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How to insure the Poor? Evaluating the Welfare Effects of Subsidized Community-based Health Insurance in Rural Burkina Faso

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Micro health insurance; demand for micro insurance; micro insurance pricing; targeting; micro insurance and health

Abstract

We evaluate the impact of a 50 per cent premium subsidy on micro health insurance offered to poor households in Nouna district of Burkina Faso.

The fact that the subsidy was based on community wealth rankings allows us to use a sharp regression discontinuity design to identify causal effects of the subsidy on insurance take-up, household expenditure patterns, and health outcomes.

We find, first, that the subsidy resulted in a doubling of insurance enrolment by poor households implying that their price elasticity of demand for health insurance is large and equal to about one. Second, we find that the subsidy reduces the probability of reporting days lost due to illness by about 50 per cent in the target population.

Introduction

Motivation

Illness is one of the most frequently self-reported shocks in low-income countries (World Bank, 2013). Apart from an immediate deprivation in well-being there is also a functional dimension of illness. Health shocks cause indirect costs by preventing individuals from engaging in income-earning activities and trigger high out-of-pocket (OOP) expenditures for medical care at the same time. Therefore, health shocks constitute a severe, yet, unpredictable economic risk (Smith & Witter, 2004) threatening households' short and long-term consumption levels (Gertler & Gruber, 2002; Wagstaff, 2007). Given unhealthy working and living conditions, poor people are especially exposed to the risk of ill health (Grant, 2005).

Due to restricted access to private insurance (Balkenhol & Churchill, 2002), the poor traditionally rely on informal insurance mechanisms. These are not only insufficient to fully insure consumption (De Weerdt & Dercon, 2006), but also come at high future economic costs that can increase their vulnerability to poverty (World Bank, 2013). Relative to informal arrangements, formal insurance schemes are expected to offer better financial protection, mainly by providing more efficient risk pooling and by circumventing enforcement problems.

Nevertheless, similar to problems of banking the poor, providing voluntary formal health insurance in developing countries is complicated by high transaction costs and asymmetric information between the insurer and the insured, as well as by liquidity constraints and a lack of trust in formal institutions among poor households. These as well as other problems tend to drive actuarially fair insurance premiums beyond the poor's ability or willingness to pay, even when expected insurance benefits exceed its cost (Dercon 2005; Matul et al., 2013).

In such situations, there clearly is scope for both equity and efficiency-enhancing market interventions. In this paper, we analyze one important such intervention, subsidization of the insurance premium for very poor households. Primarily by countering problems of liquidity constraints and lack of trust, but also by mitigating problems of transaction costs and asymmetric information, this measure has the potential to expand the outreach of micro-insurance. Moreover, similar to microcredit, even if such subsidies are financially unsustainable in the short run, they have the potential to promote financial inclusion of the poor in the long run in a sustainable way when phased out carefully.

Country background

Burkina Faso has been ranked fifth to last globally regarding its Human Development Indicators and featured a poverty rate of 44.6 per cent in 2009 (1.25$ poverty line in 2005 prices). In particular, life expectancy at birth is merely 55.9 years (UNDP, 2013) and infant mortality is high with 91 deaths of 1000 births (Ministere de la santé Burkina Faso, 2011). One major reason for the dismal health indicators is insufficient access to healthcare, especially for poor households, which is mainly due to a lack of health infrastructure and financial barriers to accessing medical care. These are especially severe in rural areas, due to an urban bias regarding public spending on health. Burkina Faso has no statutory health insurance in place and people usually pay themselves at the point of service (Ministere de la santé Burkina Faso, 2011).

Community-based health insurance

Community-based health insurance (CBHI) schemes are a form of not-for-profit micro-health-insurance, which are particularly adapted to the needs of rural households in low-income countries. By adapting benefits, procedures and pricing, CBHIs have the potential to provide risk pooling for individuals who are otherwise effectively excluded from private or statutory health insurance (Preker et al., 2004). Furthermore, due to their use of existing local structures and their participative nature, CBHIs present a promising model to effectively dismantle the poor's skepticism towards formal institutions (Jütting, 2004).

Research Objectives

Research question

In this study we are interested in the following two questions: first, to what extent does subsidization of insurance premia increase outreach of micro-health insurance among the poor? Second, does subsidization deliver tangible welfare effects among the target group?

Policy relevance

Expanding access to formal health insurance, be it private or public, is a high priority among governments of several developing countries (World Bank, 2013). We provide valuable evidence on one important policy measure in this connection, targeted subsidization of basic private health insurance. In particular, our work informs policy makers about the returns to such a policy in terms of expansion of outreach and health improvements in the targeted population.

Contribution to academic literature

This work contributes to two strands of literature. The first one is a literature on the dissemination of and demand for micro-health-

insurance. Apart from a wide range of observational studies that provide rather descriptive evidence, to the best of our knowledge, there are only two studies related to ours which rigorously evaluate interventions aimed at expanding the uptake of voluntary health insurance. Thornton et al. (2010) find that Nicaraguan workers from the informal sector are 30 per cent more likely to enroll in a CBHI scheme when offered six months of free coverage initially. Wagstaff et al. (2014) find that a subsidy on the premium together with an information campaign significantly increased insurance take-up among morbid households. Our innovations in this connection are that, first, our study is the first one located in sub-Saharan Africa. Second, the households targeted by our intervention are much poorer in absolute terms than those in the other two.

Second, our work contributes to a literature on welfare effects of health insurance in low-income countries in two ways. First, previous work on the effect of health insurance on household welfare, such as Aggarwal (2010) for India, has focused exclusively on direct economic costs in the form of out-of-pocket expenditures for medical treatment. Our innovation in this connection is that we consider an important measure of both immediate well-being and indirect costs of illness, days lost for work or schooling. Second, by applying a regression-discontinuity design to elicit causal effects of health insurance on individual welfare, our work requires weaker identifying assumptions than previous studies, which do not employ randomized or quasi-randomized designs and merely control for observables (see, for instance, Chankova, Sulzbach & Diop, 2008; Jütting, 2004; Franco et al., 2008; Saksena et al., 2010). Consequently, they are likely to suffer from selection bias as insurance enrolment is voluntary in all of these studies.

Methods

Empirical setup

The Nouna Health District (NHD) in the North of Burkina Faso is the local context of this work, an area populated by approximately 70,000 individuals living in rural (65%) or semi-urban (35%) areas. The CBHI scheme has been offered in 41 villages and Nouna town since 2006 and exhibits the typical characteristics of a CBHI. Members of the community strongly participate in decision-making and scheme management. Enrolment is voluntary and takes place at the household level. Annual flat premiums are relatively low (from about US$ 1 to US$ 3 per individual) and do not recover the costs of the insurance, which would not be viable without external donor support. The benefit package covers the most basic important treatments in the primary health care facilities. There is no limit regarding the frequency of consultations covered.

Since only 1.1 per cent of the poorest twenty per cent of households were enrolled by the end of 2006, a 50 per cent discount was offered to this group in 2007. Poor households in each village were identified through a Community Wealth Ranking (CWR), where three democratically elected informants ranked all community households independently in a first step and reached a decision on the eventual group of targeted households in a second step (Souares et al., 2010).

Data

The empirical analysis relies on a matching of three independent data sources. First, for health outcomes and expenditures, we use three waves (2007 to 2009) of a household survey comprising 990 randomly drawn households (De Allegri et al., 2008). Second,

for constructing the forcing variable in our regression discontinuity design, we use the village-wise community wealth rankings conducted in 2007. Third, we use administrative data from the insurance provider for each household's enrolment status.

Methodology

For estimation of causal effects on enrolment and welfare, we exploit the fact that all households in each village were ranked continuously in terms of their wealth, but only households eventually ranking in the lowest quintile were offered the subsidy. By comparing households just under this threshold with households just above we obtain treatment effects which are causal for households near the threshold under the assumption that insurance demand and health outcomes absent the intervention are continuous in the household rank around the threshold. This methodology has been widely used in empirical economics over the last ten years and is called sharp Regression Discontinuity Design (RDD).

The key-identifying assumption for a RDD to be valid is that individuals cannot manipulate the CWR and thereby are not able to precisely sort themselves around the poverty threshold in order to just become eligible for the premium subsidy (Lee & Lemieux, 2009). We are confident that this assumption holds since the ordinal wealth score makes it especially difficult to approximate the corresponding 20 per cent threshold in the first place. Besides of that, in order to manipulate their CWR scores, households would have needed to strategically manipulate an array of wealth determinants which makes a precise sorting very unlikely.

As suggested by Lee & Lemieux (2009), our estimating equations are based on a so-called local linear regression model of the following form,

$$Y_i = c + \beta Disc_i + \eta_1 WealthR_i + \eta_2 WealthR_i * Disc_i + \varepsilon_i,$$

where i refers to one individual and Yi is one of the three outcome variables of interest, namely being enrolled in the CBHI (data source: insurer's administrative data), any health-related OOP expenditures during the last month, or any day lost due to illness in the last month (data source: household survey).

$Disc_i$ is an indicator variable for subsidy eligibility and $WealthR_i$ gives the average wealth ranking score for each individual (data source: community wealth ranking). The specification above allows for different slopes at both sides of the threshold and can be estimated by ordinary least squares. In our estimations we include households whose wealth ranking is in a pre-specified interval around the eligibility threshold (e.g. poorest two quintiles or second and third-poorest deciles).

Results

Descriptive statistics

Descriptive statistics for individuals from the two poorest household wealth quintiles are presented in table 1. Information is provided at individual level and the recall period for illness-related indicators is one month. About 7 per cent of the sample is enrolled in the CBHI and almost 11 per cent suffered from at least one episode of illness during the past month.

Table 1: Descriptive Statistics (For Individuals in Household Survey, 2008-2009)

Variable	Mean	Std. Dev.
Enrolment incidence	0.070	0.255
Illness incidence$^{\Delta}$	0.107	0.309
Any day lost$^{\Delta}$	0.055	0.228
OOP expenditure incidence$^{\Delta}$	0.018	0.131
Age (in years)	24.2	19.2
Household size	11.4	6.2

The sample is trimmed towards the two quintiles around the wealth threshold and contains 6,765 observations. Enrolment information is obtained from insurer's administrative data.

$^{\Delta}$ 1 month recall period.

The variable OOP expenditures is constructed as the sum of transport costs, expenditures for drugs, material, and consultations, subsistence costs, and hospitalization costs; 1.8 per cent of individuals had any OOP expenditures associated with seeking care at an official health care facility.

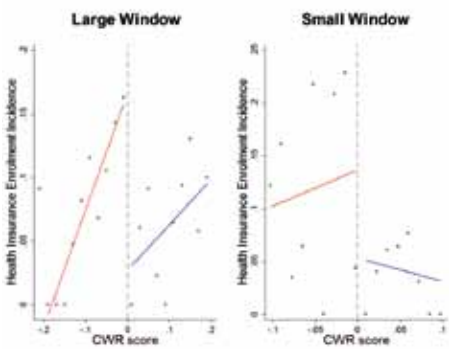
The variable days lost is constructed as the total sum of days a person was prevented to work or go to school due to illness. About 5.5 % of the sample could not go to school or work due to illness for at least one day.

With an average age of about 24 years the Nouna district has a young population while mean household size is 11.4. The latter is based on local definition that household includes all individuals sharing resources to meet basic needs (Sié et al., 2010).

Local linear regression

The non-parametric plots depicted in figure 1 show the relationship between subsidy eligibility and enrolment into the CBHI for a large and a small window around the wealth threshold. There is a clearly visible downward jump in enrolment at the threshold which ranges between values of 0.09 and 0.12. Notice that "CWR Score" denotes the wealth ranking quantile of a household (from poorest to richest) centered around the eligibility threshold.

Figure 1: Local linear regression – Subsidy eligibility and CBHI enrolment incidence



The impression from the figure is confirmed by the estimation results, which are set out in in the upper panel of table 2, where a positive and statistically significant effect of similar magnitude is found. Given the estimate in the second column, being eligible for the subsidy increases the probability of being insured by 10 percentage points which amounts to a price elasticity of demand of about minus one.

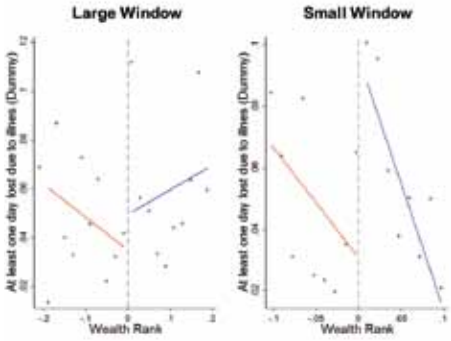
Table 2: Results from Local Linear Regression (Nouna HSS, 2008-2009

	Window Size	
	Two Quintiles	Two Deciles
Enrolment		
β	0.096*** (0.015)	0.100*** (0.021)
At least one day lost due to illness		
β	-0.029*** (0.011)	-0.047*** (0.015)
Any health-releated OOP expenditures		
β	-0.003 (0.006)	-0.008 (0.009)
N	6,765	4,006

* p<0.10, ** p<0.05, *** p<0.01, Standard Errors in Parentheses

We go on to estimate the welfare effects of the intervention. As we focus on the outcomes of all households (not just those that enrolled) around the threshold, we obtain so-called intent-to-treat effects, that is the effect of being offered the subsidy on outcomes averaged over the entire population close to the threshold, including those who choose not to enroll. As confirmed by the non-parametric plot in figure 2, table 2 shows negative and statistically significant effects of subsidy eligibility on the probability of having reported at least one day lost due to illness. On average, this probability is reduced by 2.9 percentage points for eligible households close to the threshold, which amounts to a reduction by about 50 per cent given a sample mean of about 5.5 percentage points.

Figure 2: Local linear regression – Subsidy eligibility and at least one day lost due to illness



Regarding the incidence of health-related out-of-pocket (OOP) expenditures, in the third panel of table 2, we find negative, albeit statistically insignificant, program effects.

Robustness checks

We conduct a so-called placebo test by estimating the relationship between subsidy eligibility and enrolment prior to the introduction of the subsidy in 2007. The non-parametric plots as well as regression estimates of the placebo test (available on demand) do not show a jump in enrolment around the threshold with data from the year 2005. We also test for continuity of other covariates that may explain insurance enrolment and did not find any significant differences at the cut-off. Therefore, we conclude that the strong effect of subsidy eligibility on enrolment appears to be robust.

We finally check whether our results are robust to alternative specifications of the sample or the functional form. Concerning the former we first estimate the same regression model as used above at the household level. Second, we include the baseline survey round in 2007 and estimate a Panel RDD using individual Fixed Effects. No significantly different results in comparison to the main specification were found for any of these two alternatives. Finally, allowing for a non-linear relationship between the standardized wealth ranking score and the outcome variable, we estimated a Local Polynomial Regression function for the post-intervention rounds 2008-2009. Similar effects are found here as well.

Discussion

Discussion of the results

Results suggest that being eligible to receive a 50 per cent premium discount increases the probability of enrolment by about 10 percentage points. This implies a price elasticity of demand for health insurance of about minus one. This finding differs markedly from studies on the demand for health insurance in high-income countries that tend to report inelastic demand for health insurance. Thus, according to our results, the price elasticity of demand for health insurance appears to differ markedly across different contexts. Re-

garding policy one implication of our finding is that premium subsidies could greatly increase enrolment rates of CBHI schemes in low-income countries. This is important since CBHI schemes often struggle to expand their membership base.

Regarding the indirect costs of illness in the form of lost time, our results suggest a large and significant reduction in the probability that an individual lost at least one day due to illness. More importantly, this finding is of great economic significance since we find that subsidy eligibility reduces the probability of at least one lost day due to illness by about 50 per cent. In contrast, Aggarwal (2010) studied the effect of a CBHI on time lost due to illness in India and did not find significant effects.

Our OOP expenditures results suggest that subsidy eligibility reduces the incidence of OOP expenditures from 1.7 to 0.9 per cent over a period of one month. Nevertheless, even if a similar negative relationship between insurance enrolment and OOP expenditures is found in most of the related studies (see, for instance, Saksena et al. 2010), our point estimates are not statistically significant. It could be argued, however, that our design does not allow for identifying economically significant effects. In particular, since the average incidence of OOP expenditures is 1.8 per cent but the estimated standard error is about 0.9 per cent (table 2) only an effect of 1.9 per cent would be statistically significant at the 5 per cent significance level. Yet, such an effect would be larger than the sample average.

Limitations

Our empirical design allows for the identification of local effects only, that is effects which are valid for households on the threshold between the poorest and second-poorest quintile. Consequently, the results have to be interpreted with respect to those households. This subpopulation can be considered very deprived by international standards. While this is certainly a limitation of our analysis, it is also a strength as we are able to speak for a particularly poor subgroup rather than the entire rural population.

The relatively large effects found for the incidence of having lost at least one day due to illness require some more attention. In this connection complementary analyses will focus on possible adverse selection into the insurance scheme, similar to Wagstaff et al. (2014). This can be done by looking at the subgroup of eligible households and checking whether enrolment correlates with previous morbidity.

Further research

It is of interest to exploit the RDD further to learn more about intent-to-treat effects of the premium subsidy on child outcomes. One could focus on households with children born shortly after the subsidy implementation and compare those households close to the wealth threshold with respect to child mortality incidence. Given the relatively high child mortality rates in this region, such an analysis is especially relevant. Second, one could follow the children born shortly after subsidy implementation over time and check whether they show significantly different schooling outcomes in later years. Such a long-term analysis can shed light on whether micro health-insurance can contribute to increasing long-term investments in human capital.

Furthermore, and similar to Cole et al. (2014), a long-term analysis could investigate the dynamics of insurance demand patterns across time and thereby contribute to

the literature on microinsurance diffusion. Looking at patient's consultation and medication records over time one could estimate the relationship between the individual's recent medical treatment experience and the probability for extending health-insurance coverage into the next year. Furthermore, in order to check for spillover effects among peer households one could aggregate such figures of individual recent experience at village level and estimate its effect on future enrolment incidence.

Finally, considering the premium subsidy as a tool to encourage insurance enrolment, a performance-based assessment of this measure seems important from a policymaker's perspective. First, one could conduct a cost-benefit analysis by looking at the priced hours of days that are saved (as a proxy for opportunity costs) in relation to the additional total expenses that arise due to the subsidy. Second, from a cost-benefit perspective, the premium subsidy strategy can also be compared to the option of simply increasing overall insurance coverage. Such an assessment is especially suitable in our context, since the CBHI was randomly phased-in between 2004 and 2006. Third, the performance of targeted premium subsidy programs substantially depends on the underlying targeting mechanism. Further research, therefore, should focus on the performance of Community Wealth Rankings in order to correctly identify the target group. As first step, the question should be addressed to what extent and under which circumstances CWRs provide different outcomes than conventional targeting methods, such as proxy means tests. As the CWR's main advantage lies in its easy and cost-effective way of implementation, it has the potential of being duplicated for alternative contexts where the implementation of targeted premium subsidies is considered.

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