Boosting health insurance coverage in developing countries: The effect of conditional cash transfer programmes in rural Mexico (Revised version: 26/11/2012)

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Abstract

This is the first paper to investigate health insurance choice controlling for participation in a conditional cash transfer programme (CCT). We hypothesise that increased health awareness from the mandatory health education classes for CCT programme participants may change preference parameters related to health insurance uptake. The analysis uses Mexican data from the 2007 round of data collected for evaluation of the *Oportunidades* conditional cash transfer programme. The Mexican case provides an excellent example as the government implemented both a CCT programme and rolled out an opt-in universal health insurance system. A selection model controlling for participation in the conditional cash transfer programme specified by a logit equation for public insurance choice is estimated. Results indicate that participation in the conditional cash transfer programme increases the likelihood of choosing public health insurance. Complementarities across policies for the production of health are to be considered for the design and implementation of efficient universal health insurance programmes.

1. Introduction

Improving general health has become a priority for governments of many developing economies. Access to health insurance, particularly for those on low-incomes, has been identified as a crucial component of public health policies. Insurance improves health status by eliminating barriers to accessing adequate health care, and is key for protecting people from unexpected expenditure and impoverishment (Bärnighausen et al., 2007; Gumber and Kulkarni, 2000). In developing countries, enrolling the rural population remains one of the main challenges for achieving universal coverage (Nguyen and Knowles, 2010). Despite this challenge, many countries such as Mexico, China, the Philippines and Vietnam, among others, have developed voluntary health insurance schemes for informal sector workers, or at least for the poorest among them (Wagstaff et al., 2009). To make these health insurance schemes successful, demand-side incentives such as raising product awareness may also be needed to increase uptake.

In developing economies, the concept of health insurance is frequently not well understood, especially among the poor who are often illiterate or have very low education levels. This acts as a barrier to insurance uptake even in scenarios where insurance is free but individuals need to enrol in the programme. Evidence reveals a strong socio-economic gradient in the demand for health care (Nguyen and Knowles, 2010), indicating that demand-side factors, as well as supply-side factors, are important determinants of health insurance choice at the household level. This paper examines how poverty alleviation programmes such as conditional cash transfers might efficiently promote insurance uptake, when delivered alongside universal opt-in health insurance.

Conditional cash transfer (CCT) programmes give money to individuals in exchange for complying with specific behavioural conditions such as up to date vaccinations for their children, health education classes, or attendance at preventive health care services. CCTs offer a two pronged approach to combating poverty by improving family liquidity and building up human capital (Doetinchem et al., 2008). In practice, the cash component increases purchasing power of the household, plausibly affecting health and education production decisions (Gertler and Van der Gaag, 1990), and the explicit conditions of the programme influence household behaviour. CCT programmes have been widely adapted in Latin America and are spreading to Asia and Africa.

Evaluation of CCTs has mostly focused on outcomes that are directly associated with the conditions imposed by the programmes such as health care service use, health, and nutrition. The recent literature argues that CCTs are an effective tool for modifying and improving health and education-related household behaviour (Lagarde et al., 2009).

To improve health, the Mexican government has used a multi-pronged approach focusing on both access to health care and health capital. *Oportunidades*, formerly PROGRESA, is a CCT programme that started in rural Mexico in 1998 with the aim of 'breaking the intergenerational circle of poverty' by improving the educational, health and nutritional status of the low income population. In 2004, the Mexican government rolled out the *Seguro Popular* programme with the goal of providing universal health coverage to all Mexicans. This approach, based on developing both CCT and updating the public health insurance system to combat poverty and ill-health, provides a good context for exploring how providing information on health affects demand for health insurance. Opting-in to the health insurance system is a spillover effect of CCT programmes, as it is not an explicit condition of receipt of

cash payments. Therefore, the impact of CCT programmes on beneficiaries' health insurance uptake has not been evaluated in the literature.

We argue that *Oportunidades* might be having positive effects on altering the demand for medical services and health insurance for participant households. The behavioural conditions associated with CCT programmes such as mandatory health education classes increase health awareness and may alter preferences for investment and maintenance of health capital, impacting on health insurance choice. To our knowledge, this is the first paper to look at health insurance choice controlling for unobserved preference parameters and increased health awareness from participation in a CCT programme. It, thus, contributes to the literature on the impact of health-related poverty alleviation policies in developing countries (Sosa-Rubi et al., 2009a).

The rest of the paper is organised as follows. Section 2 outlines the structure of the Mexican health insurance market and the basic operational features of the *Oportunidades* programme in Mexico. Section 3 develops a theoretical framework to inform the econometric model. This framework considers the household decision process related to the choice for public health insurance. We hypothesize that those households participating in the CCT programme are more likely to be insured compared with non-participants because of the behavioural conditions associated with CCTs and also the monetary aspects of the programme changing the demand for health. However, the analysis also needs to control for the possibility that households that opt-in to the health insurance market may be more likely to contain individuals that suffer from a long term health condition or engage in risky health behaviours such as smoking. This analysis controls for this potential adverse selection by including past health care utilisation, medical expenditure, and tobacco expenditure. Section 4 discusses the data used in the empirical analysis, which comes from the 2007 round of data collection for *Oportunidades* evaluation. This wave of data collection includes the two Mexican states with the highest proportion of *Oportunidades* participation as well as being the first wave after the implementation of public insurance at the federal level. The sample is limited to households of working age (15-60 years old). This section also details the econometric framework used to estimate a model of the demand for public health insurance controlling for selection and participation into the *Oportunidades* programme. Section 5 presents the results. Section 6 concludes and considers implications for public health policy.

2. Background

2.1 Health Insurance in Mexico

Mexico's Social Security system was first implemented in 1943. Traditionally, it exclusively covered formally registered waged workers and their families. Formal private sector employees were mainly enrolled in the Mexican Institute of Social Security (IMSS), and federal government and state employees received health insurance services from the Social Security Institute for Government Employees (ISSSTE). There are also a number of additional insurance programmes for employees of specific state-run enterprises. Although contributions are mandatory for private employers in the formal sector, these are often not paid (Aterido et al., 2011). It is not mandatory for self-employed individuals to contribute to these programmes, which historically excluded them from utilising these insurance options.

In 2000, the Social Security system left approximately 50% of the Mexican population with limited access to health care and no access to benefits or pensions, particularly those in the informal or agricultural sectors. These workers had to attend other low-cost public facilities funded by the Department of Health (SSA) or pay for private health care services. Out-of-pocket health expenditure represented more than half of the total national health expenditure. The nature of the system triggered important debates on fairness and efficiency issues such as unequal distribution in the allocation of public resources per capita between the insured and uninsured, as well as the unequal allocation between states (González-Pier et al., 2007).

Seguro Popular was the government's main solution to addressing the problems of: (i) limited access to health insurance for the majority of the population and (ii) high household expenditures on health care. Created in 2001 and fully implemented by 2004, it is a voluntary insurance system financed jointly by the federal government and states. It was envisioned that beneficiaries would pay contributions according to their decile of income, with families in the bottom deciles receiving free coverage. *Seguro Popular* extends to the partner or spouse of the affiliate, children under 18 or up to 25 if single and a student or economically dependent and living in the same household as their parent(s) (Aterido et al., 2011). In practice, in 2006, only 2% paid to participate in the programme (Sosa-Rubí et al., 2009b). This reveals that *Seguro Popular* is effectively reaching its target, i.e. poorest and uninsured groups of the population. Households covered by higher-quality public schemes for formal workers are not legally entitled to participate in *Seguro Popular* (Sosa-Rubí et al., 2009a) and better-off groups with purchasing power prefer to pay private providers (Sosa-Rubí et al., 2009b).

Private health care in Mexico operates under a free market system based on ability to pay. Wirtz et al. (2012) found that, in Mexico, despite being affiliated to *Seguro Popular* or having employer-based health care coverage, households still spend a significant percentage of income on private providers. This has proved equally true for other developing economies (Wagstaff et al., 2008).

2.2 Oportunidades

Oportunidades is a CCT programme that was designed by the Mexican government as a policy instrument to combat poverty. Participation in the programme is restricted to families in the poorest groups of the population that satisfy a number of socio-economic criteria. *Oportunidades* provides regular payments to female household heads[1] in the form of cash or electronic transfers into their bank account. The payments are contingent upon regular school attendance of children, medical check-ups for family members and preventive health fortnightly workshops on subjects such as nutrition and disease prevention. It also provides additional health benefits during pregnancy and for children up to age 5. There are additional services targeted at pensioners and school graduates. *Oportunidades* currently provides services to approximately 25 million Mexicans (5.8 million families). The programme operates in the 32 Mexican States, with a budget in 2011 of over 5 million USD.[2]

The *Oportunidades* programme focuses on three distinct areas: education, nutrition and health. While the three components can be separately delivered, the programme is meant to provide integral support, creating synergies when acting simultaneously on the three areas. Families participating in the programme receive schooling and nutrition grants, the specific amount of which varies according to the age, gender and school grade of the children in the household. While these two components are mainly targeted to children and pregnant women, the health component of the programme is addressed to all the family members, who must attend regular medical visits. To access these health care services, beneficiaries receive a health insurance package with limited coverage called IMSS-Oportunidades.

The health component of *Oportunidades* mainly targets women/mothers aged between 20 and 59. Female household heads are encouraged to attend fortnightly workshops where they receive information on preventive health methods and best health practices for the home.

[1] Couples are comprised of a male and female household head. The female household head receives the conditional cash transfer payment.
[2] More information on the programme can be found on www.oportunidades.gob.mx

Working age women are also entitled and encouraged to attend preventive treatment sessions for tuberculosis, diabetes, etc. as well as receiving treatment for addictions, when needed.

Oportunidades was originally envisioned to generate long-term effects from investment in human capital. It is suggested that human capital accumulation in younger generations through education grants and health improvements will increase the income received during their working lives and, consequently, break the intergenerational circle of poverty (Levy, 2006). This is based on the assumption that poor families may underinvest in their human capital development for a number of different reasons. The impact of CCTs on child health, schooling and other outcomes associated with the programme conditions, has been thoroughly analysed in the literature.[3] However, the impact on adults who benefit from the programme has been substantially less explored.

Even if most effects of the programme, related to human capital formation, are expected to be in the long term, there is a growing body of evidence showing short and medium term effects for low-income adult beneficiaries. This paper will contribute to this body of knowledge. Gertler et al. (2004) summarize these positive short and medium term effects as (i) increased short-term productivity resulting from investments in human capital due to a reduction in liquidity and credit constraints associated with the cash transfers and (ii) improved household health, associated in the literature to higher productivity in microenterprise or agricultural activities, allowing for a permanent rise in consumption (Strauss and Thomas, 1995).

3. Theoretical Framework

The first decision of the household head we are interested in is if they decide to participate in *Oportunidades* (providing that the household meets the criteria to participate in the programme). We hypothesise that this decision is based upon marital status and household socioeconomic status measured by a deprivation indicator, household home ownership status, and if the household owns a car. The participation decision will also be based on whether the household head is employed full-time. If the household decides to participate in *Oportunidades,* the health component of the programme may affect its preference parameters related to health insurance by increasing health awareness, improving understanding of the insurance market and services available to the family, and/or reducing liquidity constraints.

[3] A thorough review of the PROGRESA-*Oportunidades* academic and operational literature can be found in Levy (2006) or Soto and Mora (2008). For impact studies of alternative CCT Latin-American programmes on health outcomes see, for example, Thomas (2012).

The household head must then make a decision on whether to participate in the health insurance market. This is based on whether the costs of the insurance (as perceived by the individual) are less than the perceived benefits of the insurance. Costs in the case of public insurance can be time and possibly travel costs of enrolling in the programme. This is the same as any economic choice an individual makes regarding consumption decisions. The decision to have insurance will be partially based on previous medical utilisation and expenditure. Health related behaviour such as tobacco expenditure may also influence the decision to invest in health insurance; adverse selection would occur if individuals that smoke choose to invest in health insurance whereas those who have a zero expenditure on tobacco choose to not invest in health insurance. Health awareness from participation in *Oportunidades* may influence an individual's likelihood of choosing an insurance option. *Oportunidades* participants may have greater knowledge of the insurance market impacting on their perceived benefits of having insurance or they may choose insurance as a form of investment in their health capital. We also assume that other economic and socio-demographic factors such as age and ethnicity, among others, will influence the likelihood of choosing an insurance option.

This is formalised by developing a simple model for the demand of health care loosely following the framework proposed by Goddard and Smith (2001). A representative household (h) has the option of investing in public insurance which has a price of (C_h) (includes both implicit and explicit price and could be zero[4]). The value of public health insurance is denoted by (V_h). This is capturing the benefits of increased access to health care services and the reduced likelihood of an income shock in a health care emergency from being insured. For simplicity, assume that time or travel distance to access health care services are denoted by (t). Thus, for a representative household (h), the benefits of public health insurance is reduced as (t) increases which is expressed as a negative exponential function $\exp(-g_{ht})$. (g_h) is a preference parameter which may be influenced by participation in *Oportunidades* and increased health awareness. The quality adjusted benefit from having public insurance is represented by $V_h \exp(-g_h)$.

[4] Implicit cost is the opportunity cost of public insurance and explicit cost would be travel costs or lost wages from using public insurance.

Using the above assumptions household (*h*) has two possible options: 1) to enrol in public health insurance; and 2) to forgo medical insurance coverage. Health insurance choice of household (*h*) will be determined by the following preference:

- Public health insurance will be preferred to no coverage if: $V_h \exp(-g_h) - C_h > 0$.

The main empirical model will therefore aim to test the following hypotheses.

A) Households will choose public health insurance if the unobserved preference parameters (g_h) are influenced by participation in *Oportunidades* (for example, by learning more about health in the mandatory health education classes).
B) The cash transfer received by *Oportunidades* participants may change the value of public insurance (V_h), and preferences for enrolling in the insurance programme (g_h).
C) The other control variables related to socio-economic status and previous health care use are also expected to influence the value of public health insurance (V_h).

4. Methods and empirical model

4.1 Data

The *Oportunidades* programme was originally designed as a randomized trial that would allow for rigorous evaluation of its impact. Initially, access to the programme was randomly assigned among the rural localities in seven Mexican states.[5] In 320 localities, the programme began in 1998, whilst in the remaining 186 localities it started two years later. By 2003, all targeted villages had been incorporated into the programme; an additional control group of rural localities was incorporated into the study in order to estimate medium term impacts. The last wave of data collected for the evaluation of *Oportunidades*' long term impact was in 2007.

In this cross-sectional study, we use data collected in 2007 for two main reasons. Firstly, this is the only wave of data collection on the two states with the highest proportion (21.15%) of rural beneficiaries of *Oportunidades,* Chiapas and Oaxaca. Secondly, the universal health insurance programme in Mexico, *Seguro Popular*, was introduced in 2004 after the 2003 round of data collection.[6]

[5] These states were Guerrero, Hidalgo, Michoacán, Puebla, Querétaro, San Luis Potosí, and Veracruz.
[6] The 2003 round of data collection was the wave collected previously to 2007.

In 2007, quasi-experimental propensity score matching techniques were used to sample localities receiving *Oportunidades* and localities not receiving the programme that shared similar observable characteristics. The rigorous sampling techniques allow for relatively straightforward analysis in which supply restrictions and spill-over effects can be controlled for.

The analysis is implemented at the household level, although it is worth noting that *Oportunidades*' participation is restricted to female household heads and it would be their influence on household decision making that would affect health insurance consumption. The dataset contains over 200,000 observations. For this analysis, we needed variables related to health that were only included in the longer versions of the questionnaire so that our sample size is limited to 37,091 observations.

To measure the decision to participate in public insurance schemes, we constructed a dummy variable taking the value one if the household had public insurance coverage and zero otherwise. The no insurance alternative included households that reported not being affiliated to any type of health insurance scheme. The public insurance alternative considered households that reported being affiliated to any of the following schemes: IMSS, ISSSTE and *Seguro Popular*.[7] Households that reported being privately insured were excluded from the analysis because of the small sample size in this group we could not analyze private insurance choice.

The analysis controls for age of the household head, an indicator variable for literacy level of the household head, ethnicity, marital status, home ownership, car ownership, and an indicator variable for *Oportunidades* participation. Additionally, based on the methodology used by CONEVAL (2009), we constructed a deprivation indicator to measure the satisfaction of basic needs in housing quality (flooring materials and overcrowding) and basic services (piped water and gas/electric oven). The household is considered deprived if it has a dirt floor, the overcrowding index calculated as the number of individuals living in the household adjusted by the number of rooms exceeds 2.5, there is no piped water available in the property, or no gas/electric oven/kitchenette. Employment status was also included in the

[7] The category IMSS-Oportunidades has been excluded from the analysis as all Oportunidades beneficiaries receive compulsory coverage. Oportunidades beneficiaries are entitled to receive Seguro Popular, but participation in this scheme is voluntary and no formal link exists between the two programmes (Vinay, 2010). In some cases, households may have been automatically affiliated to the Seguro Popular programme; however, beneficiaries have not been informed and are frequently not aware of their status (García-Díaz and Sosa-Rubí, 2011). In this study, data are self-reported and Oportunidades' participants who are not aware of their health insurance affiliation report themselves as not affiliated to any insurance scheme.

analysis by adding a dummy variable that takes the value of 1 if the household head worked 35 hours or more during the week prior to the survey and is equal to 0 otherwise. It is worth noting that this variable comprises both formal and informal employment.

A number of health-related variables are also included in the analysis such as weekly household expenditure on tobacco, monthly household expenditure on medication, number of days that household heads had been ill during the month prior to the survey, and past utilisation of health care services.

4.2 Econometric Model

The logistical selection model (Dubin and Rivers 1989) specifies a flexible logistical distribution permitting the estimation of logit model with selection using maximum likelihood.[8]

Oportunidades Participation

The first decision we are interested in modelling is whether the household is an *Oportunidades* participant which is estimated using a logit model:

$$O_h = \begin{cases} 1 if\ O_h^* = \beta X_h + u_h \\ 0 otherwise \end{cases} \quad (1)$$

Let the subscript *h* index households. A representative household is observed as an *Oportunidades* participant if $O_h^* = 1$. The vector X_h contains socio-economic characteristics that are likely to influence participation in the programme. β is the parameter of coefficients to be estimated. u_h is an idiosyncratic error term.

If participation in *Oportunidades* changes the preference parameters[9] related to investment in health insurance, not accounting for participation will lead to bias in the insurance choice model. However, there is the problem that preference parameters are not observable. To correct for this bias, a selection term is estimated.

[8] Estimating by maximum likelihood is the common technique used in most software packages such as STATA for calculating a logistical regression.

[9] ((g_h) from the theoretical framework)

$$\Pr(O_h = 1 \mid X_h, \mu_h) = \frac{\exp(\beta' X_h + \sigma\mu_h)}{1 + \exp(\beta' X_h + \sigma\mu_h)}, \mu_h \sim N[0,1] \quad (2)$$

The selection term, σ will then be added as an additional explanatory variable in the logit model for insurance choice.

Insurance Choice

A household chooses between no health insurance and public health insurance which is represented by the variable $M_h^* = 1$, if the individual is observed choosing public insurance. Preference parameters related to choosing to opt-in to the insurance system may be influenced by *Oportunidades* participation which will be controlled for by including the selection term from equation (2) in the model.

$$M_h = \begin{cases} 1 \; if \; M_h^* = \alpha Z_h + \xi_j P_{ht-1} + \psi_j S_h + \zeta_j \sigma_h + e_{hj} \\ 0 \; otherwise \end{cases} \quad (3)$$

The subscript *h* denotes households. Z_h is a vector of household characteristics. P_h is a vector capturing past medical utilisation and expenditure, and past expenditure on tobacco. S_h is a vector of state dummies, σ_h is the selection term controlling for participation in *Oportunidades* influencing the preference parameters related to insurance choice, and e_{hj} is a random error term. The coefficients of parameters to be estimated are α_j, ξ_j, ψ_j, and ζ_j respectively. Equation (3) is estimated by maximum likelihood.

To ensure identification of the selection equation, it is advisable to have at least one variable from equation (1) that is not included in equation (3) (Greene, 2003). We exclude marital status and full-time employment status for the head of the household for identification.

5. The effect of CCTs on demand for health insurance

Table 1 shows the descriptive statistics for the estimation sample. Approximately 46% of the sample participates in the public insurance market. 68% of our sample are *Oportunidades* participants. Approximately 82% of the sample is classified as deprived, 12% own a car, 51% own their own home, 75% of household heads are literate, 93% of the sample are married or cohabiting, 32% accessed some form of health care in the previous year, and 25% of the sample belongs to an ethnic minority group. The mean sample age is 41 years old and the

average survey respondent missed one day of work in the past month because of illness. Only 1% of households choose private insurance. The sample size is too small to provide accurate estimates of the factors influencing private insurance choice.

The average marginal effects (AMEs) for the logit regression for *Oportunidades* participation are shown in Table 2.[10] The results support the idea that marital status and socio-economic factors are likely to influence *Oportunidades* participation. Married couples and those in cohabiting relationships, homeowners, and deprived households are more likely on average to participate in *Oportunidades*. Owning a car and the head of household being employed full time, reduce likelihood of participating in the programme.

The AMEs from the logit models of public insurance choice are shown in Table 3. The first column shows the AMEs for the likelihood of choosing public insurance which includes the selection term controlling for participation in *Oportunidades.* Households that choose public insurance compared to no insurance are more likely to have a household head that is literate, member of an ethnic minority, and have used medical care during the past year. Households that are deprived are significantly less likely to choose public insurance. The AME on the selection term is marginally significant. This points to some evidence in support of hypothesis A that there are unobserved characteristics related to *Oportunidades* participation that have a positive and significant effect on the likelihood of choosing public insurance compared to no insurance.[11]

The second column of Table 3 checks our assumption that the logistic selection model is the most efficient estimator. *Oportunidades* participation is added directly to the model as an indicator variable. There are some minor differences in the significance and magnitude of the AMEs compared with the first column, but there is no change in their sign.[12]

[10] Coefficients for all models estimated are shown in Appendices A and B. AMEs are estimated using the STATA vs. 12 post-estimation command: margin.
[11] The results are also robust to using a probit-probit model (Van der Ven and van Praag, 1981; Dubin and Rivers, 1989).
[12] The instruments are valid instruments for identification. They are not significant when included as additional explanatory variables in the insurance choice model to test if they affect public insurance uptake.

The final robustness check was the estimation of a model limiting the public insurance category to individuals that participated in *Seguro Popular*.[13] The results did not significantly change from Table 3, so alternative public insurance options are not driving our findings.[14]

6. Discussion and Conclusion

The drive by the Mexican government to implement a number of poverty reduction measures such as *Oportunidades* and *Seguro Popular* (public insurance system) provide a perfect opportunity to evaluate potential beneficial spillover effects from one programme to another. We hypothesise that the introduction of *Oportunidades* and the higher incomes from receiving cash transfers and increased health awareness of participants may have affected the demand for health insurance. This is the first study to look at health insurance choice of working age households in a developing country setting controlling for participation in a conditional cash transfer programme.

The results show that unobserved preference parameters and health awareness captured in the selection term have a positive and marginally significant effect on the likelihood of choosing public insurance. Overall, these findings hint that participation in a CCT programme increases the likelihood of participating in the health insurance system. Greater health awareness and knowledge of the insurance options available to households from participating in health related training sessions may increase the likelihood of choosing to participate in the insurance system. Overall, the results suggest that complementarities exist between the two policies for the production of health.

The findings suggest that a multi-targeted approach to poverty reduction by focusing on wealth and health education may be a more sustainable option by providing the necessary funds and knowledge for households to make informed choices about their health insurance. Developing countries with CCT programmes in place, such as Colombia or the Philippines, might have a higher likelihood of achieving universal health insurance coverage and reducing out-of-pocket expenditures among the poorest population compared to countries that do not combine these anti-poverty programmes, such as China. CCTs might not only be used as a vehicle of accelerating free health insurance uptake, but also incentivize the use of private insurance. However, the nascent private health insurance market in Mexico and the small

[13] Additionally, as a further robustness check on alternative insurance choice, equations were estimated with only IMSS-Oportunidades in the public insurance category. The results support the findings from the main models in Table 3.

[14] Results from the latter two models are available upon request.

take-up by sample members in the data set of private insurance impeded considering private insurance choice in the analysis. This paper builds a case for tailored health insurance policy accounting for the different poverty alleviation programmes that might be in place in each developing country.

References

Aterido R, Hallward-Driemeier M, Pages C. Does expanding health insurance beyond formal-sector workers encourage informality? Measuring the impact of Mexico's Seguro Popular. The World Bank, Policy Research Working Paper Series 2011; 5785.

Bärnighausen T, Liu Y, Zhang X, Sauerborn R. Willingness to pay for social health insurance among informal sector workers in Wuhan, China: a contingent valuation study. BMC Health Services Research 2007; 7; 114.

CONEVAL. Metodología para la medición multidimensional de la pobreza en México. Consejo Nacional de Evaluación de la Política de Desarrollo Social: Mexico DF; 2009.

Doetinchem O, Xu K, Carrin G. Conditional cash transfers: What's in it for health? Technical Briefing Papers 2008; 1. World Health Organisation: Geneva, Switzerland.

Dubin, J., Rivers, D. Selection bias in linear regression, logit and probit models. Sociological Methods Research 1989; 18 (2-3): 360-390.

Exchange rate averages. http://www.x-rates.com/average/?from=MXN&to=USD&amount=1&year=2007. Accessed 28 September 2012.

García-Díaz R, Sosa-Rubí S. Analysis of the distributional impact of out-of-pocket health payments: Evidence from a public health insurance programme for the poor in Mexico. Journal of Health Economics 2011; 30(4); 707-718.

Gertler P, Martínez S, Rubio-Codina M. El efecto de oportunidades sobre el incremento en el consumo de los hogares a partir de inversiones productivas en microempresas y producción agrícola. In: Hernández-Prado B, Hernández-Ávila M. (Eds) Evaluación Externa de Impacto del Programa Oportunidades, IV. Instituto Nacional de Salud Pública: Cuernavaca, Mexico; 2004. p. 105-154.

Gertler P, Van der Gaag J. The willingness to pay for medical care: Evidence from two developing countries. Johns Hopkins University Press: Baltimore and London; 1990.

Goddard M, Smith P. Equity of access to health care services: Theory and evidence from the UK. Social Science and Medicine 2001; 53(9); 1149-62.

González-Pier E, Gutiérrez-Delgado C. et al. Definición de prioridades para las intervenciones de salud en el Sistema de Protección Social en Salud de México. Salud Pública de México 2007; 49(1); 37-52.

Greene WH. Econometric Analysis. Prentice Hall: Upper Saddle River, NJ; 2003.

Gumber A, Kulkarni V. Health Insurance for informal sector: Case study of Gujarat. Economic and Political Weekly 2000; 35(40); 3607-3613.

Lagarde M, Haines A, Palmer N. The impact of conditional cash transfers on health outcomes and use of health services in low and middle income countries. Cochrane Database of Systematic Reviews 2009; 4. Art. No.: CD008137. DOI: 10.1002/14651858.CD008137.

Levy S. Pobreza y transición democrática en México. Brookings Ins.: Washington, DC; 2006.

Nguyen H, Knowles J. Demand for voluntary health insurance in developing countries: The case of Vietnam's school-age children and adolescent student health insurance program. Social Science & Medicine 2010; 71; 2074-2082.

Sosa-Rubí S, Galárraga O, Harris J.E. Heterogeneous impact of the Seguro Popular program on the utilization of obstetrical services in Mexico, 2001–2006: A multinomial probit model with a discrete endogenous variable. Journal of Health Economics 2009a; 28(1); 20-34.

Sosa-Rubí S, Sesma S, Guijarro M. Análisis del Gasto en Salud en México. Estudios sobre Desarrollo Humano 2. PNUD: México; 2009b.

Soto JM, Mora JJ. Evaluación de consistencia y resultados 2007. Programa de Desarrollo Humano Oportunidades. Tecnológico de Monterrey: Mexico DF; 2008.

Strauss J, Thomas D. Human resources: Empirical modelling of household and family decisions. In: Chenery H, Srinivasan TN (Eds) Handbook of Development Economics, 3. North Holland: Amsterdam; 2003.

Thomas, R. Conditional cash transfers to improve education and health: an ex ante evaluation of Red de Proteccion Social, Nicaragua. Health Economics 2012; 21; 1136-1154.

Van de Ven, W., Van Praag, B. The demand for deductibles in private health insurance: A probit model with sample selection. Journal of Econometrics 1981; 17(2); 229-252.

Vinay, C. Do Conditional Cash Transfers Increase Poor Households' Coping Capabilities? Assessing the Effect of Oportunidades in Poor Urban Settings in Mexico. Journal of Public and International Affairs 2010, 21(2), 115-142.

Wagstaff A, Lindelow M. Can insurance increase financial risk? The curious case of health insurance in China. Journal of Health Economics 2008; 27(4); 990–1005.

Wagstaff A, Lindelow M, Jun G, Ling X, Juncheng Q. Extending health insurance to the rural population: An impact evaluation of China's new cooperative medical scheme. Journal of Health Economics 2009; 28(1); 1-19.

Wirtz V, Santa-Ana Y, Servan-Mori E, Avila-Burgos L. Heterogeneous effects of health insurance on out-of-pocket expenditure on medicines in Mexico. The Journal of the International Society for Pharmacoeconomics and Outcomes Research 2012; 15(5); 593-603.

Table 1: *Descriptive Statistics*

VARIABLES	Mean	Std. Dev.	Obs.
Head of household age	41.36	10.37	60230
Head of household age sq.	1817.94	864.60	60230
Head of household literate	0.75	0.43	60230
Ethnic minority	0.25	0.43	60230
Married/cohabiting	0.93	0.26	60218
Own house	0.51	0.50	60230
Own car	0.12	0.33	60230
Deprived	0.82	0.38	60230
Head house employed FT	0.67	0.47	31050
Weekly tobacco expenditure	1.87	12.64	40022
Monthly medical expenditure	53.76	145.24	38795
Days ill during past month	1.00	3.52	57796
Previous utilisation	0.32	0.47	59844
Oportunidades participant	0.68	0.46	60230
Health insurance	0.47	0.50	60230
No insurance	0.53	0.00	32134
Public insurance	0.46	0.00	27900
Private insurance	0.01	0.00	196
Types of public insurance			
IMSS-Oportunidades	0.09	0.00	8651
IMSS	0.31	0.00	2511
Seguro Popular	0.57	0.00	16031
ISSSTE	0.03	0.00	707

Notes: Monthly medical expenditure and weekly tobacco expenditure are measured in Mexican pesos. In 2007, the average exchange rate between Mexican pesos and US dollars was 0.09 US dollars to 1 Mexican peso (see http://www.x-rates.com/average/?from=MXN&to=USD&amount=1&year=2007). Days ill in the past month is measured in days, and all other variables are measured in percentages.

Table 2: *Logit Model of average marginal effects for Oportunidades Participation*

Oportunidades Participation	
VARIABLES	AME
Married/Cohabit vs. single	0.07***
	(0.01)
Own house vs. rent	0.04***
	(0.01)
Own car vs. no car	-0.16***
	(0.01)
Deprived vs. not deprived	0.09***
	(0.01)
Head house employed FT vs. not employed FT	-0.02***
	(0.01)
N	32031
Log-likelihood	-19758.72

Notes: Standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Table 3: *Logit estimates of the average marginal effects of insurance choice controlling for selection into Oportunidades and including a dummy variable for Oportunidades participation*

	(1)	(2)
	Selection	Oportunidades
VARIABLES	AME	AME
Head of household age	0.02***	0.00
	(0.00)	(0.00)
Head of household age squared	-0.00***	-0.00
	(0.00)	(0.00)
Head of household literate vs. illiterate	0.06***	0.07***
	(0.01)	(0.01)
Ethnic minority vs. majority ethnic group	0.04***	0.02***
	(0.01)	(0.01)
Own house vs. rent	-0.02**	-0.00***
	(0.01)	(0.01)
Own car vs. no car	0.07**	0.04***
	(0.03)	(0.01)
Deprived vs. not deprived	-0.06***	-0.02***
	(0.02)	(0.01)
Weekly tobacco expenditure	-0.00	-0.00
	(0.00)	(0.00)
Monthly medical expenditure	-0.00***	-0.00***
	(0.00)	(0.00)
Days ill during past month	0.00	0.00*
	(0.00)	(0.00)
Previous utilisation	0.14***	0.09***
	(0.01)	(0.01)
Oportunidades participant vs. not participant		0.19***
		(0.01)
Selection term	0.16*	
	(0.09)	
n	16645	31861
Log-likelihood	-10327.44	-19339.10

Notes: Standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. The model also includes state dummies which are not shown.

Appendix A: *Logit Model of coefficients for Oportunidades Participation*

Oportunidades Participation	
	Coef.
Married/Cohabit vs. single	0.33***
	(0.04)
Own house vs. rent	0.17***
	(0.02)
Own car vs. no car	-0.74***
	(0.03)
Deprived vs. not deprived	0.43***
	(0.03)
Head house employed FT vs. not employed FT	-0.09***
	(0.03)

Notes: Standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Appendix B: *Logit estimates of the coefficients of insurance choice controlling for selection into Oportunidades and including a dummy variable for Oportunidades participation*

	(1)	(2)
VARIABLES	Selection	Oportunidades
	Coef.	Coef.
Head of household age	0.08***	0.00
	(0.01)	(0.00)
Head of household age squared	-0.00***	-0.00
	(0.00)	(0.00)
Head of household literate vs. illiterate	0.27***	0.32***
	(0.04)	(0.03)
Ethnic minority vs. majority ethnic group	0.17***	0.10***
	(0.04)	(0.03)
Own house vs. rent	-0.09**	-0.01
	(0.05)	(0.02)
Own car vs. no car	0.31**	0.17***
	(0.13)	(0.04)
Deprived vs. not deprived	-0.26***	-0.11***
	(0.09)	(0.04)
Weekly tobacco expenditure	-0.00	-0.00
	(0.00)	(0.00)
Monthly medical expenditure	-0.00***	-0.00***
	(0.00)	(0.00)
Days ill during past month	0.01	0.01***
	(0.01)	(0.00)
Previous utilisation	0.67***	0.42***
	(0.04)	(0.03)
Oportunidades participant vs. not participant		0.89***
		(0.03)
Selection term	0.76*	
	(0.40)	

Notes: Standard errors are in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. The model also includes state dummies which are not shown.