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ARE THE POOR TOO POOR TO DEMAND HEALTH INSURANCE?

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Foreword

That there is an urgent need to extend income and social protection to the poor is widely recognised. One, there is greater appreciation of the fact that income and social protection to the poor is not only an end in itself but also a means to achieving higher economic growth. Two, because the adverse effects of greater economic integration (through liberalisation and globalisation) are likely to be on the poor.

In the mitigation of poverty, there is increasing appreciation of the role played by risks in the lives of the poor. It is not sufficient to provide the poor with income alone. For making any meaningful and lasting impact in their lives, there is a need to also protect them from the several risks such as risk of illness, death, loss of assets, and so forth. Accordingly, micro insurance, which is basically insurance for the low income people, is gaining importance not only in India but also in other developing countries. In India we find many community based insurance initiatives taking roots partly because of their felt needs and also because of policy design as in the social obligation imposed by the Indian insurance regulator.

In some of the initiatives involving low-income people, the members of an insurance scheme have themselves contributed (even if partly) towards paying insurance premium for covering against risks. The early success of these initiatives points towards the possibility of mobilising funds from the beneficiaries themselves. It is an open issue to what extent the poor can contribute towards paying premium. If the poor are unable to contribute it may be not due their lack of ability per se but because of the prevailing institutional rigidities. This paper explores this particular issue and provides some valuable insights. In particular, the finding that institutional rigidities, such as credit market constraints, may prevent the people from demanding insurance that they can otherwise afford is an important message that ought to be taken note of by the policy makers, insurance initiators, social activists and all others working for the upliftment of the poor.

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Abstract

Community based micro insurance has aroused much interest and hope in meeting health care challenges facing the poor. In this paper we explore how institutional rigidities such as credit constraint impinge on demand for health insurance and how insurance could potentially prevent poor households from falling into poverty trap. In this setting, we argue that the appropriate public intervention in generating demand for insurance is not to subsidise premium but to remove these rigidities (easing credit constraint in the present context). Thus from insurance perspective as well, our analysis highlights the importance of having appropriate savings and borrowing instruments for the poor.

Key Words: Micro-insurance, Micro-credit, Credit Constraint, Demand for Insurance.

I Introduction[#]

After micro-credit is the turn of micro-insurance.¹ Of late, the idea of micro-insurance has caught the attention of researchers, NGOs, donor agencies, policy makers and social scientists involved in tackling poverty. The optimism with the idea of micro-insurance stems mainly from two different sources: one, from the success of micro-credit programs² in ameliorating the conditions of the poor in different parts of the world by enabling them through asset and/or skill formation to generate income on a sustained basis (Morduch 1999a), and two, from the growing recognition of the role risk plays in the lives of the poor, and hence the need for increasing the ability of the poor in dealing with the variety of risks they face. Improving the risk management capacity of the poor has come to be viewed an integral part of any poverty alleviation program (Holzmann and Jorgensen 1999).³

Although, the empirical literature on the impact of micro-insurance schemes is still limited, the available evidence seems to suggest that micro-insurance, if properly designed and implemented, can provide an effective mechanism for meeting health care challenges

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¹ We do not state this in any pejorative sense. We state this to point out the order in which research has proceeded and also to hint at the order (between credit and insurance) we suggest in the paper.

² Although credit and insurance are two very different concepts (for the difference between the two, see Siegel et al. 2001), it is believed that the success of micro-credit shows how the impediments posed by informational asymmetries (giving rise to the moral hazard and adverse selection problems) and those relating to high transaction costs that prevent formal providers of financial services from catering to the low-income section of a society, can be overcome.

³ According to Preker et al. (2001), motivation for the provision of health insurance also comes from the failure of public sector to provide health care at reasonable cost.

of the poor--that is, in reducing out-of-pocket health expenses of poor households and in improving their access to health care services.⁴

The potential of up-scaling, extending and expanding of micro-insurance programs depends crucially on the issue of affordability, that is, to what extent resources for meeting health care costs can be mobilised from the people themselves.⁵ Limited reach and coverage of the existing micro-insurance programs by itself is not sufficient to question the affordability of premium by the poor and hence justify the need for subsidising premium. In this paper we explore the issue of affordability, and demonstrate with the help of a simple analytical device how institutional rigidities, and in particular credit or borrowing constraint, suppresses demand for insurance by the low-income households who can otherwise afford to pay for insurance, and how in the absence of insurance household's vulnerability can push them into poverty trap.⁶

The paper is organised as follows: in section 2 we give a brief overview of micro-insurance, and highlight the importance of the affordability issue in the context of community-based health insurance schemes in section 2; in section 3 we show with the help of simple analytical device how easing of credit constraint could potentially increase

⁴ See Jakab and Krishnan (2001), Preker et al. (2001) for a summary of different case studies on the impact of community-based-health insurance schemes.

⁵ Unlike micro-credit where transfer in the first instance takes place from the credit provider to the poor, in case of insurance a reverse transfer takes place, i.e., from the poor to the insurance provider (for a promise of covering the loss resulting from a particular event). Therefore, in the context of insurance affordability becomes an important issue.

⁶ The effect of borrowing constraint on the technology adoption by the poor farmers as well as on the risk preference of the poor have been explored by Eswaran and Kotwal (1989, 1990) and Morduch (1994). The effect of borrowing constraints on the savings behaviour too has been well covered in the literature (see Besley 1995).

demand for micro-insurance, in the absence of which a household runs the risk of falling into poverty trap. In section 4 we review appropriate government intervention in the light of our analysis. Section 5 concludes the paper.

II Overview: Health Risks, Micro Insurance and Affordability

Insurance is not the only way of dealing with risks⁷, and not all risks are insurable⁸. However, *health risks* such as those relating to illness, injury, disability, maternity and the like are considered to be eminently insurable as these risks are mostly independent or idiosyncratic, that is, not correlated among community members.⁹ Moreover, among several risks facing poor households, *health risk* is considered to be crucial as it has destabilising effect on household finances: directly, by thrusting health expenditure in the event of illness and indirectly, by affecting the income earning capacity of households¹⁰ (Asfaw et al. 2002). Hence the need for a two-pronged strategy: *one*, aimed at improving the health status of the poor, and *two*, protecting them from the financial consequences in

⁷ Depending on an individual response to dealing with risks, the literature classifies all risk management practices into three broad groups: risk reduction (RR), risk mitigation (RM) strategies and risk coping (RC) strategies. The former two strategies are ex ante risk management strategies (that is, used before a risky event takes place) whereas the later one is an ex post strategy (that is after the event takes place). Insurance, similar to savings and borrowings, is a part of risk mitigation strategy (Brown and Churchill 1999, Holzmann and Joergensen 2000).

⁸ Insurability of risks depends on the characteristics of risk. Literature on risk management approach classifies risks along several lines. For example, depending on the nature of risks: whether risk is independent vs. correlated, high frequency low cost vs. low frequency high costs, or depending on the appropriate agency handling risks. On insurability of risks, see Jütting 2002, Brown and Churchill 1999, Siegel and Alwang 1999.

⁹ Unlike many health risks, political, social and institutional risks are often covariate in nature (Weinberger and Jütting 2000).

¹⁰ The literature recognises that improvement in health status is not just the result of higher incomes but is also an input into generating higher incomes, especially for the poor. This linkage has been recently demonstrated in the work of the Commission on Macroeconomics and Health of the WHO (CMH 2001).

the event of illness. For this reason micro-insurance that essentially protects households against the financial consequence of illness is regarded as a complement to, and not as a substitute for, other health interventions.

Amidst shrinking government budgets, failure of the markets to reach the poor and widespread criticism of levying user charges, community based arrangements have aroused much interest and hope in meeting health care challenges facing the poor, and micro-insurance is considered to be an important financing tool for protecting the poor from adverse financial consequences in the event of sickness. While the out-of-pocket expenditure on illness in spot payments imposes great financial hardship on the poor, community based health insurance is seen as an effective way in financing health care costs. Health insurance by pooling of risks across members who participate in health insurance lessens the financial burden of members affected by illness. Indeed, several types of community based health insurance schemes have emerged in Sub-Saharan Africa (Wiesmann and Jütting 2000, Atim 1998), Asia (Krause 2000) and in other regions (Bennett et al. 1998, Jakab and Krishnan 2001).¹¹ Some of these are community based, while others are based on membership to a particular group. In this paper these community-based and member-based arrangements are collectively referred as community financing schemes. In some cases, health insurance feature is embedded in the other types

¹¹ Four models of micro-insurance have been discussed in the literature. In the partner-agent model, insurers, health care providers and organisers of the scheme decide on the insurance-cum-health care package. In a community-based insurance model policyholders are owners and managers of all aspects of insurance operations. The full-service model is similar to formal sector insurance provision, and finally, the provider model where the health care provider and insurer are the same party, with insurance coverage is restricted to the services provided by the health care provider. (Siegel et al. 2001). These arrangements should not be confused with other community schemes that merely subsidise the cost of health care for the poor sick people. Such schemes are devoid of any risk pooling.

of functions that a community or member based organisations provide¹². In fact, some micro-finance programs have successfully introduced insurance on a limited scale (Morduch 1999b).

Community health care financing schemes are usually based on the following characteristics: voluntary membership, non-profit objective, link to a health care provider (often hospital in the area), risk pooling and relying on an ethic of mutual aid/solidarity. Their advantage lies in being able to reach low-income people in rural areas and working in the informal sector who are otherwise difficult to reach, able to exploit social capital in bringing about greater awareness, correcting for adverse selection and moral hazard problems¹³ and encouraging preventive measures, and increased access to health care. But community based schemes also have certain weaknesses such as low capital base, low level of revenue mobilisation, frequent exclusion of the poorest of the poor, small size of risk pool, limited management capacity, isolation from more comprehensive benefits.

However, the reach of the existing micro insurance schemes is still low and attempts are being made to bring more and more people under its ambit, by up-scaling and extending and replicating the schemes. In extending the reach of micro insurance, *demand side* and *supply side* factors and factors relating to *design and development* of scheme are

¹² To give one example of this, the Self-Employed Women's Association (SEWA) in Gujarat (India) has the basic objective to help the poor generate income for themselves. Since 1992, it also started providing medical insurance to its member (for more on SEWA, see Ranson 2001).

¹³ Both these problems arise due to informational asymmetry between seller and buyer of insurance. Generally, buyer of insurance is more well-informed about his health status and the care level taken by him. While adverse selection problem tends to reduce the size of membership, the moral hazard problem leads to over-consumption of benefits covered under the scheme.

important (Dror and Jacquier 1999, Wiesmann and Jütting 2000, Siegel et al. 2001).¹⁴ However, the focus of the present paper is only on the demand side factors and in particular on the issue of affordability.¹⁵

By and large the literature on demand side is still thin.¹⁶ A few micro-level studies that have tried to estimate demand for health insurance based on the willingness-and-ability-to-pay for health insurance have come out with positive findings. A survey-based study on the willingness to pay even in case of Ethiopia - one of the poorest countries in the Sub-Sahara Africa - shows that the poor are willing to pay up to 5 % of their monthly income (Asfaw et al. 2002) for having a scheme that can take care of their costs of illness. A review of various existing schemes by Jakab and Krishnan (2001) highlights that (a) micro-insurance schemes can raise substantial resources but need to get additional funds by donor agencies, the state or health care providers, and (b) the poorest of the poor in a community are often excluded from the schemes. In order to increase the access of these people some schemes have developed mechanisms which lower entrance barriers for the poorest, e.g. flexibility in premium collection and exemption mechanisms.

¹⁴ This classification is only for the sake of simplicity. In reality one expects these factors to be interdependent. For example, weak supply of health care services may be the result as well as the cause of poor demand. Similarly, if the design of health insurance scheme is poor, it may fail to attract households (see Dror and Jacquier 1999).

¹⁵ This is not to deny the role of other demand side factors such as social and cultural milieu in which the poor live, access to other risk management instruments and so on. To give an example of how social cultural factors pose a barrier to demand for insurance, in some societies people believe that to think about the consequences of one's ill-health or death is to wish oneself the same. Similarly, in some societies people interpret ill-health as the wish of gods or links it to one's fate and hence refuse any medical treatment and turn to religious head (Wiesmann and Jütting 2000).

¹⁶ Much of the existing literature on micro-insurance focuses attention on supply and institutional issues (Siegel et al. 2001). In the words of Brown and McCord (2000), "The limited understanding of households' needs, preferences, and expectations will have to be deepened, if future experiments in micro-insurance are to be "demand-driven."

One of the common perceptions about the poor is that the poor are too poor to either save or buy insurance. In other words, the poor are too poor to buy insurance. While this may be true for the poorest of the poor who struggle for survival every day, this need not to be true for those living close to the poverty line (Martin et al. 1999, Zeller and Sharma 1998). For people living close to poverty line, their apparent inability to join insurance scheme may not be the result of affordability *per se* but may be the result of institutional rigidities such as credit constraint that may be preventing their latent demand from translating itself into effective demand for health insurance. In such situation, easing credit constraint rather than subsidising premium may help improve the reach of micro insurance schemes. How borrowing constraint impinge on demand for insurance by a poor household is demonstrated in the next section.

III The Analytics of Insurance Demand¹⁷

In this section we first analyse how a borrowing constraint may affect the demand for insurance in general, and then, show how it influences insurance demand in case of poor households.¹⁸

¹⁷ Demand for insurance, which is mandated by the providers of credit to the poor needs to be distinguished from the demand for insurance necessitated purely by health considerations. In the former case, insurance protects the interest of the creditor against the risk of default in the event of the borrower falling ill. In the latter case insurance protects the financial interest of the borrower in the event of his/her falling ill. Furthermore, in the former case premium is deducted from the credit extended to a borrower, and in the latter case, timings and mode of premium collection are important determinants of demand for health insurance. In this section we analyse the latter case.

¹⁸ See Eswaran and Kotwal (1989, 1990) on how borrowing constraint affects adoption of technology by farmers as well as on how such constraint shape their risk preference (also see Morduch (1994). See Besley 1995 on the effect of borrowing constraints on the savings behaviour.

III.1 The general case

For this, we consider a two-period model in which a typical risk averse individual faces no uncertainty in the first period and therefore has a fixed given income y . In the second period, however, the individual (or household) has random income. For simplicity we assume that there are only two possible states of nature: a *good state* in which the individual income is $y+z$ and a *bad state* in which his income is $y-z$. The bad state in the current context is the state of the individual falling sick.¹⁹ The probability of the bad state, denoted as p , is assumed to be 0.5 . The risk averse behaviour is captured by the restriction on the utility function, U , that is by its strict concavity (i.e., $U' > 0$ and $U'' < 0$). Expected utility of the individual in the absence of insurance is given as:

$$EU = U(y) + 1/2 \{U(y-z) + U(y+z)\}$$

Notice that the income loss suffered by the individual in period 2 should the bad state show up, is $2z$, and that the discount factor is assumed to be 1 (unity).²⁰

Let's first consider the case where the individual faces no borrowing constraint. Furthermore, assume that the individual can buy as much insurance coverage as he likes at actuarially fair price.²¹ From the standard result on insurance literature, at actuarially fair

¹⁹ In case of illness, the individual not only suffers income loss but also loss on account of having to bear cost of illness (i.e., of medicines etc.). In the model we do not distinguish between these two costs and treat the entire loss to be insurable.

²⁰ This is a simplifying assumption that implies that the future is as much dearer to the individual as is the present.

²¹ Actuarially fair price is the price at which insurance company selling insurance makes zero-expected profits. This condition characterises competitive insurance market. In the absence of zero transaction costs, the actuarially fair price is the same as probability of bad state showing up.

price, the utility maximising individual would demand full insurance coverage (see Mas-Colell et al. 1995, pp. 187-188). If D represents demand for insurance, full coverage implies $D^*=2z$. The utility of the individual after the maximisation would be:

$$EU=U(y-z+B)+U(y+z-B),$$

where B represents borrowings by the individual. Since we have assumed no borrowings constraint, the optimal borrowing is one that equalises income in the two periods. This occurs when $B^*=z$. Substituting B^* in the above condition equation yields $EU^*=2U(y)$.

If the individual faces a borrowing constraint (i.e., $B^*<z$) his demand for insurance would be *partial*. To demonstrate this, suppose that the individual cannot borrow at all. If the individual still demands full insurance his utility would be: $U(y-z)+U(y+z)$, which is lower than his initial utility (i.e., $U(y)+1/2\{U(y-z)+U(y+z)\}$), suggesting that he would demand partial and not full insurance.²² Now, if we allow for some borrowing but the borrowing falls short of the optimal level, the demand for insurance would continue to be partial.

More generally, starting from a point where the individual demands partial or no insurance and faces a borrowing constraint, individual's demand for insurance would

²² This follows directly from the definition of risk aversion which yields, $U(y) > (1/2)\{U(y-z)+U(y+z)\}$.

increase as the borrowing constraint is relaxed. This result is formally stated and proved in the proposition given in Appendix I to this paper.

III.2 Demand for insurance by the poor

Since the paper deals specifically with the demand for insurance by the poor, we characterise them by the assumption that they are at (or close to) their subsistence level in the current period (i.e., period 1), and face credit constraint which is a well known fact about the poor in the developing world. An important implication of this assumption is that the poor cannot spare much, if at all, from their current income for insuring their future. Let c denote the minimum consumption needed by the individual to keep him at the subsistence level. In the above construct, let the relationship between c , y and z be defined by the condition, $y - z < c = y$. What this condition implies is that the individual is just able to meet his minimum consumption (defined by c) in period 1. In period 2, the individual runs the risk of falling below his subsistence level (or the poverty line) in case the bad state shows up. In this case, if the individual cannot borrow at all, he will not demand any insurance. However, if the individual could borrow, he would demand full insurance, yielding utility $EU^* = 2U(y)$. Thus, the individual is able to keep himself afloat the poverty line (i.e., able to meet minimum consumption needs in both periods). The example is specifically constructed to highlight the importance of subsistence consumption that constraints demand for insurance by a poor individual. If the poor individual is allowed to borrow against his future income his demand for insurance would go up. This is the situation in which people are aware of the benefits of purchasing insurance but cannot set aside any money from their current income for this purpose. In reality, borrowing for

insurance need not necessarily take the form of actually taking credit at the prevailing interest rate. In fact, many schemes are so designed as to take account of this fact. For example, flexible premium option is one of the ways of addressing this issue. Creating a common pool of funds that can be used to give soft loans to group members is another way. Although the literature on micro-insurance is thin, there is some evidence already available to this effect.²³ In fact, many micro-finance organisations dealing with savings and credit have been successful in introducing and running micro-insurance schemes.²⁴

Although in the above construct we equate consumption to income ($c=y$), it is not crucial for the result. To show this, assume that $c < y$, that is, the subsistence constraint is not rigidly defined. Assume further that the individual cannot borrow at all. In the normal case (in the case of non-poor) we noted above that in the absence of any borrowing facility, the individual would demand partial insurance. Let this partial coverage be denoted by z^0 . Now in case of poor individual, who is faced with subsistence constrained, he may not be able to buy even this partial coverage. This would be the case when $\{y - (z^0/2)\} < c < y$, that is, when the amount over and above his subsistence consumption is insufficient to pay premium required for this coverage. In this situation, his demand for insurance would be lower than z^0 , and allowing for borrowing would then increase this demand level.

²³ The authors visited a micro-insurance experiment in T. Narsipur region of Karnataka (India) where soft loans among members of self-help groups is common. The loan can be used for any purpose, including paying insurance premium.

²⁴ A recent ILO Compendium of micro insurance schemes in India shows that about one-third of the insurance schemes are initiated by micro finance organisations.

To show that the above analysis is not a special case, we do some robustness test. In particular, we check how lack of access to credit affects demand for insurance under two different income scenarios (i.e., different combination of present and future income). This is shown in Appendix II where we find that the above result is applicable to alternate income scenarios also, and is not due to the specific example constructed above.

Thus, in the above analysis we show how subsistence constraint faced by the poor who can otherwise afford insurance, interferes with their purchase decision, and how access to credit can mitigate the effect of subsistence constraint.

It needs to be stressed that the setting we outline above is applicable not to the poorest of the poor for whom affordability is indeed the major issue and thus are dependent on public subsidy.²⁵ This setting is applicable to those who, though currently living above or on the poverty line, are likely to fall into poverty trap in the event of any major health shock.²⁶ If such people have access to credit, their need for health insurance may get translated in terms of effective demand for insurance, which fails due to their subsistence constraint, and through purchase of insurance they may be able to protect themselves against the risk of falling into poverty trap.

²⁵ The poorest of the poor would not buy insurance even if some credit is made available to them. According to Dror and Jacquier (1999), the needs of the excluded (the poorest of the poor) are often not structured in terms of “solvent demand.”

²⁶ According to Holzmann (2001) the group of poor that moves in and out of poverty is strikingly large compared to the group that is always poor (poor at all dates). In fact, one could further subdivide the poor who move in and out of the poverty, depending on their income prospects.

The existing literature points to the circularity between *poverty* and *vulnerability*: that is, the poor people are more vulnerable (exposed to risk) and their vulnerability is the cause of their poverty. In other words, the link runs both ways (Martin et al 1999). The above analysis shows how the presence of credit constraint might be reinforcing this link, and how this link can be severed by the easing of such constraint. Another aspect where the above analysis can be useful is in understanding the *order* of priority between savings and credit on one hand and insurance on the other. Whereas the importance of financial services (savings, insurance and credit) in risk management literature is well recognised, it is not clear how to prioritise the allocation of public funding and effort between savings and insurance. That is, whether access to voluntary, flexible withdrawal of savings and credit should receive a higher priority (over insurance) or should insurance be assigned higher priority than savings and credit. From the above analysis it follows that savings and credit functions should at least be undertaken *concurrently* with insurance, if not before insurance. Perhaps, it is appropriate to embed micro-insurance function in the micro-credit schemes that are already in place—the point about which there is some mention in the literature (Sadoulet 2001).

IV The Role of Public Intervention

Nobody doubts the need for public health intervention for the poor living in developing countries. Where affordability is the issue, government subsidy is clearly needed and an important policy issue here is the *extent* and the appropriate *form* that subsidy should take. This deceptively simple model is powerful enough to highlight several aspects.

First, public intervention has an important role in up-scaling, extending and replicating micro-insurance schemes that have emerged as promising route for health care financing. One important role is in removing of institutional rigidities present, for example, in labor, credit and product markets. These rigidities may take the form of pre-existing patron-client relationships, inter-linking of wage and credit contracts, various government controls and so on.²⁷ Presence of such rigidities prevents the poor from fully participating in market opportunities. The above analysis shows that removing these rigidities, and in particular, easing of credit constraint may be an appropriate way of translating latent demand into effective demand for insurance. However, this channel is likely to work for the poor who are currently able to meet their basic needs but face the risk of falling into poverty trap. For people who can afford premium but for the institutional rigidities, subsidising premium may not be an appropriate strategy. In fact, subsidising premiums bears a disadvantage that it may aggravate associated moral hazard problems.

Second, for the poorest of the poor, who are already below poverty line, easing of credit is unlikely to generate insurance demand. If credit is made available to them, it will in all probability be used in meeting their current basic needs than for hedging against risks in the future. The poorest of the poor need direct public support for meeting their health care needs. Their health care needs can be met either directly through free access to public health care services or indirectly by integrating them into micro-insurance schemes and

²⁷ These controls may, for example, take the form of preventing free movement of agricultural produce. The rigidity may also take the form of local government not being responsive to the needs of local people.

subsidising premium. The idea behind integrating the poorest of the poor into micro-insurance schemes is to enlarge the risk pool and thereby make the existing schemes more stable. Without subsidising premium, the poorest of the poor can hardly be integrated into such schemes since no resource pooling (distinct from risk pooling) can be effected by selling insurance to them. How can they be integrated? Supposing, a micro-insurance agency is already offering insurance to members of a village community in which some members are too poor to be able to afford insurance. If government has a policy of subsidising the premium for these poorest members then the insuring agency can, for example, collect premium from the government after submitting a proof of having provided insurance to the poorest of the poor, who can be well identified.

Third, some inferences can be drawn on the design and the development of micro-insurance scheme. For example, schemes that allow for flexibility in payment of premium (small amounts collected more often; allowing premium in kind as well) are more likely to succeed because such flexibility can in fact serve the role of credit.²⁸ Perhaps, credit facility can be in-built into the schemes by having a separate pool that can be used for paying premiums of members who are unable to make payments in time. Also, linking credit exclusively for the payment of premium may also check against its dissipation in meeting other less urgent needs.

²⁸ Allowing flexibility in paying premium is similar, in effect, to extending credit facility to the individual who buys insurance for the purpose of paying premium. The credit gets returned when the individual actually pays the premium amount.

More broadly, public intervention can play an important role in risk reduction activities such as improved sanitation, preventive health care and controlling for communicable diseases. The burden of these shocks falls inequitably on the poor. Public intervention can contribute to the success of micro-insurance schemes by insuring against covariate risks that undermine micro-insurance arrangements against *uncorrelated* shocks. Moreover, public intervention can also make micro-insurance program viable at least in the early stages of their formation when, because of limited risk pooling capacity of such programs and because of low capital base, these programs may have difficulty in breaking even. Reinsurance, which is a mechanism designed to guarantee the solvency of institutions providing insurance, is one of the ways in which public intervention could contribute to the viability of the schemes (Dror and Preker 2002).²⁹ Because micro-insurance is generally offered to a targeted population living in close proximity, the risk pool is not well diversified across geography, occupation, age etc. Hence, there is a greater need to parcel out the risk by transferring (also called ceding) it to a specialised agency (re-insurer) that insures the insurers. Just as the poor have no access to insurance, micro-insurance institutions too typically have no access to reinsurance. So, reinsurance could be one way of public intervention. Public intervention could also bring about greater awareness among the people about protection through insurance.³⁰

²⁹ Reinsurance in the context of micro-insurance is also known by the name of Social Re

³⁰ In this context it is also important to recognise what public intervention should not do as some interventions may actually have a negative impact on the functioning of community financing schemes (Hsiao 2001).

V Conclusion

In the context of the discussion on extending the reach of micro-insurance scheme, which hold promise for reducing health related shocks facing poor households, it is essential to make a distinction between those who can afford health insurance and those who cannot. Lack of demand for insurance need not necessarily be the result of affordability *per se*, and thereby justifying the need of government subsidy, but may be the result of other institutional rigidities such as borrowing or credit constraint. This would mean, that it is probably wise for donor agencies to look for potentials to embed micro-insurance in existing micro-credit schemes rather than building micro-insurance schemes from scratch. Further research should test this hypothesis in an empirical setting by analysing if micro-insurance schemes have faired better in an environment were credit is less binding or where credit facility is inbuilt into such schemes than those in which availability of credit is more restricted.

Appendix I

Proposition: If the credit available to the credit-constrained individual is increased, his demand for insurance too will increase.

Proof:

The individual has the following objective function:

$$\text{Max } EU = U(y - 0.5 D + B) + 1/2 \{U(y - z + D - B) + U(y + z - B)\}$$

$\{D\}$

The first order condition (where D° denotes the optimal coverage) would be:

$$(-0.5)U'(y - 0.5 D^\circ + B) + 0.5 U'(y - z + D^\circ - B) = 0$$

or

$$U'(y - 0.5 D^\circ + B) = U'(y - z + D^\circ - B)$$

The above condition implies, $(y - 0.5 D^\circ + B) = (y - z + D^\circ - B)$, which upon rearranging yields $D^\circ = (2B + z)/1.5$. In the unconstrained case we mentioned that $B^* = z$. Substituting this in above equality confirms that optimal insurance in the unconstrained case is $D^* = 2z$. However, if the individual is credit constrained (i.e., $B^* < z$), it constrains his demand for insurance as well i.e., $D^\circ < 2z$. To see how $D^\circ(B)$ changes with B , differentiate the f.o.c totally with respect to B . It yields:

$$(-0.5)U''(y - 0.5 D^\circ + B) (-0.5 dD^\circ/dB + 1) + 0.5 U''(y - z + D^\circ - B) (dD^\circ/dB - 1) = 0$$

$$dD^\circ/dB = \{U''(y - 0.5 D^\circ + B) + U''(y - z + D^\circ - B)\} / \{0.5 U''(y - 0.5 D^\circ + B) + U''(y - z + D^\circ - B)\}$$

$dD^\circ/dB > 0$, implying demand for insurance would increase as credit constraint is relaxed.

Appendix II

We consider two different income scenarios (i.e., different combination of present and future income), and each scenario has two cases, depending on the assumption about the subsistence constraint.

Income Scenario (a): If $EU = U(y) + 1/2\{U(y) + U(y-z)\}$. In this scenario, while first period income continues to be y , it is the second period income which is different now : it could be y or $(y-z)$ each with probability one-half.

Case (i): $\{y-(z/2)\} < c < y$, the individual will only demand partial insurance because with full insurance his first period income will fall below his subsistence consumption (the expression $\{y-(z/2)\}$ denotes income less insurance premium for full loss coverage).

Case (ii): $c < \{y-(z/2)\}$, the individual will demand full insurance since with full insurance individual gets highest utility ($U(y-z/2) + U(y)$) compared to the case of either no insurance or partial insurance.

Income Scenario (b): If $EU = U(y) + 1/2\{U(y) + U(y+z)\}$. In this scenario too income in the first period remains y , but the second period income now could be y or $(y+z)$, each with probability one-half.

Case (iii): $\{y-(z/2)\} < c < y$, the individual will demand only partial insurance since subsistence constraint becomes binding before the individual reaches full insurance level.

Case (iv): $c < \{y - (z/2)\}$, the individual *may* still demand full insurance. In the context of the result in the paper, the relevant cases are (i) and (iii) as it is in these cases that subsistence constraint becomes binding which can be eased by having access to credit.³¹ Note that in the above cases we have deliberately omitted the possibility of $(y < c)$ since this is applicable to those who cannot meet even their subsistence consumption, i.e., the poorest of the poor.

³¹ If $c < y$, and if there are some (fixed) transaction costs (say T) upfront in buying insurance the individual may be tempted to self-insure by setting aside (or save, s) the excess of income over consumption ($s = y - c$) in the first period (i.e., saving in physical or financial form) rather than buy (partial) insurance. If the transaction costs are greater than the excess of income over consumption in the first period ($T > y - c$), the individual would not be able to buy insurance even if he wanted to.

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