denotes the threshold level of risk loading. It is the minimum risk loading that an insurance firm will use to remain solvent in the business.

We found that,

$$\frac{d\underline{r}}{da} = \frac{n'(a)}{pN} < 0$$

From this we state the next proposition of the model.

PROPOSITION-6: *Suppose, the insurance firm hires an NGO whose outside option is such that $\bar{y} < \frac{\theta_H^2}{8}$. The firm can set a lower threshold level of risk-loading with the higher monitoring effort of the NGO.*

Proof: Follows from the above discussion. QED.

To reduce the insolvency risk, the insurer can increase the risk loading but that will lead to a higher premium which in turn dampens the insurance demand among them. With the help of NGO, the insurer can set risk loading at a lower level.

5.5. Conclusion

The present chapter deals with the issue of sustainability of the commercial insurer from providing insurance to low-income households. In order to extend the health insurance to the poor, an insurer has to design the scheme judiciously so that the poor households feel encouraged joining the scheme and at the same time the risk of scheme-insolvency should be at the minimum level. To reduce the insolvency risk, the insurer can increase the risk loading but that will lead to a higher premium which in turn dampens the insurance demand among them. Compared to regular insurance market, an MHI agency faces this dilemma. It is very important for an MHI agency to keep balance between a low premium and maintaining the financial sustainability of the scheme. The MHI schemes around the world are mainly developed by the social organisations for the poor section. The literature on financial sustainability of MHI schemes is rather thin and the role of nodal agency in maintaining the financial sustainability of such schemes remains largely unexplored. So, we attempt to investigate whether a for-profit insurance firm can sustain financially from providing MHI to low-income households.

We developed a simple theoretical model of MHI scheme which was initiated by a commercial insurance firm and is managed in collaboration with a local NGO. In this framework, we considered a risk-neutral insurance firm, naïve of rural community preferences aimed to provide MHI to risk-averse individuals with identical level of initial wealth and risk type (so, there was no adverse selection in the present framework). To operate the scheme the insurance firm hires a risk-neutral NGO which is working among the low-income households of that locality for sometimes and assigned two tasks: enrolling potential beneficiaries in the scheme (in stage-1) and encouraging and monitoring their preventive efforts (in stage-2). In stage-1, if outside option to the NGO is very low, the variable compensation component and the enrolment go down when NGO's cost of effort goes up, optimal bonus decreases with the higher altruism of NGO and optimal effort increases with the altruism of the NGO. However, if the outside option is not very low, optimal bonus decreases with the higher altruism of NGO but optimal effort does not depend on the altruism of the NGO. In the stage-2, insurance firm's optimal contracting problem yielded the optimal effort level and optimal bonus payment of NGO for which insurance firm remained financially sustainable. Our analysis shows that the presence of a local voluntary

organization makes a positive impact on the financial sustainability of commercial insurer. If the individual claims are independent and identically distributed random variables, under certain conditions the expected claims are decreasing in the NGO's effort level. the firm can set a lower risk-loading with the higher monitoring effort of the NGO.

APPENDIX

Proof of PROPOSITION-3:

The surplus of the firm can be expressed as

$$S_1 = K - A + \beta z^* (\pi - \alpha^*)$$

$$\Rightarrow \frac{dS_1}{d\alpha^*} = \beta(\pi - \alpha^*) \frac{dz^*}{d\alpha^*} - \beta z^*$$

Now,

$$\frac{dS_1}{d\alpha^*} > 0 \Rightarrow \beta(\pi - \alpha^*) \frac{dz^*}{d\alpha^*} - \beta z^* > 0$$

which yields,

$$\frac{\alpha^*}{z^*} \frac{dz^*}{d\alpha^*} > \frac{\alpha^*}{\pi - \alpha^*}$$

$$\Rightarrow \eta > \frac{\pi - \lambda v}{\pi + \lambda v}$$

Proof of LEMMA-1:

Following Assumption 1, in presence of an NGO a beneficiary will exert $e = e^*$ with the probability a and $e = 0$ with the probability $1 - a$.

Since, $p(0) > p(e^*)$ the expected probability of illness is:

$$ap(e^*) + (1 - a)p(0) = p(0) + a[p(e^*) - p(0)] < p(0)$$

Proof of PROPOSITION-4:

The individual claims are independent and identically distributed random variables with each of them taking two values viz. D with probability $p(e)$ and 0 with probability $(1 - p(e))$ where, $e \in \{e^*, 0\}$.

From the Assumption 1 we know: the beneficiary will put effort $e = e^*$ with probability a and will put effort $e = 0$, with probability $(1 - a)$.

Hence, for any representative beneficiary j , the expected claim(loss) amount is:

$$E(x_j) = a [p(e^*)D + (1 - p(e^*)) \cdot 0] + (1 - a)[p(0)D + (1 - p(0)) \cdot 0]$$

$$\Rightarrow E(x_j) = [a p(e^*) + (1 - a)p(0)]D$$

Proof of COLLORARY-1:

$$\theta^I - \theta^{II} = \frac{\theta_H^2}{4} - \left[\theta_H - \sqrt{2(\bar{y} - F)} \right] \sqrt{2(\bar{y} - F)}$$

$$\Rightarrow \theta^I - \theta^{II} = (a^*)^2 - 2 \cdot a^* \cdot a^{**} + (a^{**})^2$$

$$\Rightarrow \theta^I - \theta^{II} = (a^* - a^{**})^2$$

Since, $a^* > a^{**}$,

$$\theta^I > \theta^{II}$$

CHAPTER -6

Demand for Microinsurance of Health Among Informal Workers: A Discrete Choice Experiment

6.1. Introduction

The public spending on health in India is inadequate. It was only 1.02 per cent of GDP in 2015-16 (NHP, 2017)³⁵. Moreover, even that limited public expenditure is not just on primary care, the benefit of which accrues mostly to the poor. The government health expenditure as a per cent of total health expenditure was 29 per cent whereas the OOP expenditures as per cent of total health expenditure was 62.6 per cent in 2014-15 (NHE, 2017). Although the share of OOP expenditure in the total health expenditure reduced from 69 per cent in 2004-05, it still remains the main source of healthcare financing in India. Due to high OOP healthcare expenditure, 4.21 per cent of the population fall below the poverty line and 17.33 per cent households suffer catastrophic health expenditures at 10 per cent threshold level (WHO, 2017)³⁶ in 2011. The outpatient medicines, mostly antibiotics, comprise a large proportion of these OOP expenditures (Frost et al. 2019)³⁷. The public expenditure in health for all the major states, except Rajasthan, are less than 2 percent of their respective GSDPs and on average, a meagre amount of Rs 158 was spent per person on PHIs by major States in 2014-15 (Srinath et al. 2018). Even in the government facilities, which are supposed to be completely free, people have to incur OOP expenditure³⁸. The rural population spent, on an average, Rs. 5636 for a hospitalised treatment in a public sector hospital and the average total expenditure of the urban population for a hospitalised treatment in a public Rs.7670 (NSSO 2015). Average out-of-pocket expenditure per delivery in public health facility was Rs. 3197 in 2015-16 (NFHS-4). Clearly, the strategy of free public health provision has not worked well in most Indian states.

³⁵ Public spending on health in India remains around 0.98 to 1.12 percent of GDP since 2009-10 (NHP, 2018). As a result, India has one government doctor for every 10,189 people (against the WHO's recommendation of 1:1000) and the nurse-patient ratio is 1:483, leading to a deficit of about 6,00,000 doctors and about two million nurses (Frost et al. 2019).

³⁶ Calculation of the WHO was based on the Household Consumer Expenditure (2011-12) Survey, NSS (68th round).

³⁷ Shahrawat and Rao (2011) found that medicines constituted 72 per cent of total OOP payments. In case of outpatient care it was 82 per cent and for inpatient care it was 42 per cent.

³⁸ Public health facilities lack adequate medicine stocks, and antibiotic availability is 50 % to 60 % in some states (Prinja et.al, 2015).

The Government of India and various state governments launched health insurance schemes targeted at the poor and vulnerable households since 2004. The government has fully subsidized most of the schemes. Andhra Pradesh launched Rajiv Aarogyasri in 2007. Later many states such as Karnataka, Tamil Nadu, and Maharashtra had launched their own schemes for the poor people of their respective states. The Ministry of Labour and Employment of Government of India launched Rashtriya Swasthya Bima Yojana (RSBY) in 2008 for the BPL population. The Government of West Bengal launched Swasthya Swathi- a fully subsidised health insurance scheme for the informal sector workers in 2016³⁹. At the same time, several MHI schemes operate in India with the purpose of meeting the healthcare needs of the low-income group (NHE 2017). The Inventory of MHI in India (ILO 2005) provides information on 51 micro insurance schemes. Out of this 57 per cent of the schemes provided healthcare services.

Most of the MHI schemes in India are initiated by NGOs followed by the healthcare providers. There are three basic models of providing the MHI schemes in India - provider model, mutual model and partner-agent model (Devadasan et al., 2004; Devadasan and Nagpal, 2007). Except for the partner-agent model, for the former two models the NGO (or trust as in case of Yeshwani) bears the risk. In the partner-agent model the insurance company bears the risk of the scheme. The regulation in microinsurance market emerged with the IRDA Micro-insurance Regulations (2005), which defined microinsurance products and divided them into two categories: general insurance and life insurance. MHI falls under the general micro-insurance product. The regulation allowed a MoU between life and non-life companies to bring out hybrid products and allowed three channels of distribution: NGOs, MFIs and SHGs. IRDA Micro-insurance Regulations 2015⁴⁰ reviewed the 2005 regulations and among other revised the maximum amount of cover offered for various kinds of policies.

³⁹ On September 23, 2018 the Government of India launched Ayushman Bharat scheme. It covers the costs of treatment and hospitalization at the secondary and tertiary levels. West Bengal, earlier merged its own health protection programme Swasthasathi with Ayushman Bharat, but latter pulled out of the scheme. Our study was done prior to its implementation.

⁴⁰ The Obligations of Insurers to Rural and Social Sectors Regulations (IRDA 2002) placed an obligation on both life and non-life insurers to include a certain percentage of business from the rural sector and made it mandatory to cover a certain number of lives in the social category. Both these obligations were further updated in IRDA Regulations 2015.

The individual health policies and group health policies have been allowed a maximum cover limit of Rs.1,00,000 and Rs. 2,50,000 respectively.

The target group for most of the publicly sponsored health insurance schemes (like RSBY) is the BPL population. The near-poor (i.e., those just above the poverty line) households are not covered by these schemes and at the same time they cannot afford the private insurance schemes available in the market. So, this group is likely to be bypassed by all the insurance schemes. But these near-poor households can be covered by the MHI schemes. In India, MHI schemes such as Yeshasvini, Uplift and Vimo SEWA provide coverage to the informal poor workers, who may be (marginally) excluded from government schemes (Kimball et al., 2013; Jain, 2017). Moreover, the evaluation studies on RSBY find that it has been ineffective in reducing the burden of out-of-pocket spending on poor households. Using the data of three NSSO rounds of household expenditure surveys and district level RSBY enrolment information, Karan et al. (2017) did not find any statistically significant effect of RSBY on the outpatient out-of-pocket expenditure, rather they get the likelihood of incurring the out-of-pocket spending (inpatient and outpatient) rose by 30per cent due to RSBY. Devadasan et.al (2013) estimated around 60 per cent of insured and admitted patients made OOP payments in the Patan district of Gujarat. In case of Maharashtra also the effect of RSBY on catastrophic health expenditure was not found to be statistically significant (Ghosh, 2014). The importance of the MHI in the Indian context is mainly to complement the tax-funded health system for the financial risk protection and access to healthcare within a specific local context. The difference in incidence of illness episodes in different location suggests that healthcare needs of the poor are context dependent. Following that a “one-size-fits-all” health insurance products is not suited for the poor in India (Dror, 2006).

Evidence confirms that MHI schemes have succeeded in enrolling a small proportion of their target population. MHI products are not just the scaled down version of existing health insurance schemes. The former should be designed to meet the specific characteristics of the low-income households engaged in informal sector. A customized MHI product can trigger demand among the low and middle-income households (Churchill, 2007) and that even as a supplementary to the existing free or near to free public healthcare and public schemes (Kimball et al., 2013, Abihiro et al., 2014). Panda et al. (2014) found that the RSBY did not dampen the demand for community-based MHI schemes located in rural Uttar Pradesh and Bihar. Thus, there is a potential for further development of market for MHI through designing

products beyond the existing ones. In this context the present study aims to analyse the demand for MHI scheme among the informal sector workers in the Purulia district of West Bengal where there was no such scheme available for them during the time of our survey.

There are in general two approaches for preference-based outcome measurement: stated preference methods and revealed preference methods. It is practically difficult to obtain real market data on the revealed preferences of prospective clients of MHI since it is yet to penetrate into the market. In the absence of actual insurance scheme in the market, the demand for insurance can be estimated by using 'stated preference' methods such as contingent valuation method (Ranganathan et al., 2014). The stated preference methods estimate the value of non-market goods on the basis of individuals' stated behaviour in a hypothetical setting. Moreover, none of the Revealed Preference method or contingent valuation method consider the characteristics of a product (such as MHI scheme) while estimating the demand for it among the households. The characteristics of the MHI schemes could have a significant impact on their demand. Hence the method of Discrete Choice Experiment was applied in our study to elicit the preferences for MHI scheme. In a DCE application we can determine the characteristics that describe a product and to what extent the respondent is willing to trade-off one characteristic to another. In the absence of actual MHI scheme in market, the demand for insurance can be estimated by using a DCE.

In any DCE, the potential product is described by a number of attributes (main characteristics of an alternative), and each attribute is assigned a range of definite dimensions (or values) called attribute-levels (Louviere et al., 2010). Using experimental designs, the attributes and attribute-levels are combined to produce 'choice sets' of hypothetical options. The choice sets are then placed before the respondents and are asked to choose their preferred option. A respondent's choice indicates his/her preference or utility he/she attaches to the product and its attributes. So, it becomes possible to examine the degree to which each attribute influences the choice of the decision-maker.

In the recent years, DCEs are increasingly applied in different issues of health economics (De Bekker-Grob et al., 2012; Soekhai et al., 2019). However, only few studies⁴¹ had conducted DCE to elicit the preferences for an MHI product. Even those are mostly in the context of

⁴¹ See Abihiro et al. (2014) for the references of such DCEs.

high-income countries except Abihiro et al. (2014) and Ozawa et al. (2016). These two studies applied DCE in rural Malawi and Cambodia respectively to elicit the community preference for MHI schemes. To our knowledge there is no such DCE conducted to elicit the demand for MHI in India⁴².

The chapter is organised as follows. The section 6.2, gives the theoretical framework of our analysis in which we explore the importance of different characteristics of an MHI scheme⁴³ in influencing its demand. In the section 6.3, we give an overview of DCE methodology. We have discussed the design and theoretical foundation of a DCE in two sub-sections of it. In the next section, 6.4., we narrate the DCE conducted in present study. The econometric specifications are mentioned in section 6.5 and the corresponding results along with their analysis are provided in section 6.6. Finally, the concluding section summarizes the findings and offers policy suggestions.

6.2. Theoretical framework

Consider a single-period model in which a typical risk averse individual with initial wealth of $w(> 0)$ faces a possible loss, m , due to illness. So, the wealth lottery of the individual is: $(w - m)$ with probability $p(< 1)$ (denote as bad state) and w with probability $1 - p$, (denote as good state). Suppose, an Insurance company designs an MHI product to insure the informal sector household having identical preferences, loss distribution and identifiable wealth endowment. The insurer offers the representative individual a fixed compensation $d(= \gamma m)$ with $\gamma \in (0,1)$, at a non-contingent premium⁴⁴ $r(> 0)$. Here, the specification $\gamma < 1$, does not denote a typical deductible scheme. The health insurance schemes usually do not cover the outpatient care incurred by individuals and $\gamma < 1$ simply denotes that. In other

⁴² In case of India, we have come across a study that focused on consensus building within community on MHI benefits; however, the analysis was not based on a DCE exercise. Dror et al. (2014) explored the process of involving informal sector individuals in three rural locations of India. The study examined whether and how they would select the benefit package relevant to the local community requirements. The options were initially reduced by community leaders and then three CHAT (Choosing Health plans All Together) rounds were conducted to select the benefit package.

⁴³ For rest of the paper, we will use MHI scheme and MHI product interchangeably.

⁴⁴ So, the individual under the contract has to give premium in both states of nature.

words, we will start our analysis by assuming that the insurer is not covering the expenses of outpatient care.

Now, under the MHI contract the individual has to bear a hazard cost which is incurred by the individual for claim settlement since long delays, complex terms and conditions etc in settling claims create disutility and exacerbate any negative perception about insurance. Let the hazard cost is z . It depends on the efficiency of the insurance company⁴⁵. We assume the insurer⁴⁶ exerts effort $i(> 0)$ for the purpose of scheme efficiency. Following this investment (effort), the hazard cost of the individual under the MHI scheme reduces such that $z = z(i)$, with $z'(i) < 0$, $z''(i) > 0$ but at the same time the insurer has to bear the operating cost⁴⁷ $c(i)$ with $c'(i) > 0$, $c''(i) < 0$.

The expected payoff of the insurer is

$$\pi = p(r - \gamma m) + (1 - p)r - c(i)$$

Suppose the insurance market is competitive. So, the insurer earns no supernormal profit, i.e., $\pi = 0$. Hence, from the insurer's expected payoff we get:

$$r = pym + c(i)$$

We assume that the individuals join the MHI scheme⁴⁸, i.e., his post-insurance payoff exceeds the autarky payoff U^N

⁴⁵ In reality it also depends on the healthcare provider's service. To keep the things simple, we have avoided the provider's side separately. The insurance company can itself be a healthcare provider which is initiating and running the MHI scheme (like the schemes ACCORD, MGIMS, RAHA, SHH, VHS).

⁴⁶ The insurer may have employed an NGO as manager of the scheme. Providing insurance to the low-income people without the help of any organization familiar in the local community is costly for any insurer (Ahuja 2005). So, the i is the effort level exerted by the NGO.

⁴⁷ If the insurer appoints an NGO, operating cost can be thought of as the payment to the NGO.

⁴⁸ A risk averse individual will enrol in the MHI scheme, even s/he is a beneficiary of the free or near to free public scheme if $u_i(1) > u_i(0)$, where, his utility $u_i(q)$ is given by $u_i(q) = w_i + v_g + qv_q - e_g - e_q$ and $q = \{0,1\}$. v_g is the utility received from the public scheme, v_q is the utility from the MHI scheme. e_g and e_q are the costs (both direct and indirect) associated with the public scheme and

Under the MHI scheme, the state-contingent wealth levels are:

(Good state)

$$w - r = w - p\gamma m - c(i)$$

(Bad state)

$$w - r - m - z(i) + \gamma m = w - p\gamma m - c(i) - (1 - \gamma)m - z(i)$$

Suppose, the marginal utility of the individual in the good state (healthy) is α and the marginal utility of the when bad (sick state) is β . Given the risk aversion, we have $\beta > \alpha$. So that, the expected payoff (utility) of the individual is

$$EU = (1 - p)\alpha[w - p\gamma m - c(i)] + p\beta[w - p\gamma m - c(i) - (1 - \gamma)m - z(i)]$$

Clearly, $EU'(r) < 0$. So expected utility of the individual will increase with a fall in the premium suggesting a low level of the premium will raise the demand for MHI.

Now, we will do some comparative statics exercises. The results have interesting implications in our context.

Result-1: The investment (effort) of the insurer to increase the efficiency of the MHI scheme will increase the welfare of the beneficiary if

$$\frac{|z'(i)| - |c'(i)|}{|c'(i)|} > \frac{(1 - p)\alpha}{p\beta}$$

Proof- See Appendix

$|z'(i)|$ is the absolute value of the marginal cost of hazard. The hazard curve is downward sloping. $c'(i)$ is the marginal cost of efficiency. Cost of efficiency is increasing in the

MHI respectively. Whenever, the individual is enrolling himself under the MHI scheme, $q = 1$. In this specification it is assumed that the individual, if offered, will always enrol himself in the public sector scheme.

investment in efficiency. The LHS of the above relation gives the marginal benefit of the investment (in the product efficiency) in terms of the marginal cost whereas the RHS gives the slope of the indifference curve drawn from the expected utility EU.

Result-2: A rise in the (parameter) γ increases the expected payoff of the individual.

Proof- See Appendix

The direct implication of the result is that willingness to join the scheme increases (as welfare rises) with the rise in the coverage level. For the indirect implication, think the variable m as the sum of all type of costs (both direct and indirect like transportation reimbursement, wage loss compensation) related to a sick-episode and d is the number of types of benefits covered under the scheme. In this case γ gives the proportion of types of benefits covered under the scheme. Following this line of thought, this result suggests that a broader set of benefits covered under the scheme will induce the demand for the scheme.

Result-3: Suppose the beneficiary gets back the $\mu(< 1)$ proportion of his premium in case there is no episode of illness. Such a policy of cash-back will increase the welfare of the individual so the demand for MHI.

Proof- See Appendix

This section suggests that the demand for MHI scheme depends not only on the premium level but also on the other characteristics of the product. The simple theory outlined here demonstrates the importance of designing a customised MHI scheme to raise the demand for it.

6.3. Overview of Discrete Choice Experiment

6.3.1. Design of a DCE

There are mainly three main components in choice experiment methodology.

At the first stage we have to identify the appropriate attributes⁴⁹. Once that is established, next attribute-levels are required to be assigned for each of these attributes. Attributes can be quantitative or qualitative in nature; whereas, the levels assigned must reveal the range of definite situation that respondents might experience (Lancsar and Louviere, 2008; Mangham et al., 2009). In a DCE the attributes and attribute-levels are combined to produce hypothetical scenarios. Hence, development of attributes and levels are critical for underlying validity of the study. For the precision of parameter estimates, identifying the relevant attributes and defining realistic levels are very crucial. Hence, prior to the experiment, focus group discussion must be conducted to ensure appropriate attribute and levels are presented to the decision makers (respondents). Existing literature and government reports are also useful in identifying proper attributes. Abihiro et al., (2014) conducted a DCE to elicit community preference for MHI in rural Malawi. They derived attributes and levels from a literature review and by conducting focus group discussions with community members⁵⁰.

In the second step the researcher conducting DCE has to decide the design to be used. Among the different classes of design available, full factorial design is regarded the most general class of design (Hensher et al., 2005). It is defined as a design in which all possible combinations of the attribute-levels are used. If in a design L , M and A denote the number of levels, alternatives, and attributes respectively, the possible number of choice sets is equal to L^{MA} in case of labelled choice experiments and L^A in case of unlabelled choice experiments. An experiment is called unlabelled if it uses generic titles for alternatives whereas, if each of the alternatives of an experiment are labelled it is denoted as labelled choice experiment. A

⁴⁹ There are no design restrictions on the attribute numbers; however, most DCEs included fewer than 10 attributes so that decision makers can consider all the attributes contained while choosing option (DeShazo and Fermo, 2002).

⁵⁰ Baltussen and Niessen (2006) suggested to engage local institutions during this initial stage of conducting choice experiment.

full factorial design is usually very large and thus asking the decision maker (respondent) to choose from all the possible choices (emanated from full factorial design) may put a substantial burden on them⁵¹. This results in lower response from the respondents and even that is with lower reliability. So, we need to reduce the possible choices from full factorial design. Hensher et al. (2005) mentioned four important strategies that can be adopted to narrow the number of choice sets:

- i) the number of levels used within the design can be reduced
- ii) reducing the size of experimental design,
- iii) blocking the design, and
- iv) using a fractional factorial design combined with a blocking strategy.

Here, we will discuss the second strategy in details. To reduce the size of experimental design only a fraction of total number of choice sets can be used. This type of design is known as fractional factorial design. However, randomly selecting a subset of all possible choice sets may produce a sub-optimal design. Orthogonal design has been usually used to select the optimal choice sets for conducting DCE⁵²(Huber and Zwerina, 1996). A design in which all attributes are statistically independent of one another is known as orthogonal design⁵³ (Hensher et al., 2005). The orthogonal design permits estimation of main effects. Main effect refers to the direct independent effect of each attribute on the choice (response) variable. Here, independence implies that effect of each attribute is independent of all other attribute effects⁵⁴.

⁵¹ The burden is likely to be higher if the respondent is unaware about the product in question (of choice)

⁵² In other words, orthogonal design is the statistically efficient fractional factorial design.

⁵³ So, the columns of the design show zero correlations. In any non-orthogonal design, it is difficult to disentangle the effect of individual attribute.

⁵⁴ In case of full factorial design, we can estimate both main effect and interaction effect. An interaction effect implies the preference for the level of one attribute is dependent upon the level of a second attribute.

In the third step, an appropriate econometric model must be determined.

6.3.2. Theoretical foundation:

The theoretical foundation for any DCE is derived from the 'random utility maximization model which assumes that the utility attached by the individual to any of the choice alternatives is derived from its attributes and attribute levels (Louviere et al., 2000). In the m -choice (alternative) model, the utility of an individual i from the j th alternative is given by

$$U_{ij} = V_{ij} + \epsilon_{ij}, \quad j = 1, \dots, m$$

where, V_{ij} is the deterministic component of the utility. It is defined as

$$V_{ij} = \beta_1 X_1 + \dots + \beta_n X_n = \mathbf{x}_{ij} \boldsymbol{\beta}$$

Here, $\mathbf{x}_{ij}$ is the vector of attributes of the product in question and $\boldsymbol{\beta}$ is the vector of associated preference parameters. ϵ_{ij} is unobservable error term.

According to the random utility model, alternative j is chosen if it entails the maximum utility among m alternatives, so that

$$\Pr(y = j) = \Pr(U_{ij} \geq U_{ik}, \text{ all } k \neq j)$$

6.4. Description of DCE conducted in Present Study

6.4.1. DCE Data

The study was conducted in the Purulia district of West Bengal. The target group of our analysis is informal workforce. The experiment was undertaken along with the household survey mentioned in the chapter-4. As mentioned in chapter 4, we considered only the

households that reported incidence of healthcare seeking during reference period. Hence, initially 450 households were considered for the study. We found that only 47 (approximately 10 per cent) sample households had enrolled in public health insurance schemes (like RSBY). We considered the households without any health insurance for the DCE. So, the sample size of our DCE was 403. The sample for our DCE consisted of farmers, landless labourers, vendors; Toto drivers, Rickshaw pullers, security guards etc.

Prior to the experiment we made a pilot survey and focus group discussion. On the basis of the responses, the final design required for our experiment was designed. From each household, only the head of the family was questioned. The average monthly income of the sample households (sample size=403) was approximately Rs. 8700 and the average monthly OOP healthcare expenditure was nearly Rs. 865.

6.4.2. Attributes and Levels

The most important issue for the demand of MHI product is its characteristics i.e., the factors which are defining the scheme. The MHI scheme should be designed and implemented on the basis of target group's preference at the local context. In the present study the attributes and the levels were derived from the literature as well as from the pilot survey and focus group discussion in the study area. We identified five attributes with three levels for each in our study. The description of the attributes and their levels are in table 6.a.

Table-6.a: Description of Attributes and levels

Attribute	Attribute-Level		
Unit of Enrolment	Individual	Maximum 3 members	Maximum 5 members
Premium (quarterly)	150	250	300
Coverage	25000	45000	60000
Benefit	Drug, Free consultation	Drug, Lab test, 50 per cent of Transportation cost	Drug, Lab test (including one preventive test), Transportation cost, less-costly in-patient surgical
Cash-back	No	25 per cent in case of claim less than 5000 p.a.	50 per cent in case of claim less than 5000 p.a.

Since, most public Health insurance schemes for the poor usually do not cover outpatient care; this became the purview of the healthcare benefit considered (as attribute of experiment) in our hypothetical MHI scheme. While determining the levels, we abided by the IRDA Micro Insurance regulations 2015, which allows enrolment of maximum 7 individuals (family), a maximum premium of Rs 6000 p.a. and the maximum sum assured of Rs 250000. In case of MHI schemes the premium should be at community-rated level. So, to fix the levels of premium and coverage, we used the relative frequency of the cases in which the households have to incur recurring healthcare expenditure. As we found in our household survey⁵⁵, this value is nearly 0.4. According to the NHFS 4, 45 per cent of the households those do not generally use government facilities reported the distance as the prime reason. Moreover, from our target group discussion we found transportation cost (and time lost) is a vital factor for avoiding healthcare seeking. So, we incorporate the “Transportation cost” as one of the levels of Benefit attribute. Finally, people in the lower income strata use to view the premium of insurance as a sunk cost and thus a cash back offer would induce them to avail insurance facilities and benefit from it. In turn, it would help the participating households to take proper care of their health⁵⁶.

6.4.3. Experimental Design

As we have five attributes with three levels each, it will result in 3^5 i.e., 243 possible combinations of MHI products. However, it is impractical to consider 243 combinations for our study. We expect asking to choose from such a large number of choices may place cognitive burden on our sample respondents. The number of orthogonal combinations⁵⁷ required to estimate the main effects of the attributes is found to be 16. These 16 alternatives are used to make eight choice sets of two alternatives each. We have included an opt-out

⁵⁵ It refers to the household survey conducted besides the choice experiment. The chapter 4 of the present thesis is based on this household survey.

⁵⁶ There are some MHI schemes which offer supplementary cash benefits. For example, the Caregiver product initiated by Jordan’s Microfund for Women uses to pay a fixed cash amount for each night spent in hospital to cover indirect costs associated with hospitalization, such as lost wages, child care, and transportation (Kimball et al.,2013)

⁵⁷ We did the orthogonal design of experiment in SPSS 20 software.

alternative since forcing to make a choice on MHI schemes can lead to overestimation of preference (Hensher et al., 2005). So, in the final design we have eight choice sets with two alternatives and one opt-out option. But given five attributes and different levels choosing eight alternatives would be burdensome on the respondents. So, each respondent is asked to choose only one alternative from the only choice set shown to him/her. The choice sets are randomly assigned to them. The options are placed before the respondents in such a way that they can understand clearly. Then the question asked is “What will you do?” The choice sets used in present study are given in the appendix.

6.4.4. Dummy Coding

All the attributes except premium and coverage are dummy-coded. Dummy coding allows for non-linear effects in the levels of attributes (Hensher et al., 2005). This is done by creating⁵⁸ a number of variables for each coded-attribute. For example, in case of the attribute unit of enrolment we defined two variables viz. unit1 and unit2, where unit1 =1 if maximum three family members can be enrolled under the MHI scheme and 0 otherwise; and unit2 =1 if maximum five family members can be enrolled under the MHI scheme and 0. Since we had two dummy-coded variables but three levels (of this attribute), the third level i.e., individual unit of enrolment, is represented as a 0 in both unit1 and unit2. The coding for all the three attributes of our study is shown in table 6.b.

Table-6.b: Dummy Coding of Attributes

Attribute	Level	Dummy-coded variable	
Unit of enrolment		unit1	unit2
	Individual	0	0
	Maximum 3 members	1	0
	Maximum 5 members	0	1
		Dummy-coded variable	
Benefits		benefit1	benefit2
	Drug, Free consultation	0	0

⁵⁸ The number of new variables created is equal to the number of levels of the attribute being coded, minus one.

	Drug, Lab test, 50per cent of Transportation cost	1	0
	Drug, Lab test (including one preventive test), 25per cent of Transportation cost, less-costly in-patient surgical	0	1
		Dummy-coded variable	
Cash-back		cashback1	cashback2
	No	0	0
	25per cent in case of claim less than 5000 p.a.	1	0
	50per cent in case of claim less than 5000 p.a.	0	1

6.5. Econometric Model

In our DCE, each respondent was presented one randomly selected choice set with 3 alternatives (including one opt-out alternative) and given this he/she was asked to choose an alternative. Hence, a Conditional Logit (CL) model is the appropriate model for our econometric analysis. The conditional logit model assumes that all respondents (households) have homogeneous preferences⁵⁹.

To analyse the heterogeneity of preferences among the respondents, we include interactions of household characteristics with the alternative-specific attributes in the utility function⁶⁰ and estimated a conditional logit model with interactions. The household characteristics considered here are: average monthly income, average monthly OOP healthcare expenditure, dependency and awareness. The regressor dependency implies the dependency of a household members on its working members. For any household it is defined as household size divided by its total working members. It is found that average dependency level of our sample is approximately 2.71 In our analysis awareness is considered as a dummy variable. The variable awareness is coded as 1 if the respondent has basic knowledge about any insurance of any kind, and is coded as 0 otherwise. In our sample approximately 57 per cent of respondents are found informed about insurance. The household characteristics are the

⁵⁹ CL model does not account for a different constant for each individual (fixed effects)

⁶⁰ The random parameter logit model can be used to account for unobserved heterogeneity. But it fails to explain the sources of heterogeneity (Boxall and Adamowicz 2002).

case-specific regressors that do not vary with alternatives. Hence, they are multiplied with the monetary value, (in our case premium) prior to the estimation of this CL model with interactions.

6.6. Results and Discussion

6.6.1. Conditional Logit Model (without interaction) Results

The results of the conditional logit model (without interactions) are provided in Table-6.c. The overall goodness of fit of this model is good enough and the model is significant at less than 1 per cent level of significance. The model results indicate all the attributes levels are significant at less than 5 per cent level of significant with premium and both the levels of cash-back attribute are highly significant at less than 1 per cent level of significance. The results suggest that all the attributes are very relevant to the respondent in their decision making for choosing the MHI scheme. Moreover, all the levels have the expected sign. The negative sign of the parameter estimate of premium implies⁶¹, an increase in the premium of the one alternative decreases the probability of choosing that alternative and increases the probability of choosing other alternative. Similarly, the positive sign of the parameter estimate of coverage implies an increase in the coverage amount of the one alternative increase the probability of choosing that alternative and decreases the probability of choosing other alternative MHI scheme. The positive signs (of both the levels) of cash-back, unit of enrolment and benefits attribute suggest (respectively) that cash-back in an MHI scheme is preferred over no cash-back, family coverage is preferred over individual coverage and schemes providing diagnostic expenditure, transportation coverage are preferred to the MHI schemes with only drugs coverage.

The table 6.c also reports the odds ratio (OR) for attribute levels. In connection with the preference for specific attribute-levels, the results in table 6.c suggest that, other things remaining same, probability that one MHI scheme is preferred over the other is more than 2 times higher if it provides a cash-back of 25 per cent (of total premium given) in case of

⁶¹ The sign of the coefficient in the CL model is directly interpretable (Cameroon and Trivedi, 2005)

claim less than 5000 p.a. compared to no cash-back at all. If the scheme backs 50 per cent of the total premium deposited in case of claim less than 5000 p.a., the probability to choose the scheme will be more than 3 times higher compared to the schemes with no cash-back provision. Thus, a cash-back offer can encourage them to join the MHI scheme. For the benefit attribute, the results show if the MHI provides the cost of diagnostics and 50 per cent of transportation cost of them along with drugs, the probability of joining the scheme is more than 1.55 times higher than the schemes which do not bear cost of diagnostics cost, transportation cost. This probability becomes around two times higher than the schemes with no diagnostics cost, transportation cost if along with lab test, transportation (25 per cent) costs, quite a few (less costly) in-patient surgical costs are covered. The transport coverage component is the important most determinant in the benefit attribute of an MHI scheme among the respondents since they use to get free healthcare services from the public facilities in West Bengal. The respondents have higher preferences for the MHI scheme in which the unit of enrolment is family coverage with 5 members followed by the family coverage with 3 members compared to the individual coverage.

Table-6.c: Conditional (fixed-effects) logistic regression [without interaction]

Attribute and attribute-levels	Coefficient	OR	z	P>z
Premium	-0.00136	0.99864	-5.21	0.000
Coverage	0.00002	1.00002	2.75	0.006
Unit of enrolment				
Individual (reference)	0.00000			
Maximum 3 members	0.50626	1.65908	2.82	0.005
Maximum 5 members	0.52591	1.69201	2.65	0.008
Benefits				
Drug, Free consultation	0.00000			
Drug, Lab test, 50per cent of Transportation cost	0.44429	1.55938	2.37	0.018
Drug, Lab test(including one preventive test), 25per cent of Transportation cost, less-costly in- patient surgical	0.64446	1.90496	2.93	0.003
Cash-back				
No	0.00000			

25per cent in case of claim less than 5000 p.a.	0.80399	2.23443	4.42	0.000
50per cent in case of claim less than 5000 p.a.	1.14587	3.14517	6.51	0.000
Number of observations	1203			
LR chi2(8)	83.11			
Prob > chi2	0.0000			
Pseudo R2	0.0943			
Log likelihood	-398.98863			

Source: Own calculation

As a whole, the respondents preferred the MHI scheme which provides family coverage, covers transport, diagnostics and a cash-back of the total premium deposited in case of no claim. Besides this, their willingness to join the scheme increase with the lower premium and higher coverage amount.

6.6.2. Conditional Logit Model (with interaction) Results

Table-6.d gives the estimates of the conditional logit model with interactions. The LR chi-square of 142.73 with a p-value < 0.0001 implies that our model as a whole fit significantly. The goodness of fit for this model (with interaction) is better than the model (without interaction) presented in Table-6. d.

Table-6.d: Conditional (fixed-effects) logistic regression [with interaction]

Attribute and attribute-levels	Odds Ratio	z	P>z
Premium	.997037	-6.78	0.000
Coverage	1.000014	2.51	0.012
Unit of enrolment			
Individual			
Maximum 3 members	2.187169	2.80	0.005
Maximum 5 members	3.270223	2.47	0.014
Benefits			
Drug, Free consultation			
Drug, Lab test, 50per cent of Transportation cost	1.710822	2.75	0.006
Drug, Lab test (including one preventive test),	2.094573	3.26	0.001

25per cent of Transportation cost, less-costly in-patient surgical

Cash-back

No

25per cent in case of claim less than 5000 p.a.	1.668033	4.24	0.000
50per cent in case of claim less than 5000 p.a.	1.656854	6.50	0.000

Monthly Income	1	2.61	0.009
Healthcare Expenditure	1.000001	3.71	0.000
Dependency	1.000065	0.73	0.464
Awareness	1.000807	4.12	0.000

Number of observations	1203
LR chi2(12)	142.73
Prob > chi2	0.0000
Log likelihood	-369.17658
Pseudo R2	0.1620

Source: Own calculation

Table-6.d shows that the choice of an MHI scheme is influenced by the household's characteristics. Except dependency all other variables are statistically significant at less than 1 per cent level. Households with higher out of pocket healthcare expenditures are more likely to join the MHI than the households with comparatively less expenditure on health, whereas respondents with a (elementary) knowledge of insurance are also more likely to join the MHI schemes than the respondents who have no insurance related knowledge.

6.7. Conclusion and Policy Implication

We have conducted a DCE to elicit the preference of MHI scheme. Our target group is informal sector households and the study area is Purulia district of West Bengal. MHI as a product is quite different from the commercial insurance. MHI schemes are designed according to the local community's specific needs. So proper designing of the scheme is very

crucial part from the insurer perspective. It may be the case that the insurers (policymakers) have inadequate knowledge of clients' priorities and due to that, may misinterpret the low demand as low willingness to pay. The importance of the DCE exercise is rightly here. In a DCE we can evaluate the value of a product by estimating distinctly the preferences of respondents for the relevant attributes that characterize the good. Hence, it delivers much information that can be utilized to the preferred design of the good.

We have identified five attributes and three levels for each of them. Then we have performed orthogonal design to reduce the total number of choice-sets to 16. 8 alternatives are constructed using these 16 choice sets. An opt-out option is also included in every choice set. Choice sets are randomly assigned to the respondents and they are asked to choose preferred alternatives from the choice set shown. The present study shows that there is a preference for the MHI product among the sample households. Our DCE suggests that, to encourage enrollment under MHI schemes, they should include coverage for transport costs, offer a comprehensive benefit package, cover the family as the unit of enrollment, provide cash-back facility and keep the premium reasonably low enough.

Based on the preferences expressed for the specific attribute of MHI we suggest that a potential MHI scheme should include a comprehensive benefit package (like covering transport costs etc. and thus reduces the indirect cost incurred by the beneficiary) cover the family as the unit of enrollment, provide cash-back facility and keep the premium low as far as practicable. Determining levels of the attributes are also equally important. Designing the scheme with appropriate characteristics is also required for the financial sustainability of the scheme. Lastly, in our analysis we found that the demand for MHI is considerably high for the insurance-aware individuals. So, to encourage the poor individuals to join, the perquisite is to penetrate awareness regarding the importance of insurance.

APPENDIX

Proof of Result-1:

Differentiating EU with respect to i we get

$$EU'(i) = -[(1 - p)\alpha + p\beta]c'(i) - p\beta z'(i)$$

Clearly, $EU'(i)$ is positive if

$$\frac{|z'(i)| - |c'(i)|}{|c'(i)|} > \frac{(1 - p)\alpha}{p\beta}$$

Proof of Result-2:

differentiating the EU function w.r.t γ gives $p(1 - p)(\beta - \alpha)\gamma$ which is positive since $\alpha < \beta$.

Proof of Result-3:

Since the beneficiary gets back a $\mu(< 1)$ proportion of his premium in case there is no episode of sickness, the level of wealth in the good state changed to:

$$w - r + \mu r = w - (1 - \mu)r$$

Now the expected payoff is given by:

$$EU_\mu = (1 - p)\alpha[w - (1 - \mu)r - c(i)] + p\beta[w - r - c(i) - (1 - \gamma)m - z(i)]$$

Clearly, EU_μ rises with μ .

CHOICE SETS

Choice Set:1

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	250	Max 3 members	Drugs & tests	45000	No
2	250	Individual	Comprehensive	25000	50%
3 (opt out)	...	...	...	...	...

Choice Set: 2

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	150	max3 members	comp	25000	25%
2	300	max5 members	comp	60000	No
3 (opt out)	...	...	...	...	...

Choice Set: 3

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	150	individual	drugs	25000	No
2	300	individual	drugs & tests	25000	50%
3 (opt out)	...	...	...	...	...

Choice Set: 4

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	150	Individual	Drugs & tests	60000	No
2	150	Max 5 members	Drugs	45000	50%
3 (opt out)	...	...	...	...	...

Choice Set:5

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	150	Max 5 members	Drugs	25000	No
2	250	Max 5 members	Drugs & tests	25000	25%
3 (opt out)	...	...	...	...	...

Choice Set:6

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	300	Individual	Drugs	45000	25%
2	150	Individual	Comprehensive	45000	No
3 (opt out)	...	...	...	...	...

Choice Set:7

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	250	individual	drugs	60000	25%
2	300	max3 members	drugs	25000	No
3 (opt out)	...	...	...	...	...

Choice Set:8

Alternative	Premium	Unit	Benefits	Coverage	Cashback
1	150	Individual	Drugs	60000	No
2	150	Max 3 members	Drugs	25000	50%
3 (opt out)	...	...	...	...	...

CHAPTER-7

Thesis Summary and Conclusions

The main objective of the present thesis is to investigate the various issues related to microinsurance of health. To accomplish the objective, the thesis concentrates on three relevant aspects. *First*, we explore the issue of distress healthcare financing among the informal sector workers. *Second*, we look into the question of financial sustainability of MHI scheme. *Third*, we examine if offered, whether there is a market for MHI or not among informal-sector households. The first and third issues mentioned are addressed empirically whereas the second issue is analysed theoretically. The present study confirms that a substantial number of sample households had to rely on risky coping mechanism such as borrowing with interest and/or selling assets to meet their OOP healthcare expenditure which justifies the importance of MHI scheme as an (complementary) option to the informal-sector households to finance healthcare payments. In addition, the findings revealed the collaboration of commercial insurance firm with local organization (such as an NGO) will be crucial for maintaining the financial viability of the scheme. Finally, the study found the evidence of high preference for MHI scheme among the sample households. In this section, we will summarize the major findings of the thesis.

In the fourth chapter we examined how do the informal sector households cope with health shocks in West Bengal (a state in India). The present study is based on a household survey conducted in Purulia (a backward district of West Bengal). In our micro-level study at the first stage, three blocks (viz. Purulia-I, Purulia-II and Hura) were selected randomly under Purulia Sadar sub-division. Then from each block, two villages were selected randomly and finally eighty households were selected from each village through random sampling procedure. For the analysis we considered the households that sought healthcare at least once during the reference period. We found that 30 households (representing 6.25 per cent of total selected households) did not seek any healthcare, so, the present study is based on 450 households. In our study sample the principal working member in most of the households were involved in casual wage employment. The monthly average healthcare expenditure incurred by sample households was around Rs 800 which represent nearly 11.20 per cent of average monthly household income and 35.59 per cent households resorted to distress healthcare financing. We defined distress healthcare financing as a situation when a household required to borrow money with interest and/or sell assets/livestock for its

healthcare expenditure. Among the households that incurred catastrophic health payments nearly 57 per cent faced distress financing. We considered any OOP healthcare spending exceeding 10 per cent of household's expenditure as catastrophic. Initially we examined the determinants of OOP average monthly healthcare expenditure of the sample households. Next, we investigated the factors influencing the incidence of distress healthcare financing of those sample households. To examine the determinants of monthly average OOP healthcare expenditure of sample households, we used an IV (2SLS) regression where logarithm of household's average OOP monthly healthcare expenditure was dependent variable and logarithm of average monthly income of household, incidence of outpatient care, incidence of hospitalisation, size of the vulnerable age group (total number of children aged five or less than five and number of members aged fifty-five or more), healthcare seeking from private provider(including traditional healer), principal earning member's activity status and education of household-head were the explanatory variables. The family income was treated as endogenous regressor and total number of working-members in a household was considered as an instrument for it. The Wu-Hausman test for endogeneity validates the use of IV(2SLS) regression. The results of IV(2SLS) estimation showed that factors like incidence of hospitalization, total number of children aged five or less than 5 and number of household members aged 55 or more in a household, seeking medical care from private sources are substantially contributing the OOP healthcare expenditure of sample households. Next, to investigate the factor(s) influencing distress healthcare financing of sample households we fitted a seemingly unrelated (SUR) Bivariate Probit model in which distress healthcare financing was outcome variable (binary in nature; coded as 1 if a household faced distress financing) and catastrophic healthcare expenditure, self-help group membership, total number of working-members, principal earning member's activity status and education of household-head were the explanatory variables. The dummy variable catastrophic healthcare expenditure (it was coded 1 if a household's share of healthcare expenditure in total expenditure exceeded 10 per cent) was treated as endogenous and incidence of hospitalisation, size of the vulnerable age group and healthcare seeking from private provider (including traditional healer) were found as valid instruments. The ML estimation results showed that households incurring catastrophic healthcare expenditure have significantly higher likelihood of facing distress healthcare financing; however, there is no one-to-one correspondence between these two. Probability of incurring catastrophic health expenditure significantly rises with incidence of hospitalization, size of vulnerable group and incidence of

care seeking from private provider. The other factors proved to be responsible for distress healthcare financing are: high dependency on earning-members and absence of any regular wage employment among the members. We found no statistically significant difference in vulnerability due to SHG membership and with education level of household-head.

In the fifth chapter we developed a simple theoretical model of MHI scheme which is initiated by a commercial insurance firm and managed in collaboration with a local NGO. In this model, we analysed the financial sustainability of MHI scheme and derived the optimal incentive contracts between firm and NGO. We considered the case of a risk-neutral insurance firm, naïve of rural community preferences intended to provide MHI to risk-averse individuals with identical level of initial wealth and risk type (so, there was no adverse selection in our framework). A representative beneficiary faces a risk of income loss due to the health shock which are covered under the MHI scheme. The probability of facing bad state (i.e., illness) is decreasing and convex in individual's preventive effort. But exerting effort is costly. The firm teams up with a risk-neutral NGO and assigned it to execute two tasks: enrolling potential beneficiaries in the scheme (in stage-1) and encouraging and monitoring preventive care/treatment (in stage-2). Enrolment under the scheme was dependent on NGO's effort in creating awareness of individuals and improving the insurer's familiarity with the preferences and behaviour of them. In addition, due to the access to local informal network it could encourage and monitor preventive effort of beneficiaries. The firm cannot monitor the NGO's effort level in both stages. In the stage-1, firm offered a linear contract (with a fixed and variable compensation component) to NGO. The NGO was altruist and its reservation utility is low enough. In stage-1, if outside option to the NGO is very low, the variable compensation component and the enrolment go down when NGO's cost of effort goes up, optimal bonus decreases with the higher altruism of NGO and optimal effort increases with the altruism of the NGO. However, if the outside option is not very low, optimal bonus decreases with the higher altruism of NGO but optimal effort does not depend on the altruism of the NGO. We further showed that if the individual claims are independent and identically distributed random variables, under certain conditions the expected claims are decreasing in the NGO's effort level. In the analysis of stage-2, we assume that at the end of stage-2 the scheme yielded a binary output to the firm: high i.e., a non-negative financial profit, or low i.e., a negative financial profit. The firm could financially sustain if its expected payoff was non-negative. As earlier result of our model suggests the NGO's effort,

stochastically improves the probability of making positive financial profit of firm. The insurance firm offered a state contingent contract to the NGO. We derived the optimal effort level and optimal bonus payment of NGO for which insurance firm could remain financially sustainable. In addition, it the firm can set a lower risk-loading with the higher monitoring effort of the NGO. So, from our analytical framework we can conclude that the presence of a local voluntary organization (NGO) helps the insurer to achieve high scale and plays an important in ensuring financial sustainability of an MHI scheme (initiated by for-profit insurer).

The theoretical model of the thesis analyzed the case of a for-profit insurer providing MHI to low-income households without exploring the demand aspect of such schemes. Evidence confirms that these schemes have succeeded in enrolling a small proportion of their target population. So, in the sixth chapter we investigated the demand for MHI among the informal sector workers in the state of West Bengal, India. The characteristics of an MHI scheme (i.e., premium level and benefit package) could have a significant impact on its demand among the target group. Hence, the method of Discrete Choice Experiment (DCE) was applied in our study to elicit the preferences of sample households for MHI scheme. The study area was Purulia district of West Bengal. Prior to the experiment we made a pilot survey and focus group discussion. On the basis of the responses, the final questionnaire required for our experiment was designed. The experiment was undertaken along with the household survey mentioned in the chapter-4. We considered the households without any health insurance as our sample for the DCE. So, the sample size of our DCE was 403. We identified five attributes with three levels for each on the basis of literature as well as from the pilot survey and focus group discussion in the study area. The five attributes with three levels each, result in 3^5 i.e., 243 possible combinations of MHI products. However, it seemed impractical to consider 243 combinations for our study. So, using orthogonal design we derived 16 combinations which were further used to construct eight choice sets of two alternatives each. In addition, an opt-out alternative was also included to control overestimation of preference. Again, given five attributes and different levels, choosing eight alternatives would be troublesome for the respondents. So, each respondent was asked to choose only one alternative from the only choice set shown to him/her. The choice sets were randomly assigned to them. Then the question asked was ‘What will you do?’ A respondent’s choice indicates his/her preference or utility he/she attaches to the product and its attributes. So, it

becomes possible to examine the degree to which each attribute influences the choice of the decision-maker. Our empirical strategy relied on estimating a conditional logit model. To allow for the heterogeneity of preferences among the respondents, we included interactions of case-specific regressors monthly income of household, average monthly healthcare expenditure, dependency, awareness about insurance with the alternative-specific attributes in and estimated a conditional logit model with interactions. The evidence emerging from our DCE analysis shows that there is a high preference for an MHI scheme among the sample households i.e., given the hypothetical choices (based on experimental design) offered there is a market for MHI. Based on the preferences expressed for the specific features of MHI, we recommend that, in order to maximize consumer utility and encourage enrollment in MHI, potential schemes should include coverage for transport costs, offer a comprehensive benefit package, define the core family as the unit of enrollment, avoid high premium and ensure a (conditional) cash-back provision. Lastly, we found that the demand for MHI is considerably high for the insurance-aware individuals. Hence, to encourage the participation, the prerequisite is to penetrate awareness regarding the importance of insurance.

CHAPTER-8

Policy Implications

In other low- and middle-income countries, most of the population are engaged in the informal sector (Pratap and Quintin, 2006; Bacchetta et al., 2009). People working in informal sector are often belong to low-income strata since they are engaged in small-scale, self-employed activities. At the same time, they are typically unrecorded, unregistered and accompanied without proper integration with the administrative machinery. As a consequence, they are usually excluded from market or government arrangements through which they might benefit from health insurance (ILO, 2000). Under these conditions, for the informal sector households MHI is considered as a vital instrument to cope with impoverishing effects of large OOP health expenditure.

One of the common perceptions is that poor people cannot afford health insurance, thus insurance was never been considered as an instrument to finance their healthcare spending. This may be true for the poorest of the poor, but this need not be true for the near-poor group i.e., those are living close to the poverty line (Zellar and Sharma, 1998). Target group for most of the publicly sponsored health insurance schemes is the bottom of the income-pyramid. The near-poor (i.e., those just above the poverty line) households are not covered by these schemes and at the same time they cannot afford the private insurance schemes available in the market. So, this group is likely to be bypassed by all the insurance schemes. The importance of the MHI in the context of LMICs is mainly to complement the tax-funded health system for the financial risk protection and access to healthcare within a specific local context. For example, in India, MHI schemes like Vimo SEWA, Yeshasvini, Uplift is providing health insurance to the poor individuals, who fall outside the domain of target group of government health insurance schemes.

The workers engaged in informal sector activities are usually not familiar with the explicit contracts of the market economy. For example, in India 82 per cent of those employed in agriculture and non-agriculture sector had no written job contract (Ministry of Labour and Employment, GOI 2015). They use to rely much on social relationships in which trust is a vital element (Eswaran 2018). MHI as a product is quite different from the commercial insurance. MHI schemes are designed according to the local community's specific needs. So proper designing of the scheme is very crucial for generating demand for the scheme. Designing the scheme with appropriate characteristics is also required for the financial sustainability of the scheme. Finally comes the implementation part associated with the MHI

scheme. For this, the insurer (if not itself an NGO) has to make a partnership with any organization working in the local proximity. Such organizations use to enjoy the trust of the local community and have information advantage. If any insurance company has tailored an MHI product, then the activities like keeping the accounts of transportation cost, calculation of cash-back, arranging camp for preventive care etc can be done by the appointed NGO (agent). Lastly, in our analysis we found that the demand for MHI is considerably high for the insurance-aware individuals. So, to encourage the poor individuals to join, the perquisite is to penetrate awareness regarding the importance of insurance.

We found that i) there is a requirement for MHI scheme, ii) such scheme has the potential for sustainability and iii) MHI schemes are feasible. Hence, MHI should be considered as a springboard for achieving the Universal Health Care in LMICs. MHI can contribute to government efforts to serve large numbers of informal workers. In Ghana, MHI schemes were consolidated into a government scheme, which is managed at district level. In Thailand, the government incorporated lessons from early MHI schemes in the design of a voluntary scheme for informal workers. Governments can also form partnerships with MHI schemes to deliver key insurance functions, such as marketing, identification of eligible clients, distribution of insurance, premium collection and even claims processing and risk-carrying. As a whole such collaboration can potentially reduce duplicative or competing models of health insurance for informal sector.

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