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LITERATURE REVIEW ON THE IMPACT OF MICROINSURANCE

Ombeline De Bock
Darwin Ugarte Ontiveros

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LITERATURE REVIEW ON THE IMPACT OF MICROINSURANCE[1]

OMBELINE DE BOCK[2]
DARWIN UGARTE ONTIVEROS[3]

1. INTRODUCTION

No one is free from exposure to risk. But in developing countries, low income individuals are particularly vulnerable to losses incurred in the wake of adverse events. Uninsured risks usually force poor households to undertake costly strategies to manage their losses. These welfare costs can be substantial and contribute to persistent poverty (Dercon (2004)). Microinsurance represents a financial instrument designed to protect the poor against risks, by using community-based mechanisms that are characteristic of developing countries. By offering a pay-out in critical situations, microinsurance has the potential to avoid costly ways of coping with losses.

This paper provides a selective overview of the current state of research on the impact of microinsurance. Its key purpose is to explore the role played by insurance in developing countries. In reviewing the most recent literature about the impact of microinsurance in developing countries, special attention will be given to the issue of statistical identification of the impact, and to the need of highlighting the channels through which microinsurance affects the outcomes.

The structure of the paper is as it follows: in the first section, recent evidence on the impact of microinsurance is described, focusing mainly on studies in which the impact of microinsurance has been properly identified and taking into account potential self-selection bias. The main areas of impact reviewed are the use of services, the financial protection offered by the insurance, the health status of the insured and the distributional aspects of such insurances. This section concludes that the evidence on the impact of microinsurance is mixed but that there is growing evidence on a range of products, including health, rainfall insurance, natural calamity insurance, etc. and that recent research is including a broad range of outcome variables (such as investment, child labour, etc.).

The second section aims at understanding the reasons why insurances scheme performed poorly in these studies. We discuss the main obstacles to the success of microinsurance products that come out of the empirical literature and focus, in particular, on the poor quality of the services offered at health facilities, on ill-designed contracts, and on the lack of information about the insurance and its modalities. These dimensions have been neglected in many studies and further research may try to incorporate them in impact analysis in order to enable a deeper discussion of the results while relying on more rigorous methodologies, which leads us to the the topic of the last section.

In the last section, therefore, we take a critical look at the identification strategies used to estimate the impact of microinsurance. The section does not aim at discussing the different methods available to identify impact evaluations but rather at approaching the problems encountered when applying different methods in the evaluation of microinsurance programs. The main conclusion from this section is that more rigorous evidence on the impact of insurance is needed. As detailed in this section, many of the existing studies face methodological problems that make it difficult to determine whether the reported effects were caused by the policies under consideration. While recent evaluation studies of the impact of microinsurance provide better rigorous evidence than past studies, still more caution is needed to identify the impact of microinsurance. Finally, we conclude.

2. OUTCOMES

2.1 USE OF THE HEALTH-CARE SERVICES

An outcome measure commonly used in health microinsurance evaluations is related to the insured's utilization of its services[4]. Insurance can increase health-seeking behaviour mainly by reducing the cost of care following a health shock.

The evidence regarding this outcome shows that in most of the cases microinsurance improves insureds' utilization rates. Among the recent positive findings linked to health microinsurance programs, new evidence presented by Binagwaho et al. (2012) shows that the Mutuelles de Santé improved the access to preventive and curative health services of children in Rwanda. Children covered by this health insurance were between 16-29 % more likely to receive treatment at a modern health facility or from trained personnel when being sick. Also, they were 5-8 % more likely to receive a treatment with oral

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2 FNRS Research fellow, University of Namur, CRED
3 University of Namur, CRED

4 Most of the evidence is related with health microinsurance as that is most researched in the empirical literature.

rehydration supplements when suffering from diarrhoea. Results on prevention show that insured households were more likely to purify water before drinking (8-22 %), and to have slept under a mosquito net for protection (3-11 %). Similarly, Fitzpatrick et al. (2011) find that among those children insured at the Nicaraguan Social Security Institute's health insurance program, the number of visits to covered health providers increased overall by 1.3 visits. Positive results are also found by Mahal et al. (2012) in a randomized trial in India. These authors suggest that being assigned to a subsidized out-patient insurance group increased the overall number of visits to the covered provider. In addition, Gustafsson-Wright (2013) find that the Hygeia Community Health Care (HCHC) program in Nigeria increased the use of health care by over 15 % on average. Other evidence on positive effects can be found in Lei and Lin (2009), Wagstaff et al. (2009) and Pradhan and Wagstaff (2005).

Considering different measures for health-seeking behaviour, Levine and Polimeni (2012) find mixed results in their assessment of the SKY microhealth insurance program in Cambodia. While this program increased by 18% the use of public health centres as the first source of care and reduced by 11% the use of private providers and drug sellers, it was not able to encourage insured individuals to seek care straight after a serious health incident nor did it reduce the chances to forgo care in general compared to the control group. Their results in terms of preventive care suggest that the SKY program did not have a detectable effect on the proportion of children whose immunizations are up to date. In addition, there was no significant impact on the percentage of pregnant insured women receiving antenatal care in general, on post-natal check-ups, or on the delivery location. Dercon et al. (2012) find no significant improvement in utilization of health facilities, nor on subjective wellbeing between insured and uninsured households in Kenya.

Contrasting results were recently obtained by Sheth (2013) in her analysis of the community based health insurance program, DAN, in rural Maharashtra, India. In this scheme, reimbursement claims have to be filled by the insured who incurred health expenditures and their validity is investigated at the group level. Sheth (2013)'s findings suggest lower health care utilization in response to health shocks, either when recalling the previous year or the previous month. This may partly be due to the lower incidence of health shocks observed among treated villages but since the management at the community level also implies peer control, this also contributes to the reduction of superfluous utilization of health care services.

To sum up, the empirical evidence shows that, in most cases, an increase in the use of curative health services is observed for insured households. However, this may happen at the cost of alternative health care providers, decreasing their number of visits. However, results about utilization rates for preventive health care are less clear-cut.

2.2 FINANCIAL PROTECTION

Reduction of out-of-pocket expenses

A second expected impact of the insurance schemes is to enhance the financial protection of the insured. The different channels through which this can occur have been accurately documented by Radermacher et al. (2009). On one hand, insurance is expected to limit risk coping strategies that weaken the productive capacities of the households. It should moreover reduce the likelihood of incurring catastrophic payments when confronted with a health shock since those expenses are mostly covered by the scheme. On the other hand, households are expected to make more profitable investments once insured and to better allocate the available resources. In this sense, the self-insurance decisions they previously took to mitigate risks, such as diversification of the crop or engaging in different income-generating activities, are not needed anymore in order to smooth consumption. Finally, insurance should enable the accumulation of assets and encourage more investment in productive goods.

The most direct impact is a reduction of the out-of-pocket expenditures for the subscribers. This is in line with empirical findings from Vietnam where the Health Care Fund for the Poor (HCFP), through a significant price reduction offered to the insured, induced not only a sharp decrease in the amount of out of pocket expenditures, but also a drop in the catastrophic payments disbursed following unexpected health shocks (Pham and Pham (2012)). The same observation is true of the national health insurance programme in Ghana where Nguyen et al. (2011) report a reduction that ranges from 0.5 percentage points to 1 percentage point (which amounts to a reduction of 36% to 67% of the sample means). Evidence from India (Mahal et al. (2012)) also indicates that access to insurance reduces hospitalization expenses, though the effect is small and mainly driven by previously sick patients. Lower health expenditures for insured households are also observed for community-based insurance schemes, as Sheth (2013) have demonstrated in her Indian sample. There, the insurance product was offered to women belonging to self-help groups. The results show that health expenditures in treated villages were substantially lower. Similarly, Levine and Polimeni (2012) find an average decrease of 44% in treatment costs for serious health incidents once insured. This reduction is mostly due to a reduction in the very high medical expenses paid by households. In line with these results,

Dercon et al. (2012) find a reduction in net health expenditures among insured, with some exceptions. Additional evidence of this increased financial protection effect has been observed in Nigeria (Gustafsson-Wright (2013)), where the insurance induced a 40% decrease in health expenditures.

In line with the aforementioned recent studies, most empirical evidence find a decrease in the health expenditures once insured (Jütting (2004), Schneider and Diop (2001), Ranson (2001), Sepehri et al. (2006), Aggarwal (2010), Smith and Sulzbach (2008)). Wagstaff et al. (2009) and Lei and Lin (2009), however, do not find any significant impact on expenditures. At the same time, Smith and Sulzbach (2008), Chankova et al. (2008) and Gumber (2001) observe mixed evidence of a reduction in the cost of treatment. Those disappointing results are mostly due either to high co-payment rates or to limited coverage, what makes insurance less attractive. Evidences also depend on the country analysed but most studies find encouraging results.

Lowering expensive risk-coping strategies

Beyond the direct impact on the out-of-pocket expenditures, insured individuals may also benefit from a lower need to sell assets in order to cope with unexpected health expenditures. Since insurance covers (part of) the expenses incurred following a shock and hence reduces the overall financial burden of the adverse event, dissaving stops being the only option left to the household. Evidence for this specific channel can be found in Aggarwal (2010), Morsink et al. (2011) and is briefly summarized in Radermacher et al. (2009)'s review. An additional study by Levine and Polimeni (2012) confirms this trend for Cambodia. The authors observe a 9.2 percentage point lower likelihood of assets sale after a health shock. Looking at the impacts of a livestock insurance in Kenya, Janzen and Carter (2012) also show that insured households are less likely to sell livestock as an emergency coping strategy.

Similarly, Mobarak and Rosenzweig (2013) find that less risk-mitigating action are taken by Indian farmers once insured against weather shocks. In fact, fewer types of drought-resistant crops are observed among insured in favour of high-yielding rice varieties and the adoption of technologies not sensitive to rainfall is less frequent among insured farmers. In other words, they find evidence for an increase in risk-taking among insured farmers, allowing higher average returns. In line with these results, a study of Liu et al. (2013) in which randomly selected individuals are offered to purchase an insurance for swine with a delayed payment shows that the insurance allows more remunerative but risky investments in the breeding activity. Indeed, farmers who bought the insurance with delayed payment bought more piglets for fattening and were also more likely to invest in medium-risk activities (buying cross-breeds). The results found by Cole et al. (2013) in a recent randomized controlled trial in China enable us to have a finer understanding of this investment effect, identifying an impact on extensive rather than intensive farming decisions. Instead of a global effect on the amount invested in farming activities, the insurance coverage seems to bring about a shift in the composition of the investments: inputs are rather invested in the high-yielding cash crops and the proportion of land allocated to this type of crops is higher among treated households.

In addition, the level of indebtedness has been shown to decrease for the insured households in a few studies (Giné et al. (2008), Levine and Polimeni (2012), Aggarwal (2010)). For instance, Levine and Polimeni (2012) observe a significant decrease (by 14 percentage points) in the number of households who take out a loan after an adverse medical incident. Similarly, Dercon et al. (2012) observe a drop in the informal loans contracted for medical costs and a decrease in savings for the insured individuals. In the context of an insurance against weather hazards for tobacco producers in Colombia, Dietrich and Ibanez (2012) observe a decrease in the use of informal loans once insured. Interestingly, they find indicative evidence that insured farmers have a higher propensity to contract a formal loan to cope with climatic shocks. They moreover note that the value of the formal loans is higher for the insured individuals and, conversely, the value of informal ones is significantly lower for them. Lastly, insured farmers seem to have benefitted from better conditions for credit than uninsured farmers, obtaining higher maturities and lower interest rates in the formal credit sector.

Improvement of the production

The theoretical impact of formal insurance on risk-taking is ambiguous. On the one hand, if farmers face binding credit constraints, purchasing the insurance today against the promise of a payment in the future if an adverse event occurs can lower investments in risky farming activities. On the other hand, in the absence of insurance, the risk of inadequate weather motivates farmers to plant various types of crops, resistant to different weather conditions. Once insured, this should not be a concern anymore since losses due to poor weather are compensated. Hence, farmers are less restricted in the choice of their crops and might even realize economies of scale when buying their inputs and fertilizers. In a multi-stage randomized control trial, Karlan et al. (2012) look at the impact that offering either capital grants, rainfall insurance or both grants to maize farmers in Ghana have on the investment choices in agricultural assets. In the second year, they reiterate the cash grant offer and sell the

crop insurance at different prices, all still subsidized. In the last year, they only sell the insurance at either the actuarially fair price or the competitive market price. The authors observe that relaxing liquidity constraints alone have no significant effect on agricultural investment whereas relaxing the risk constraint by providing crop insurance has a substantial positive impact on investment in the risky asset. Similarly, Cai (2013) estimates that introducing weather insurance for tobacco farmers in China increases by almost 20% the area planted with insured crops and raises the credit demand by 25%. Mobarak and Rosenzweig (2013) observed that farm output of farmers who subscribed to the weather insurance strongly increased with rainfall, and Morsink et al. (2013) show how farm investment increases under indemnity insurance in Ethiopia.

2.3 HEALTH STATUS

Since a health microinsurance program is designed to reduce economic difficulties following health shocks, it can also improve health itself by making financially accessible a valuable care that people would have forgone or delayed, by redirecting care from lower to higher-quality care, or simply by increasing preventive care. Currently, the number of studies assessing the effects of microinsurance on health indicators is scarce. The main reason might be the difficulty in measuring objectively the health status of insured and the long-term visibility of the effects. Exceptions exist. Thus, Pradhan and Wagstaff (2005), using anthropometric indicators, find positive effects on the height and weight of young children and the body mass index of adults in Vietnam. Quimbo et al. (2011), who use anthropometric measures of health (wasting) and a biomarker (C-reactive protein (CRP)), obtained from blood samples drawn from individual patients in Philippines, find a reduction in the likelihood of wasting and the risk of infection. Recent evidence does not suggest positive effects. Dercon et al. (2012), in their study in Kenya, look at the number of days of inactivity due to illness as an indicator for subject wellbeing (health status perception). They find no significant difference between individuals with and without the insurance policy. Binagwaho et al. (2012) find mixed effects, while the Mutuelles de Santé in Rwanda helped to improve the child health of those below the age of two by improving the height-for-age z-scores and reducing the risk of infant mortality, this program was not able to reduce the likelihood of being sick or to improve stunting significantly. Similarly, Levine and Polimeni (2012) did not find a detectable effect on objective measures of children's health in Cambodia like the body mass index, height-for-age, and weight-for-age.

Other evidences regarding the impact on health status and based on proxies to measure health can be found in Lei and Lin (2009), Franco et al. (2008), and Sheth (2013) who finds that insured households in India were 15% less likely to suffer an illness or a health shock.

2.4 DISTRIBUTIONAL ASPECTS

Does microinsurance succeed in providing an equitable distribution of benefits among subscribers? Or are some specific types of individuals disadvantaged with regard to the provision of the services offered by the insurance? This section briefly reviews whether membership in the insurance scheme yields differential effects according to income level, gender, education or the age of the individuals (but it does not look into the question as to whether enrolment in the scheme is egalitarian or not).

Empirical evidence is mixed. On the one hand, Gnawali et al. (2009) observe inequitable distributions of the benefits across income quartiles. Richer households seem to benefit from a 40 percentage points increase in the use of the health services whereas this trend is not significant for less well-off individuals.

On the other hand, Polonsky et al. (2009) have looked at this particular question in rural Armenia where community health insurance schemes have been supported by Oxfam. Their results indicate that women and elderly and less well-off individuals consult health services more frequently, confirming that the most vulnerable population groups take full advantage of the benefits granted by insurance membership. They note that this equity of use may be a consequence of the homogeneity in socio-economic status among rural communities in Armenia. Other studies support this equitable sharing of the benefits and sometimes even point at a pro-poor performance. Jowett et al. (2004) show that use of health care services is higher among the poor in their Vietnamese sample. Similarly, Nguyen et al. (2011) find a sharp reduction in the out-of-pocket payments for the poorest quintile of insured households in rural Ghana.

The evidences reported by Wagstaff et al. (2009) for China are more nuanced. While the 20% poorest households of the sample seem to have experienced a larger increase in outpatient care at the village and township level, this does not hold at the county hospital level, nor for inpatient care in general. The positive outcomes in terms of better financial protection affect less the poorest quintile of the sample. By contrast, Ranson (2001) points at a trend toward lower frequency of hospitalization among higher wealth quintiles individuals in their Indian sample; however, these trends are not significant at the 95% level. A more inequitable distribution of benefits seems to hit older individuals who have a lower frequency of hospitalization.

Looking into the impacts credit-life insurance or health insurance products can have on the use of child

labour, Chakrabarty (2012) finds a differential effect along socio-economic categories. Indeed, while health insurance sharply decreases the reliance on child labour earnings among households suffering moderate poverty, it has to be bundled to microcredit to reduce child labour among the extremely poor households of his Bangladeshi sample. For those households above the poverty line, microfinance plays no significant role in determining child labour. Analysing similar outcomes, Landmann and Frölich (2013) conducted a panel in Pakistan and observe that extending coverage of an accident and health insurance product to all members of the household achieved a significant reduction in child labour.

Differential effects also appear in terms of education. For instance, Cole et al. (2013) find that the increase in investment for insured farmers is higher amongst educated farmers.

To sum up, the evidence about distributional aspects of the benefits of being insured is not clear-cut. Age and wealth seem to matter but the setting and initial level of heterogeneity among the target population seems to be crucial elements in understanding the divergence of results presented in this section.

3. MECHANISMS

3.1 MECHANISMS BEHIND NON-STANDARDIZED OUTCOMES

As a result of insurance provision, one would a priori expect to find positive outcomes in terms of health status and economic welfare. Most evidence indeed present promising results such as have been reported in the first section of this review. However, limitations in the available data and methodological difficulties complicate the identification of a causal impact, as will be explained in detail in the last section. Some studies have been properly designed and achieve a good identification of causal impacts. Yet, the question remains as to what mechanisms are behind the causal relationships.

This section will try to discuss the channels through which insurance operates. When there is no significant impact, we want to understand the reasons why the insurance scheme performed poorly.

There exist many obstacles to the success of microinsurance products. One striking example is the lack of efficiency in the way the insurance product is distributed to the potential customers. Another challenge of utmost importance is the best way to leverage technology to make the provision of insurance more efficient. This subsection focuses on three additional obstacles frequently mentioned in the literature: poor quality of the services offered, ill-designed contracts and lack of information about the insurance and its modalities and of the notion of insurance.

Health insurance packages mostly cover services in a designated health centre, and the (perceived) lack of quality of this centre is often identified as lowering the potential of health insurance products (Criel and Waelkens (2003), De Allegri et al. (2006)). Achieving the expected benefits of the insurance scheme clearly depends on the accessibility of good health care quality. This first condition has been particularly well documented in the work of Nguyen et al. (2011) in Ghana. Confused by the insignificant reduction in out-of-pocket expenditures, the authors have decomposed the exact health expenses incurred by the households in their sample. It comes out that the product's benefits are not consistent with the product's promised characteristics. For instance, insured individuals still pay for items that should be covered by the insurance (such as drugs, consultation fees and lab expenses). Moreover, for items not covered by the insurance (such as informal care, bribes and purchase of drugs outside the facility), insured individuals are charged more than uninsured ones. Conversely, Aggarwal (2010) explains the success of Yeshasvini community-based health insurance partly through the quality of care provided and good accessibility of hospitals. Indeed, participating hospitals have been selected based on a rigorous evaluation of the quality of the services provided. The insurance operates both through private and public sector hospitals in order to create a vast network of facilities and ensure good accessibility. Levine and Polimeni (2012) also believe that the positive results achieved by SKY, a micro-health insurance programme in rural Cambodia, are due to the above average quality of the health facilities it works with. Yet, as they did not have data on the quality of care in the private sector, it is possible that the positive effect observed on the utilization of health facilities only reflects a switch from private to public facilities rather than an overall increase in effective care. The study of Dercon et al. (2012) in Kenya explicitly investigated consumers' satisfaction with the health insurance product. They find that a majority of insured individuals declared to be satisfied with the insurance service offered. Some other studies explicitly acknowledge that controls for the quality of the services are lacking, hence potentially losing an explanatory variable (Binagwaho et al. (2012)). To sum up, quantitative evidence on the accurate quality of the service offered is mostly lacking in the literature, which restricts the interpretation of the results.

A second aspect that seems to matter when considering the effect of the insurance product is the cost-benefit of the product. Many studies come to the conclusion that the impacts are insignificant because the contract has been poorly designed. For instance, Wagstaff et al. (2009) look at the impacts of a health

insurance offered in China in which many services are not covered or only partially covered, deductibles are high, and ceilings are low. In practice, the cost of delivery was reduced but the cost of a typical outpatient visit did not decrease. Lei and Lin (2009), studying the same health insurance programme, emphasize that the absence of significant impact on expenditures and health status may be due to the huge heterogeneity across counties with respect to deductibles, co-payments, premiums, coverage and reimbursement modalities.

Moreover, applying the right pricing is crucial in order to induce changes in behaviour. The absence of significant increase in utilization of the prenatal health care services in the study of Smith and Sulzbach (2008) in Senegal is entirely due to the already low user fees charged. Gnawali et al. (2009) find disappointing results among the poorest individuals of their sample and explain this situation by the fact that the premium is simply unaffordable for them. Further evidence shows that requiring high co-payments, in an attempt to minimize the eventuality of consuming more health care (at a cheaper price) once insured, may have an ambiguous impact on the change of health care utilization among insured individuals. On the one hand, it reduces the moral hazard problem but, on the other hand, it may attenuate the positive impacts of the program when individuals face liquidity constraints. That was the case for outpatient care in Mali and Senegal, where co-payments ranged from 25% to 50%, and the health insurance had no protective effect on out-of-pocket expenditures (Chankova et al. (2008)). In a recent paper, Sheth (2013) contributes to the debate by modelling this theoretical ambiguity. According to him, the decrease in price may cause insured individuals to seek care later. The timing thus matters and may explain why there seems to be no impact on the utilization rate in the short run. This is in line with the findings of Quimbo et al. (2011) who observe lagged effects on health outcomes, only a few weeks after discharge of the hospital. Since discharge is based on a clinical assessment of the patient's health status, the authors are not surprised to find no differential impact between insured patients and others at the time of discharge. However, the insurance allows patients to borrow less to pay for their inpatient hospital bills, which in turn preserves outpatient care, food consumption and parental support. The authors therefore predict a better trajectory to full health recovery for insured households. As regards crop insurance, Karlan et al. (2012) suggest, by contrast, that liquidity is not the main hindrance to investment. Remind that they disentangle the credit constraint from the risk constraints by offering either capital grants, rainfall insurance or both grants to maize farmers in Ghana. Since farmers with insurance are able to find the resources to increase investment in their farms, they conclude that liquidity is not the main restriction.

Moreover, it is crucial to consider whether the right incentives are provided when designing the contract. The existing evidence suggests that cautiously designing an impact evaluation is crucial to be able to rightly interpret the results. Indeed, Dietrich and Ibanez (2012) find that a weather insurance product in Colombia, rather than reducing indebtedness, increases the likelihood to take a formal loan following a shock. But this a priori counterintuitive result turned out to be very sensitive once it became clear that the propensity to take up an informal loan decreased for the insured individuals and that they were able to negotiate lower interest rates and higher maturities on the formal loans. This paper contributes to the understanding of the mechanisms through which insurance operates.

The amount of basis risk inherent to the insurance also has to be carefully considered when designing the contract. Few studies compare the impacts of an insurance offering only partial versus comprehensive cover despite this aspect being a crucial factor for take-up and renewal (De Bock and Gelade (2012)). One way to overcome this trade-off in the case of rainfall index insurance would be to propose a contract with different levels of pay-outs, as suggested by De Bock et al. (2010). One would then obtain a partial compensation of the incurred losses quite frequently whereas full compensation would only be triggered when losses are very big.

The last aspect on which the success of any microinsurance system often hinges concerns the information transmitted among the insured population. For instance, Smith and Sulzbach (2008) observed that some women were badly informed and delivered at non-participating providers. One of the original features of Platteau and Ugarte (2013)'s paper is its focus on understanding information failures as mechanisms that explain the use of the insurance, satisfaction, and renewal decisions. By asking questions to insurers to measure their level of information about the characteristics of the program, Platteau and Ugarte (2013) were able to create variables pointing out different levels of information. Their findings show that the size of the coefficient of the information variables decreases monotonously as the intensity of information declines. Therefore, the less informed the insured, the less likely he is to use the health facilities covered by the insurance. The authors argue that this information failure explains why many subscribers have not actually used their insurance in spite of having reported at least one health event.

4. SUMMARY TABLE

Paper	Type of Insurance	Outcomes analyzed										Identification strategy	Mechanisms
			Financial aspects						Distributional aspects				
		Use of Health facilities	OOP Health expenditures	Sale of asset	Indebtedness	Savings	Investmen/ Production	Health Status	By income	By age	By gender	Child labor / Education	
Aggarwal (2010)	Health	+	-	-	-				Yes				PSM	Design: Incentives, Coverage and Quality
Binagwaho (2012)	Health	+						+/-					PSM; IV	Information
Bellemare (2013)	Weather						o						Diff-in-Diff	Design: a novel double-index contract
Cai (2010)	Livestock						+						IV	Design: Incentives
Cai (2013)	Agricultural				+	-	+						Diff-in-Diff-in-Diff	Design: Incentives
Chakrabarty (2012)	Health, credit-life											Yes	None	Design: microcredit+microinsurance
Chankova (2008)	Health	+	+/-										None	Design: Price
Dercon (2012)	Health	o	-		-	-		o					RCT	Design: Price and marketing strategy
Dietrich (2012)	Weather						+						None	Design: Incentives
Franco (2008)	Health	+							Yes				None	Not clearly discussed
Fitzpatrick (2011)	Health	+	o					o					RCT , IV	Not clearly discussed
Giné and Yang (2009)	Weather						-						RCT	Design: Incentives
Gnawali (2008)	Health	+							Yes				PSM	Design: Price
Gumber (2001)	Health	+	-										None	Not clearly discussed
Jansen and Carter (2012)	Livestock			-			+					Yes	Diff-in-Diff, PSM, IV	Design: Incentives
Jowett (2004)	Health	+							Yes				IV	Design: Price, Incentives
Jutting (2003)	Health	+	+/-						Yes				None	Design: Price
Karlan and Udry (2012)	Weather						+						RCT	Design: Incentives
Lei and Lin (2009)	Health	+	o					o					PSM, Diff-in-Diff, IV	Design: Price
Landman (2012)	Health											Yes	Diff-in-Diff	Design: Assistance, Coverage
Levine et al (2012)	Health	+	-		-			o					IV	Design: Quality, Coverage
Mahal et al (2012)	Health	+	+/-										RCT, Diff-in-Diff	Design: Incentives
Msuya et al (2004)	Health	+	-	-									None	Not clearly discussed
Morsink (2013)	Weather						+						RCT	Design: Incentives
Morsink (2011)	Weather						+						None	Not clearly discussed. Design Incentives
Muller et al (2011)	Weather						+/-						Simulations	Design: Frequency of payouts
Pham and Pham (2012)	Health	+	-					+					IV	Design: Price
Polonsky (2009)	Health	+/-							Yes	Yes	Yes		None	Good implementation
Quimbo (2010)	Health							+/-					Diff-in-Diff	Design: Price
Ranson (2001)	Health	o	-						Yes				None	Design: Price
Sheth (2013)	Health	-	-										RCT, IV	Design: Price
Schneider and Diop (2001)	Health	+	-										None	Not clearly discussed
Sepehri et al (2006)	Health		-						Yes				None	Design: Incentives
Smith and Sulzbach (2008)	Health	+/-	+/-										None	Design: Coverage, Information
Wagstaff and Pradhan (2005)	Health	+	-					+		Yes			PSM, Diff-in-Diff	Not clearly discussed: Design: Price
Wagstaff et al (2009)	Health	+	o										PSM, Diff-in-Diff	Design: Coverage, Price
Wang et al (2009)	Health							+	Yes	Yes	Yes		PSM, Diff-in-Diff	Design aspects. Quality
Yip et al (2009)	Health	+											PSM, Diff-in-Diff	Design aspects. Quality

5. METHODOLOGY

5.1 CONSIDERATIONS RELATED TO THE IDENTIFICATION STRATEGY

This section critically reviews the identification strategies used to estimate the impact of microinsurance by a number of significant studies. The section does not aim at discussing the different methods available to identify impact evaluations but at focusing on the problems encountered when applying different methods in the evaluation of microinsurance programs[5].

Currently, it is clear that rigorous evidence on the impact of a program requires an appropriate evaluation design. These designs, either experimental or quasi-experimental, aim to deal with the well-known self-selection bias in order to guarantee the internal validity of the results. Essentially they determine which counterfactuals are used, how the data is obtained or generated and how it is analysed. Evaluations that do not assess outcomes against explicit and policy-relevant counterfactuals are now widely seen as unsatisfactory.

In the last decade, various papers have been written without performing any tests to control for the presence of unobservable variables susceptible of influencing both the decisions to participate in the program and its outcome, e.g. Gumber (2001), Jütting (2004), Jutting et al. (2004), Ranson (2001), Smith and Sulzbach (2008), etc. Recent evaluation studies of the impact of microinsurance provide more rigorous evidence by following either an experimental or quasi-experimental approach.

A) When an experimental design is used and placement is randomized in such that all individuals (within some well-defined set) have the same chance ex-ante of receiving the program, the following characteristics can be inferred from the practice of randomized trials in microinsurance evaluations:

The quality of randomization is generally not assessed

A simple test of the quality of randomization usually consists in summarizing variables that describe some characteristics of the individuals in treatment and control samples, and testing if they are balanced on the basis of mean difference measures or analysis of variance. Among the papers measuring the impact of microinsurance with an experimental design, the quality of randomization was assessed by Levine and Polimeni (2012), who in their randomization of the price of insurance in Cambodia, test the relevance of the experiment design by presenting average characteristics of the groups compared (those with and without highly subsidized price). They find that among the thirty variables considered, only three of them show a statistically significant difference at the 5% confidence level. Similarly, Cai et al. (2009) tested whether the means of the pre-experiment variables are equal across the villages assigned in their experimental groups. In addition, by running regressions for the probability of being assigned to the three experimental groups on a list of pre-experiment village-level variables, they showed that none of the included variables predict the experimental group assignment.

Selective compliance is not addressed

In particular, the random assignment of the intervention can be compromised by non-compliance to the assigned intervention, i.e. members of the treatment sample may drop out of the microinsurance program, and members of the control group may participate in it. If this non-compliance is selective, i.e. correlated with the outcome variable, then the difference of the average outcomes will be a biased estimate of the average effect of the intervention. A discussion on compliance is in general omitted in microinsurance evaluations. The extent of this problem depends, of course, on the specific program and the outcome analysed. For example, when measuring the impact of a health microinsurance program on health status, it may happen that people in the treatment sample who know they do not need the program (healthy ones) will presumably decrease participation, or vice versa, people in the control sample who know they need the program (unhealthy ones) will presumably seek to participate. Thus, internal validity can be questionable due to the selective compliance with the theoretical randomized assignment.

Spillovers are not considered

In order to ensure that the distributions of recipients and non-recipients are the same (on average) in terms of relevant factors that may affect outcome, randomization assumes that the units from which the sample is taken are independently and identically distributed, and therefore the treatment of person i only affects the outcome of I, leaving all other persons in the sample unaffected. However, in practice, spillover effects can be an important source of internal validity concerns. The geographic proximity of the individuals between treatment and control groups plays a contrasting role here, since on the one hand short distances increase comparability between treatment and control units but, on the other hand, it facilitates spillover effects. Ignoring the spillovers from the treatment to the control individuals can seriously underestimate the gains from treatment. For example, when estimating the impact of a health microinsurance program on health status, studies that fail to account for potential externalities caused by reduced disease

5 Some reviews concerning the assumptions each method makes for identifying a program's impact, how these methods compare with each other and what is known about their performance, can be found in Ravallion (2007) and in Imbens and Wooldridge (2008).

transmission, can understate the benefits of treatment on the treated. Indeed, these positive externalities distort the outcome differences in health status between the treatment and comparison groups. This concern was originally raised by Miguel and Kremer (2004) in their randomized analysis of deworming treatments in Kenya. Moreover, when the outcome of interest is the use of health facilities, similar downward biased estimations can result from the overlooking of the spillover effects of information flowing from households that were insured to the non-insured households.

B) When matching methods are used and the counterfactual problem is assessed by finding a comparison group (non-participants) with pre-intervention characteristics similar to the participants, the following concerns arise from its application in microinsurance evaluations:

The impact analysis is not always restricted to the common support

In addition to the assumption that the treatment is exogenous conditional on observables (referred to as unconfoundedness or conditional independence assumption), further requirement in matching estimations is the common support or overlap condition. This assumption states that individuals with the same characteristics have a positive probability of being both participants and nonparticipants. It aims at ensuring the validity of the comparison group for identifying the impact, i.e. only the subset of the comparison group that is comparable to the treatment group should be used in the analysis. Several ways of restricting the common support are suggested in the literature, and the most straightforward way to identify the problem is through a visual analysis of the density distribution of the propensity score in both treatment and control groups. In practice, when using matching methods to identify the impact of microinsurance, papers that considered the common support issue (trying to avoid comparing the incomparable) are few: Aggarwal (2010), Gnawali et al. (2009), and Lei and Lin (2009).

The matching quality is rarely assessed

In matching methods there are two measures (metrics) to dene similarity between treatment and control groups: the conditional probability of participating (propensity score) and the Mahalanobis distance. Since the conditioning is not based on all covariates but on one of these measures (usually the propensity score), it is necessary to check if the matching procedure is able to balance the distribution of the relevant variables in both the control and treatment groups. This is done by comparing the situation before and after matching and checking if there remain any differences after conditioning on the metric. If there are differences, the matching procedure is not fulfilling its aim and a better specification may be needed (following Dehejia and Wahba (2002)), or some outliers may be distorting the metric used to dene counterfactuals (following Ugarte (2013)). Gnawali et al. (2009), for example, when assessing matching quality, present the standardized bias and find that the distribution of most covariates was balanced and that the bias was reduced by more than 73% in the matched sample, which indicates a reasonable comparability between insured and uninsured groups. The standardized bias is also used by Aggarwal (2010).

The election of the matching algorithm is not justified

To compare the outcome of a treated individual with outcomes of comparison group members, a variety of matching algorithms exist in the literature. These algorithms dene the way the neighbourhood for each treated individual is defined in the control group and the weights assigned to these neighbours. A clear characteristic of the studies using matching methods to identify the impact of microinsurance is the undeliberated election of the matching algorithm used to dene counterfactuals: Aggarwal (2010) and Gnawali et al. (2009) use the Kernel matching, Binagwaho et al. (2012) apply the tri-cube Kernel matching, Janzen and Carter (2012) employ the nearest neighbour and radius matching, whereas Lei and Lin (2009) use the nearest four neighbours and kernel criteria. Before employing these techniques, it is important to be aware about their properties and the different trade-offs each algorithm involve, which is not discussed in the microinsurance evaluations. Recent analysis provided by Busso et al. (2009, 2011) suggests that the following matching estimators have good finite sample performance, their asymptotic properties are well established, and exact formulas exist for their inference: propensity score pair matching, the propensity score local linear ridge matching, the bias-corrected covariate matching, and reweighting based on the propensity score.

Fuzzy inference

Another characteristic of the papers identifying the impact of microinsurance through matching methods is the use of bootstrap methods to calculate the standard errors. Aggarwal (2010), Gnawali et al. (2009), Binagwaho et al. (2012), and Lei and Lin (2009), for example, provide inference trusting in subsampling methods. This practice needs to be reviewed since Abadie and Imbens (2011) showed that the standard bootstrap fails to provide asymptotically valid standard errors, and that the average bootstrap variance can overestimate as well as underestimate the asymptotic variance of matching estimators. A proper inference can be obtained by using matching estimators with analytical standard errors like the bias-corrected covariate matching estimator, see Busso et al. (2009, 2011).

C) When instrumental variables are used to identify the impact of microinsurance so as to deal directly with selection on the unobservable, two aspects are worth mentioning:

The validity of the exclusion restriction must be discussed

The instrumental variables (IV) approach isolates the part of the treatment variable that is independent of other unobserved characteristics affecting the outcome. This is done by predicting participation through a variable (or instrument) that is correlated with participation but not correlated with the outcome variable, conditional on participation. This independence with respect to the unobserved characteristics affecting the outcome is called the exclusion restriction. Invalid instruments failing this restriction yield a biased and inconsistent instrumental variable estimator that can be even more biased than the corresponding ordinary least squares estimator. As this is an untestable assumption and it can be easily questioned by proposing some alternative theoretical model for outcomes, the exogeneity of the instruments should be always analysed. In practice, the discussion about the validity of the instrument is less problematic in randomized evaluations since a natural instrument can arise from social experiments: the randomized assignment can be a plausible exclusion restriction since the random assignment to the program will only affect outcomes via actual program participation. This approach is followed, for example, by Fitzpatrick et al. (2011), and Cai et al. (2009). In absence of social experiments the common practice is to trust in some theoretical arguments about the determinants of program placement and outcomes, and then a rigorous discussion is needed.

The relevance of the instruments is not always convincing

Another concern when using IVs to identify the impact is related to the level of correlation of the instrument with the participation variable. When the instrument does not properly explain participation, the so called weak instrument problem arises and biases the results and inference.

This risk, however, can be easily avoided by implementing instruments that pass the Stock and Yogo (2005) tests for weak instruments, as is done by Binagwaho et al. (2012), Cai et al. (2009), and Lei and Lin (2009). However, when trying to avoid weakness by using many instruments to identify the impact of microinsurance an additional concern arises since the two stage least squares (2SLS) method of estimation is well known to have large biases when many instruments are used. Pham and Pham (2012), for example, instrument microinsurance participation by using eligibility at the individual level, the programme coverage at the commune level, and interactions between coverage and individual and household characteristics. Two remarks must be regarded from this practice. First, using many valid instrumental variables has the potential to improve efficiency but makes the usual inference procedures inaccurate, hence some corrections are needed. And, second, the individual and household characteristics interacted with the other instruments are highly unlikely to be exogenous, and again more advanced techniques may be needed, see Kolesár et al. (2012).

D) When differences in differences are used and it is possible to track outcomes for both participants and non-participants over a time period deemed sufficient to capture any impact of the programme, two small problems can arise from its implementation. First, the identification of the impact using this approach relies on the assumption that treated and controls experience common trends (same macro shocks). The testing of this assumption requires long information over time which is not available in most of the cases. Second, this estimator can be combined with matching methods to better match control and treatment units on pre-program characteristics. In this way, it is possible to control for time invariant unobserved heterogeneity and for potential time-varying selection bias attributable to differences in initial observable characteristics, as is properly done by Lei and Lin (2009), Pradhan and Wagstaff (2005), Wagstaff et al. (2009) and Wang et al. (2009).

5.2 OTHER CONSIDERATIONS RELATED TO THE ESTIMATION OF THE IMPACT

The measurement of the outcome

In addition to the methodological concerns mentioned above, another problem with microinsurance's evaluations has to do with the way the outcomes are measured. While the lack of standard indicators to dene the benefits of microinsurance is well recognized, some set of outcomes are generally implemented to represent the different category of benefits[6]. However, it is worth stressing that when analysing the impact on a possible benefit (e.g. financial protection) and choosing an outcome to represent it, it is essential that this outcome is properly defined since it should drive the conclusions of the impact estimation. For example, when measuring the impact of a health microinsurance program on health status using as recall period the last week, or last months, as in Sheth (2013) and Levine and Polimeni (2012), it is highly likely that no significant impact will be found. But these results may be explained by the

6 For example, to measure the effects of health microinsurance on healthcare utilization, the following indicators are commonly used: the number of visits to a health facility, the substitution between public facilities and private health centres and traditional medicine, preventative care utilization, timely utilization of curative care, or self-medication.

use of the outcome variable rather than the microinsurance program. Moreover, when one estimates the impact on out-of-pocket health expenditures, sometimes this variable is understood in a broad sense (a very inclusive concept), as in Chankova et al. (2008), Wagstaff et al. (2009), Nguyen et al. (2011) or a very restrictive one, for instance to hospitalization costs only, as in Mahal et al. (2012), that makes identification of the impact of the program difficult. The number of weeks for which OOP are being calculated varies a lot from one study to the other. This should be kept in mind while comparing the impacts across studies.

Risk of omitted variable bias in the specifications

An additional feature of microinsurance evaluations is the high heterogeneity in the specifications used to explain either the participation into the program or the different outcomes being evaluated. Noticeable is the absence of a theoretical framework for analysing participation into a microinsurance program, or its different benefits, as well as for guiding future evaluations in a consensual and justified framework that can make comparisons feasible and help to avoid over or under specified models. For example, many studies trying to measure the impact of health microinsurance, like Lei and Lin (2009), Aggarwal (2010), Gnawali et al. (2009), are likely to suffer from the omitted variable bias since they do not include proxies measuring current or past health status of the individuals in their specifications.

Risk of generated sample selection bias

In addition to the well-known sample selection bias created by the unobserved characteristics that can explain participation in a microinsurance program and the outcome analysed, it is possible to create additional bias by restricting the sample based on criteria that may be correlated with the outcome. In Pham and Pham (2012), for example, by excluding from the sample those individuals who did not use health care services to measure the impact on health expenditures, the authors may get biased results since some unobserved characteristics may exist that explain the zero expenses.

6. CONCLUSION

Although the effects of microinsurance are heterogeneous across the studies reviewed, which is in line with previous works on the topic, this review also reveals that micro-insurance seems to achieve markedly positive results under specific provisions. Our state of knowledge is still very incomplete and more systematic studies are still needed to precise the conditions under which the positive impacts occur. Tentatively, the three following conditions seem to prevail. First, the product design has to be adapted to the local needs of potential clients and particular attention should be given to the implementation on the field and the distribution channels used. Second, the reviewed evidence for insurance products highlights the importance of offering high-quality services, especially in the health care providers, in order to achieve the expected impacts. Finally, precise and practical information should be given to the beneficiaries to enable higher utilization rates.

The present review advances our knowledge by discussing thoroughly the reasons behind this sharp heterogeneity across the empirical literature. A first concern we highlight lies in the methodological issues that may drive artificial results. When the results are based on a sufficiently reliable methodological approach, why is there so much heterogeneity across impact evaluations? Although randomized control trials succeed in solving the main identification problems, one may regret that they bring very few insights into the mechanisms at play and the precise reasons behind outcomes observed or non-observed. Indeed, only mean outcomes for the counterfactual are known which makes it impossible to infer the joint distribution of outcomes as would be required to say something about, for instance, the proportion of gainers versus losers amongst those receiving a programme.

Conversely, studies that did not find the expected, standardized outcomes try to provide an explanation as to why the insurance fails to meet its objectives and are often more informative in terms of mechanisms behind the results. Further research may try to incorporate explanatory variables enabling a deeper discussion of the results while relying on the most rigorous methodologies presented above.

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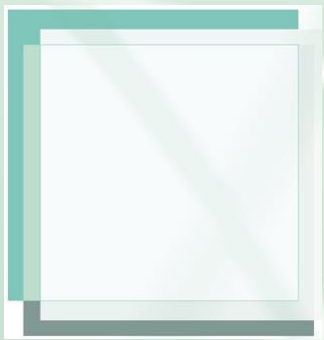

microinsurance@ilo.org
www.ilo.org/microinsurance

Housed at the International Labour Organization's Social Finance Programme, the Microinsurance Innovation Facility seeks to increase the availability of quality insurance for the developing world's low income families to help them guard against risk and overcome poverty. The Facility was launched in 2008 with generous support from the Bill & Melinda Gates Foundation to learn and promote how to extend better insurance to the working poor. Additional funding has gratefully been received from several donors, including the Z Zurich Foundation and AusAID.