

The Effects of Health Insurance on Investment Portfolios: the Case of *Seguro Popular* in Mexico, 2008 to 2012

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This paper estimates the impact that the introduction of a publically-funded health insurance system in Mexico has had on the type of investments made by that country's households. It finds that there are measurable changes in investment behavior of low-income households caused by the introduction of the health insurance system. It also shows that these changes can be interpreted as a switch from high liquidity, low return assets to illiquid, high return assets.

1. Introduction

Health insurance and the public provision of health services have been important topics of study in the development economics literature. Potentially, improving the health status of the population and reducing the risks that it faces from health problems can increase welfare, as well as productivity in general. International development agencies have made health a focus point for much of their advice for developing countries. In recent years, support for the expansion of universal health coverage has combined two main goals in the health provision agenda: provision of health services, and financial protection from high out-of-pocket health care costs.

Research findings in this area suggest that the provision of public health services does improve the overall health status of the population, and in particular that publically funded health insurance does reduce the risks faced by households (Escobar, Griffin and Shaw, 2011; Barros, 2008; Grogger et al., 2014). Other important findings in this area show that access to health insurance increases employment levels and wages in a developed country setting (Gruber and Hanratty, 1995), while public health insurance programs can contribute to a decrease in formal employment in developing countries (Aterido et al., 2011; Bosch et al., 2010; Camacho et al., 2009).

While there is a general policy and academic consensus suggesting that countries should provide public health services and publically funded health insurance - potentially the most important questions about these services have to do with their long run impact on economic development. The effects of public and private health insurance on savings have been studied widely, framed into the precautionary savings literature.¹ Bai and Wu (2014) show that the implementation of the *New Cooperative Medical Scheme* in rural China increased the nonmedical-related consumption of the households by five percent. Chou et al. (2003) estimated that the *National Health Insurance Program* in Taiwan decreased household's savings by 8.6-13.7 percent.² Kirduang (2011) found no evidence of a decrease in savings with the introduction of the *Universal Healthcare Coverage Scheme* in Thailand. However, she estimated positive effects of the program on savings in the long run.

In a developed country setting, Starr-McCluer (1996) analyzed the impact of private health insurance in the U.S. on savings and found evidence that contradicted the argument that there is a decrease in savings when households have access to health insurance. She found a positive and significant relationship between wealth (measured as liquid or financial assets)³ and insurance coverage.

While a large body of literature studies the impact of different health insurance systems on households' savings, this paper aims to look into the question of long term effects of these policies by studying the investment behavior of households affected by these programs. Intuitively, access to health insurance changes the profile of risks that

¹ In general, precautionary savings are defined to be the savings that an agent makes in order to smooth out the uncertainty around expected future income or expenditure. In standard economic theory, the agent engages in precautionary savings because he or she cannot directly buy insurance that will protect him or her from shocks at a reasonably low price. In these standard models, a reduction in the riskiness of net income, which would result from the introduction, *ceteris paribus*, of retirement insurance or health insurance, leads to a reduction in precautionary savings. Carroll and Kimball (2008) provided a recent summary of the state of the literature.

Theoretical studies on precautionary savings include Leland (1968), Kotlikoff (1989) and Kimball (1990), among others.

² The *National Health Insurance Program* in Taiwan is the only health insurance option in the country.

³ The liquid assets measured include cash, checking accounts, savings accounts, and savings bonds, among others; the financial assets measured include liquid assets plus stocks, bonds, mutual funds, and retirement accounts, among others. The latter measure requires a well-developed financial market.

households face, and therefore changes how much savings they will need to self-insure and also what types of investments they allocate their savings to. In particular, access to insurance potentially allows households to allocate their savings to ‘better’ investments. To the extent that these investments have high returns such as investments in education, the provision of public health insurance can have a potentially large impact on long run economic development.

In particular, this paper estimates the effect on households of receiving access to a publically funded health insurance system on the type of investments they allocate their savings to. The paper characterizes a number of household’s expenditures as being liquid investments, useful for insurance purposes, and other, less liquid investments. The main hypothesis of the paper is that, upon obtaining access to public health insurance, households will decrease(increase) the fraction of their savings that they allocate to liquid(illiquid) assets. Following the finance literature on liquidity, in this paper liquid assets correspond to low return assets and illiquid assets to high return assets.⁴

With this classification, this paper studies whether there is a measurable effect of the introduction of *Seguro Popular*, a large subsidized health insurance program, on the allocation of savings to different types of investment by using income and expenditure data from Mexico’s ENIGH household survey from 2008 to 2012. This research has advantages and disadvantages. ENIGH includes tens of thousands of observations in each round, which allows parsing the sample in multiple ways. However, ENIGH is not a panel, therefore this paper uses logistic regressions to infer the household participation in different health insurance categories over time. The results suggest that there is a statistically and economically significant change in the allocation of investment from liquid, low return investments to illiquid, high return investments (specially human capital investment) for households that enrolled in *Seguro Popular*, compared to uninsured households.

⁴ For example, rates or return to investment in education are estimated to be on the order of 25 percent (Psacharopoulos and Patrinos, 2004) in some cases, while, considering inflation and the risk of theft or other physical loss imply that the return to savings in cash is likely to be a negative number.

The rest of this paper proceeds as follows. Section 2 describes the *Seguro Popular* program in the context of Mexico's health care system. Section 3 develops a model of consumption under uncertainty that will be used to interpret the empirical results. Section 4 describes the bi-annual survey data used in the paper. Section 5 explains the empirical procedure, focusing in particular on how the change in status from non-participation to enrollment in *Seguro Popular* is inferred. Section 6 presents the results of the paper. Section 7 describes what can be concluded from the results of the study, and under which assumptions.

2. Background on Mexico's Health Care System

The right to receive medical treatment is guaranteed by the Mexican Constitution (Article 4),⁵ and medical care is regulated by the *Ley General de la Salud* (General Health Law). Consequently, the Mexican population is entitled, by law, to have access to health services, and the state is obligated to provide health care. In 2000, 58.6 percent of the Mexican population was uninsured. Two years later, in 2002, the government started a pilot program of a subsidized health insurance program called *Seguro Popular*. In 2004 the program was established as national policy and by 2006 the program was present in all Mexican states. By 2013, 45 percent of the population was covered by this universal health insurance program, while 21.5 percent remained uninsured.

In 2000, access to health care was unequal, not only geographically but also socioeconomically. In 2002, federal health spending was 45 percent of all health care spending in Mexico. Out-of-pocket payments accounted for an additional 52 percent of health care spending; the remaining three percent came from private health insurance (Secretaría de Salud, 2005).

⁵ "Every person has a right to receive medical treatment when deemed as necessary. The law shall not only define the guiding criteria regulating the access to health services but also establish concurrent activities to be carried out by the federation and the states in organizing public health services under article 73, paragraph XVI of this Constitution."

<http://www.juridicas.unam.mx/infjur/leg/constmex/pdf/consting.pdf>

The World Health Report 2000 identified a major problem in Mexico regarding catastrophic health spending (Gakidou et al, 2006). In 2002, the out-of-pocket health payments of low income households averaged 6.8 percent of their income, while for high income households it represented 2.2 percent of their income (Secretaría de Salud, 2005). The lack of access to health care, the inequality of access, and the aim to protect the population against catastrophic health expenditures, led the government to establish the System for Social Protection in Health in November 2002 (*Sistema de Protección Social en Salud*); *Seguro Popular* is one of its components.

In 2002, *Seguro Popular* started as a pilot in 26 municipalities in five states: Aguascalientes, Campeche, Colima, Jalisco, and Tabasco. Through a reform of the General Health Law in 2004, *Seguro Popular* was established as a national policy. Geographic coverage across the country and the inclusion of different socioeconomic groups was gradually incorporated. By 2006, the program was present in all the Mexican states (1,584 out of 2,454 municipalities).

The goal of the program was to provide health insurance to the population that was not previously covered by the Social Security system by 2012. Coverage of *Seguro Popular* has increased dramatically over time (Figure 1). When the pilot program ended in December 2003, it covered 2.2 million people. By the end of 2013, as a national policy with voluntary enrollment, it covered 55.6 million people of all income levels (45 percent of the population). On the other hand, 21.5 percent of the population remained uninsured.

In order to be eligible for *Seguro Popular*, families cannot receive any other health insurance benefits provided by the Social Security system. Affiliation to *Seguro Popular* is requested by the head of the household and it is granted for one year to families in the highest income deciles, for the case of families from low income deciles, affiliation is granted for a three year period (CONEVAL, 2014). In addition, *Seguro Popular* has extended

coverage of young adults and the elderly compared to other insurance programs provided by the Social Security system.⁶

Table 1 shows the annual fee that each household must pay to be enrolled in *Seguro Popular*. Fees are determined by the *Comisión Nacional de Protección en Salud*, based on socioeconomic information which is used to estimate the household income level. From 2008 to 2012, the annual fees were kept constant. The lowest four income deciles do not pay a fee, while the wealthier deciles pay annual fees that range from MX\$2,075 (1.6 percent of the per capita GDP) to MX\$11,374 (8.6 percent of the per capita GDP).

Since 2012, *Seguro Popular* has been the main source of health insurance for Mexican households. According to CONEVAL (2013),⁷ from 2010 to 2012 the proportion of households covered by *Seguro Popular* increased from 30.5 to 40.8 percent, as shown in Figure 2.⁸ The other health insurance sources available in Mexico are: IMSS, ISSSTE, PEMEX and private health insurance; ISSSTE, ISSSTE-Estatal and PEMEX are types of health insurance for public workers. Despite the effort of the government to make health insurance available to all Mexican households, as of 2012, 21.5 percent of the population was still not covered by any type of health insurance.⁹

According to the World Development Indicators, real health expenditure per capita in Mexico has increased by more than 80 percent in one decade, from US\$ 584.2 in 2002 to US\$1,061.9 in 2012.¹⁰ Total health expenditure is around six percent of the GDP, but public

⁶ While the Social Security system covers children up to 16, or up to 25 if disabled or studying, *Seguro Popular's* coverage extends to children under 18, or up to 25 if single, students, or economically dependent and living in the same dwelling. *Seguro Popular* also covers the parents (65 or older) of the head of the household or of his or her spouse if they are economically dependent and living in the same dwelling (Aterido et al., 2011)

⁷http://www.coneval.gob.mx/rw/resource/coneval/med_pobreza/Acceso_a_los_servicios_de_salud_Censo_2010/Carencia_a_los_servicios_de_salud_2010.pdf

⁸ Measuring the proportion of the population covered by *Seguro Popular* varies by institutions. For the case of the number of persons and households participating in *Seguro Popular* reported in Figure 1, administrative records from *Seguro Popular* were used. On the other hand, CONEVAL measures enrollment using the section of socioeconomic characteristics of ENIGH.

⁹ As discussed in the latest results report of the National Health and Nutrition Survey (ENSANUT), a new challenge will be to increase coverage targeting the young adults not attending school who have not been able to enter the formal labor market, given that they lose the right of coverage through their parents (Gutiérrez et al., 2012).

¹⁰ Values in constant 2005 international dollars.

health expenditure as a proportion of total health expenditure has increased from 43.8 percent in 2002, to 51.8 percent in 2012. During this time, private health expenditure has remained constant at around 3.2 percent of the GDP. *Seguro Popular* currently represents 60 percent of the federal government's expenditure on health (around 0.5 percent of the GDP in 2014).

In summary, Mexico has spent a significant amount of resources to provide access to health care to the population that was uninsured before 2000. In 2002, the pilot of *Seguro Popular* was launched in five states; by 2005, the program was a national policy and was present in all states in Mexico. Since 2012, *Seguro Popular* has been the single largest source of health insurance in Mexico, with 52.9 million people affiliated.

3. Conceptual Framework

This paper studies the investment decisions of households subject to uncertainty, in terms of their choice to invest in liquid, low return assets, or illiquid, high return assets. This section describes a simple, two period model of consumption and investment that serves as a conceptual framework. The objective of this section is to present the problem of a risk averse, financially constrained agent who faces uncertainty about the shock he or she will face in the short run, i.e. period 1.

Our agent makes investment decisions in period 0 and consumes in two periods: period 1 which stands for the short run, and period 2 which stands for the long run. The agent is endowed with wealth W in period 0 and has access to two investment technologies to transfer this wealth into periods 1 and 2 for consumption. She invests A_L on a liquid type of investment (e.g. cash), which she can use for consumption in period 1. She invests the rest, $A_I = W - A_L$, in an illiquid type of investment (e.g. education), which she can use only in period 2. The liquid investment pays her returns $R_L = 0$, the illiquid asset pays her higher returns $R_I > R_L$. Crucially, the agent is financially constrained, in the sense that she cannot borrow in period 1 using her income from her A_I investment to pay back the loan (e.g. while she is a student, she cannot consume out of the returns of her investment in education).

The agent faces an income shock ξ in period 1 (eg. anything from a negative shock like a costly medical emergency to a positive shock like obtaining an improved treatment for a chronic condition). The shock has mean zero (0) and variance σ and we denote its distribution with F . When the shock is negative ($\xi < 0$) the agent has more expenses than she expected. When the shock is positive ($\xi > 0$) the agent has more wealth than she expected. Because the agent is credit constrained, her consumption in period 1 is limited by her investment in liquid assets plus the income shock: $C_1 \leq A_L + \xi$. For simplicity it is assumed that, in period 1, the agent consumes all the liquid assets available in that period, i.e. $C_1 = A_L + \xi$. (e.g. while she is a student, the agent doesn't save cash for the future).

Analytically, the agent's problem is to maximize the expected value of the sum of the first and second period utilities:

$$\max_{A_L, A_I} V = E_\xi [U(C_1) + \beta U(C_2)], \quad (1)$$

where it is assumed that U is strictly increasing and concave, and $0 < \beta < 1$ is the discount factor that reflects the passage of time. The agent maximizes this expected utility subject to the following constraints:

$$W = A_L + A_I \quad (2)$$

$$C_1 = A_L + \xi, \text{ with } \xi \sim F(0, \sigma) \quad (3)$$

$$C_2 = R_H * A_I \quad (4)$$

$$A_L \geq 0, A_I \geq 0 \quad (5)$$

The first constraint describes the fact that the agent has a limited amount of resources to invest for the future. She splits her wealth between the two possible investments A_L and A_I . The second constraint describes the simplification that the agent's consumption in period 1 is equal to the sum of the liquid investment which she can dispose of and the income shock. The third row describes consumption in period 2 as the income that the agent receives from her illiquid investment, and the last constraint describes the idea that the agent cannot have a negative investment in any of the two periods.

To solve the model, we assume a Constant Absolute Risk Aversion (CARA) utility function, with $\gamma > 0$:

$$U(C) = -\exp^{-\gamma C} \quad (5)$$

As the shock ξ is distributed as a normal with mean 0 and variance sigma, the expected value of the agent's utility can be expressed as:

$$\begin{aligned} E[U(C_1)] &= E[-\exp^{-\gamma(A_L + \xi)}] \\ &= -\exp^{-\gamma A_L} \exp^{-\gamma \mu + \frac{1}{2} \gamma^2 \sigma^2} \end{aligned} \quad (6)$$

Given that $U(C_2)$ does not depend on the shock, the initial budget constraint can be used to rewrite the agent's problem as:

$$\max_{A_L} V = -\exp^{-\gamma A_L} \exp^{+\frac{1}{2} \gamma^2 \sigma^2} - \beta \exp^{-\gamma(R_H(W - A_L))} \quad (7)$$

The first order condition with respect to A_L can be expressed as:

$$\frac{\partial U}{\partial A_L} = \gamma \exp^{-\gamma A_L} \exp^{+\frac{1}{2} \gamma^2 \sigma^2} - \beta \gamma R_H \exp^{-\gamma(R_H(W - A_L))} = 0, \quad (8)$$

which is equivalent to:

$$-\gamma A_L + \frac{1}{2} \gamma^2 \sigma^2 = \ln(\beta R_H) - \gamma(R_H(W - A_L)) \quad (9)$$

Finally, the optimal level of investment in liquid assets (A_L^*) is given by:

$$A_L^* = \frac{\frac{1}{2} \gamma \sigma^2 - \frac{1}{\gamma} \ln(\beta R_H) + R_H W}{1 + R_H} \quad (10)$$

Our interest lies on the effect of the volatility of the shock on the fraction of income invested in the liquid assets $\alpha_L = A_L/W$. Intuitively, the agent will react to an increase in

income risk in a period by allocating more savings for consumption in that period. We can show this by deriving A_L^* with respect to σ^2 , which gives us the direction of the effect:

$$\frac{\partial A_L}{\partial \sigma^2} = \frac{\frac{1}{2}\gamma}{W(1+R_H)} > 0 \quad (11)$$

The agent's investment in liquid assets depends positively on the amount of risk she faces in period 1. Therefore, in response to higher period 1 volatility, the agent protects herself by allocating more of his consumption to that period, saving less at the high-return rate along the way.

The intuition is related to the precautionary savings motive. In this case it is a precautionary motive for liquidity as described originally by Keynes (1936)¹¹. Utility functions that have the property that increased riskiness in a period's consumption leads the agent to increase the savings that she allocates to that period, are said to exhibit "prudence". It can be described analytically as a convex marginal utility, or equivalently as a positive third order derivative of utility. A convex marginal utility implies that the expected marginal utility of a risky consumption level is higher than the marginal utility of the expected consumption, and therefore in any setting where the agent is equalizing marginal utilities across periods, an increase in riskiness of consumption in a period will lead to an increase on the optimal allocation of consumption to that period.

The assumption of a utility function that displays prudence is relatively weak in the sense that both CARA and CRRA utility functions exhibit this property. Indeed any increasing and concave utility function with decreasing absolute risk aversion displays

prudence since $\frac{d\left(\frac{-u''}{u'}\right)}{dc} < 0 \Leftrightarrow -\frac{u'''}{u''} > -\frac{u''}{u'}$, but $-\frac{u''}{u'} > 0$ by assumption.

¹¹ The original text reads that one of the motives for holding money is to "provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchases", (p.196).

4. Data

4.1 Mexican National Household Income and Expenditure Surveys

This paper uses two rounds of the *Mexican National Household Income and Expenditure Surveys* (abbreviated as ENIGH for its name in Spanish), Mexico's main household survey of income and expenditure, which has been implemented since 1984 by the National Institute of Statistics and Geography (INEGI). The survey is conducted every two years and is representative at the national level. It includes three units of analysis: dwellings, households, and persons. The different sections of the questionnaire provide detailed information about household income and expenditure, dwelling characteristics, and demographic variables and information on income and social security contributions for each household member. See Appendix I for details and sections of the survey.

A new methodology for the ENIGH was introduced in 2008, which includes a health module for each household member. Questions regarding enrollment in *Seguro Popular* were introduced in 2006, but additional questions about other health insurance alternatives and medical attention were added in 2008. This analysis uses two of the most recent rounds of ENIGH: 2008 and 2012. ENIGHs are repeated cross-sections rather than a panel, and the number of households surveyed varies from year to year: 24,468 households in 2008, and 9,002 in 2012.¹²

4.2 Health Insurance Measures

Different measures of access to health insurance were computed from the ENIGH data. Enrollment in *Seguro Popular* is measured at the household level. For this purpose, the proportion of household members enrolled in *Seguro Popular* was computed. Then, to identify households with other types of health insurance, or uninsured households, we used the question regarding enrollment in another health care provider; the options

¹² The number of households surveyed in 2012 is smaller because in previous years the sample was expanded to make it representative at the state level. See Appendix I for more details.

included IMSS, ISSSTE, PEMEX, and others. This information was used to calculate the proportion of household members enrolled in other types of health insurance.

Then households were classified as beneficiaries of the program if more than half of the members of the household were enrolled in *Seguro Popular*. In contrast, when more than half of the household members were enrolled with any of the other health insurance providers, the household was considered as receiving other types of health insurance.

Table 2 shows the evolution of the proportion of households classified in the different types of health insurance by year and income level.¹³ It is evident that *Seguro Popular* has expanded during the period. In 2008, 17.5 percent of the households were enrolled in *Seguro Popular*, while by 2012 that number reached 38.7 percent. In the case of low income households the proportion of households enrolled in *Seguro Popular* increased from 27.2 percent in 2008 to 55.2 percent in 2012.

On the other hand, the proportion of households with different types of health insurance and uninsured households decreased during the 2008-2012 period. In 2008, households with other state-funded or private health insurance represented 43.5 percent, while by 2012 that number decreased to 37.4 percent. The proportion of low income households receiving other types of health insurance decreased from 25.6 percent in 2008 to 19.6 in 2012. From 2008 to 2012, the proportion of uninsured households of all income levels decreased from 39.1 percent to 23.9 percent; the percentage of uninsured low income households decreased from 47.2 percent to 25.2 percent in the same period.

[4.3 Investment Measures](#)

This section describes the assumptions about liquid/low return and illiquid/high return assets of households used in this paper. The expenditure variables included in the ENIGH could be reported daily, monthly, quarterly, semi-annually, or annually; for comparability purposes, all investment and savings measures were annualized.

¹³ From now on, low-income households are defined as those households in the first four expenditure deciles. This definition takes into account the fact that households in this group do not have to pay an annual fee to be enrolled in *Seguro Popular*.

Household expenditures on assets are classified as illiquid when the acquired assets cannot be easily transformed into cash. Investment in human capital, durable assets, and high return savings are included in this category. Human capital investment consists of expenditures on education, which includes expenses on tuition, fees, educational materials, education services, and uniforms. For example, this paper deems all human capital investments as illiquid. It is difficult to cash in a high-school degree or other education credentials to pay for an unexpected health event. Investment in durable assets includes mortgage payments and acquisition of vehicles; for these assets this paper assumes that it is difficult to transform construction improvements, past mortgage payments or small business investments into cash. Finally, high return savings consist of payments of debts and credit card debts.

On the other hand, household expenditures are classified as liquid by assessing which assets can be easily transformed into cash to pay for an unexpected health event. Consumer durable goods, expenses targeted to strengthen networks, and low return savings are included in this category. Consumer durable goods investment consists of expenses on a list of domestic appliances¹⁴ that can be considered to be liquid assets, as they can be easily sold or given to a pawn shop. Different types of investments targeted to strengthen the household's network are included in the liquid investment category such as expenditures on community events and gifts and loans to friends and family. A strong network could support the household in the eventuality of a medical emergency in different ways: company, taking care of children and elders, and lending money, among others. Expenditures in this category can also be thought of as a form of social insurance. Finally, low return savings includes deposits at formal and informal institutions.

The total level of investment is defined as the sum of all the investment and savings measures for each household. Our interest lies in how the proportion of different types of investment changes when households gain access to *Seguro Popular*. For this purpose, the

¹⁴ Includes expenses on various items such as: fan, telephone, AC units, sewing machine, stove, refrigerator, blender, mixer, iron, juicer, microwave, washing machine, vacuum, water heater, lamps, toasters, beds, dining tables, chairs, carpets, rugs, book shelves, and bicycles, among others.

proportion of each type of investment or savings relative to the total level of investment of each household is defined as:

$$PropInv_i = \frac{Inv_i}{\sum_{j=1}^n Inv_j} \quad (12)$$

where i refers to a specific type of investment and j stands for the different types of investments and savings.

Table 3 shows the evolution of the proportion of each type of investment or savings for the all households and for low income households. Regarding the illiquid investments, human capital is the main form of investment of Mexican households for all periods. It represents around 40 percent of total investment, and it represents a larger proportion of the total investment for low income households. Investment in durable assets, such as buying a house or a car, represents around five percent of the total investment for all households and less than two percent for low income households. The high return savings represents around eleven percent of the total level of investment for all households throughout the period, and fluctuates between 6.2 and 7.4 percent for low income households.

On the other hand, illiquid investment measures represented less than 48 percent in all periods and for both groups. The main form of investment in this category is strengthening the household network, which decreased from 17.9 percent in 2008 to 16.2 percent in 2012 for all households and from 22.1 percent to 18.6 percent for low income households. The proportion of investment in consumer durable goods fluctuates around 11.5 percent for all households, while it represents around 14 percent of the total investment of low income households. Finally, the measure of low return savings increased for both groups during the analyzed period. It increased from 9.5 percent in 2008 to 15.9 percent in 2012 for all households and from 7.2 percent to 14.9 percent for low income households

4.4 Individual and Household Characteristics

Table 4 presents summary statistics of the household and individual variables used in the analysis. The first set of variables includes characteristics of the head of the household. In 2012, the household heads of households with *Seguro Popular* were the youngest and with the lowest levels of educational attainment, compared to uninsured households and households with other types of health insurance. In contrast, the largest proportion of female household heads was found in the uninsured group.

A second set of variables are related to the household characteristics, which include: composition of the household, geographic location,¹⁵ labor markets, educational characteristics, and participation in *Oportunidades*.¹⁶ The first group of variables is related to the composition of the household. In 2012, households enrolled in *Seguro Popular* were larger (4.56 members on average) and had more children under the age of 18 than households with other types of health insurance or uninsured households. In contrast, households with other types of health insurance had more household members aged 65 years or more, than households receiving *Seguro Popular* or uninsured households.

In 2012, most households with other types of health insurance, or uninsured resided in urban areas (93 and 84 percent, respectively), while just 63 percent of households enrolled in *Seguro Popular* lived in urban areas. Households with other types of health insurance have the largest proportion of formal workers (52 percent), followed by uninsured households (16 percent) and households enrolled in *Seguro Popular* (9 percent).

The proportion of children enrolled in school was largest for households with other types of health insurance (76 percent) than for households enrolled with *Seguro Popular* (71 percent) and uninsured households (67 percent). In contrast, participation in *Oportunidades* differed between households receiving *Seguro Popular* (24 percent) and

¹⁵ According to INEGI, a household is classified as urban if it resides in cities with more than 2,500 inhabitants; otherwise it is classified as rural.

¹⁶ *Oportunidades* is the main anti-poverty program of the Mexican government. We identify households with *Oportunidades* through the education questions. The survey asked children who were enrolled in school, if they received a scholarship; if so, they identify which institution gave them the scholarship. *Oportunidades* was the main sponsor of education scholarships during the analyzed period.

households with other types of health insurance (2 percent) or uninsured households (5 percent).

In addition to the head of the household and household characteristics, this paper used expenditure data for each year to classify each household into deciles.¹⁷

5. Empirical Strategy

To estimate the effect of *Seguro Popular* on household investment and savings decisions, the ideal dataset would be a panel with baseline data before the implementation of the program. A dataset with these characteristics allows for differences-in-differences analysis, and does not require strong assumptions regarding which households self-select into the program (selection on unobservable characteristics). Unfortunately, this type of data does not exist.¹⁸

As mentioned before, the most comprehensive income and expenditure household survey in Mexico is ENIGH. The question in this survey regarding affiliation with *Seguro Popular* was introduced in 2006, and the questions about other types of health insurance were introduced in 2008. Therefore, our analysis will be restricted to the period from 2008 to 2012. Although *Seguro Popular* was an existing and functional program in 2008, the number of persons enrolled in *Seguro Popular* doubled during the period of interest; increasing from 27.2 million persons enrolled in 2008 to 52.9 million persons in 2012.

5.1. Effects of Seguro Popular on Investment and Savings using Ordinary Least Squares Analysis

This paper first estimates the effect of *Seguro Popular* on different types of investment and savings. To do this, the following specification is proposed:

¹⁷ The expenditure deciles were computed for each survey year using the total and per capita income and expenditure values.

¹⁸ Another comprehensive dataset is the Mexican Family Life Survey (MXFLS) which has information of the demographic and socioeconomic characteristics of the Mexican families, as well as data on health, health insurance options, and expenditure. Unfortunately, it does not have detailed information regarding savings flows.

$$PropInv_{ijkt} = \vartheta_0 + \beta_1 PropSP_{jkt} + \beta_2 PropOHI_{jkt} + \sum_{l=1}^n \rho_l X_{l jkt} + \tau_k + \varepsilon_{ijkt}$$

(13)

where i indexes the type of investment, j indexes the household, k indexes the geographic region, and t indexes the year. The dependent variable, $PropInv$, corresponds to one of the i types of investment which are measured as a proportion of total investment. The $PropSP$ variable represents the proportion of household members enrolled in *Seguro Popular*. Similarly, $PropOHI$ represents the proportion of household members receiving other types of health insurance; households without health insurance are the reference category. X is a vector of characteristics of the head of the household and of the household, such as gender, age, educational attainment and employment status of the head of the household, urban status of the household, number of household members, proportion of income earners who are informal workers, participation in *Oportunidades*, and dummy variables for the type of household: one-person household, nuclear family household, or extended family household. The variable τ_k allows for state-specific fixed effects and ε_{ijkt} is an error term.

The coefficient of interest is β_1 , which captures the effect of an increase of the coverage of *Seguro Popular* on investment and savings (relative to households without insurance). The model developed in Section 3 suggests that households facing less risk will allocate a smaller proportion of their investments into liquid assets (consumer durable goods, networks, and low return savings); while the effect for the case of high return, illiquid assets is expected to be positive (human capital, durable assets, and high return savings).

[5.2. Effects of Seguro Popular on Investment and Savings using Difference in Difference Analysis](#)

The gradual introduction of *Seguro Popular* in Mexico allows one to exploit the variation of prior lack of health insurance to understand the immediate effects of this health policy on household investment and saving behaviors. For this purpose, the

difference-in-differences (DID) framework is used.¹⁹ Changes in the behavior of the control group capture any systematic factors unrelated to the program, while changes in the treatment group capture both those some systematic factors and the impact of *Seguro Popular*. The following equation will be estimated for each *PropInv*:

$$PropInv_{ijkt} = \vartheta_0 + \beta_1 OHI_{jk} + \beta_2 SP_{jk} + \beta_3 NewSP_{jk} + \gamma T + \delta NewSP_{jk} * T + \sum_{l=1}^n \rho_l X_{ljk} + \tau_k + \varepsilon_{ijkt} \quad (14)$$

where i indexes the type of investment, j indexes the household, k indexes the geographic region and t indexes the year. OHI is a dummy variable to identify households with other types of health insurance and SP is a dummy variable to identify households that participated in *Seguro Popular* during the whole period. $NewSP$ is a dummy variable that identifies households in the treatment group, those that were uninsured in 2008 and by 2012 were enrolled in *Seguro Popular*. Households that were uninsured during the 2008-2012 period are the reference category. A dummy variable for the year 2012 is represented by T . The dependent variable, *PropInv*, the additional controls (X) and the state fixed effects are described in section 5.1. ε_{ijkt} is an error term.

The interaction between $NewSP$ and T captures the early impact of access to *Seguro Popular*. Thus, the coefficient of interest is δ , which captures the program effect. Following the results of the model developed in Section 3, it is expected that δ would be negative when analyzing the low return investment measures. On the other hand, when analyzing the effects of access to *Seguro Popular* on human capital, durable assets, or high return savings, the sign of δ is expected to be positive.

¹⁹ We tested the parallel trends assumption using data from 2000 and 2002. The results suggest that there were no significant differences in the changes in investment and savings measures between insured and uninsured groups before *Seguro Popular* was established.

Insured households correspond to those households whose head of the households or working-age adults had health insurance as one of the benefits from his/her job. Another way in which we tested the parallel trends assumption, was by comparing agricultural vs. government workers, given that traditionally the agricultural sector lack of social security and health insurance, while the situation is the opposite for government workers.

The investment measures used for this test are the same as the ones described in section 4.3.

5.3. Identification of the Treatment and Control Groups

In order to perform the DID analysis in equation (14), it is necessary to classify the households into treatment and control groups. This section describes the procedure carried out to classify households into these groups.

The first step performed was to classify the sample into two groups: households that were the potential target of *Seguro Popular* and those households that had other types of health insurance. This paper assumes that the quality of the other health insurance options available in Mexico was better than the quality of *Seguro Popular* services²⁰, thus it is not expected for households to switch from other types of health insurance to be enrolled with *Seguro Popular*.

In the ENIGH data, it is possible to observe whether each household was affiliated with *Seguro Popular*, other healthcare institutions, or was uninsured. Households affiliated with *Seguro Popular* and uninsured households are defined as the potential targets of *Seguro Popular*.

The second step was to classify households into permanently uninsured households (U), new to *Seguro Popular* (NewSP), and permanently affiliated to *Seguro Popular* (SP). This is a challenge in this setting because the data is not a panel. It does not follow households over time. Therefore, it is necessary to infer for the uninsured households in 2008, whether they were affiliated to *Seguro Popular* in 2012, and for households affiliated with *Seguro Popular* in 2012, whether they were uninsured in 2008.

To perform these inferences, this paper used logistic regressions which are described in detailed in the following sections.

²⁰ A recent report from CONEVAL shows that although the number of beneficiaries of *Seguro Popular* has increased in the past years, the infrastructure, number of doctors and supplies has not increased at the same rate (see Table 7, pp34. in the report). In addition, the proportion of persons that did not get medical care when needed is higher for persons affiliated to *Seguro Popular* than for those with other types of health insurance (Figure 12, pp56.). (CONEVAL, 2014)

5.3.1. Identification of Potential Participants in 2008

In order to identify the pool of potential participants in 2008, a logistic regression predicting the probability of participation in *Seguro Popular* in 2012 was estimated. Then, the predicted probabilities of participation for 2008 were used to classify the group of uninsured households in 2008 into: i) always uninsured and ii) new to *Seguro Popular*.

Assuming that by 2012 all of the eligible households that wanted to participate in *Seguro Popular* were already affiliated, a logistic model was estimated to predict the probability of participation in *Seguro Popular* in 2012. In the sample, households with other types of health insurances were excluded. The set of control variables includes characteristics of the head of the household such as gender, age, educational attainment, and labor market characteristics (informality or self-employment) and household composition variables such as number of household members, women of childbearing age, household members (17 or 18 years old), number of children enrolled in school, proportion of informal workers in the household, participation in *Oportunidades*, a dichotomous variable identifying one-person households, and the proportion of household members with other types of health insurance. The results of the logistic model are reported in Appendix II, Table II.A.

$Prob(\widehat{Part}_{SP})$ is the predicted probability of enrollment in *Seguro Popular*, using the 2012 characteristics. Using this predicted probability in the 2008 sample of uninsured households, households were classified into two categories: households that were always uninsured, and households that were potential participants of *Seguro Popular*. The selected threshold value corresponds to the predicted probability that maintains a constant proportion of uninsured households in 2008 and 2012 (27.2 percent).

In summary, households in the 2008 sample were classified into three groups: i) households that always had *Seguro Popular* (households classified as been enrolled in *Seguro Popular* are the ones in this group), ii) potential participants in *Seguro Popular* (the group of households that were uninsured in 2008 but were probably enrolled in *Seguro Popular* by 2012), and iii) always uninsured households (the group of households that were uninsured in 2008 and probably remained uninsured in 2012).

5.3.2. Identification of Permanent Participants of *Seguro Popular* in 2012

In order to identify the households enrolled in *Seguro Popular* during the whole period, a logistic regression predicting the probability of participation in *Seguro Popular* in 2008 was estimated. Then, the predicted probabilities of participation in the 2012 sample were used to classify households with *Seguro Popular* in 2012 into households with permanent access to *Seguro Popular* and households new to *Seguro Popular*.

This logistic regression was estimated for the group of households that from the results of the previous section were classified as potential participants and households enrolled in *Seguro Popular* in 2008. The set of control variables used in the analysis is the same as the one described in section 5.3.1 in addition to state fixed effects (with Mexico City as the reference category). The results of the logistic regression are reported in Appendix II, Table II.B.

$Prob(\widehat{Perm}_{SP})$ is the predicted probability of enrollment in *Seguro Popular*, using the 2008 characteristics. Using this predicted probability in the sample of households enrolled in *Seguro Popular* in 2012, households were classified into two categories: households with permanent affiliation with *Seguro Popular*, and households that entered *Seguro Popular* between 2008 and 2012. The selected threshold value corresponds to the predicted probability that let us maintain a constant proportion of households with permanent access to *Seguro Popular* in 2008 and 2012 (16.9 percent).

By using the logistic model, we were able to classify the households into three groups: i) households that always had *Seguro Popular* (the group of households that were probably enrolled in *Seguro Popular* in 2008 and remained enrolled in 2012), ii) new participants in *Seguro Popular* (the group of households that were uninsured and potential participants in 2008 and were enrolled in *Seguro Popular* by 2012), and iii) always uninsured households (households classified as uninsured in 2012 are the ones in this group).

In summary, these two logistic specifications allow us to classify households into four categories: i) households with other types of health insurance (OHI), ii) households

that were uninsured throughout the period (U), iii) households affiliated with *Seguro Popular* throughout the period (SP), and iv) households that entered *Seguro Popular* between 2008 and 2012 (NewSP).

The same procedure was implemented excluding households that participate in *Oportunidades*, given that most of those households are enrolled with *Seguro Popular* as part of the program benefits. The results of the logistic regression for this subsample are reported in Appendix II, Tables II.A-B, and column 2.²¹

6. Empirical Results

The results suggest that households enrolled in *Seguro Popular* between 2008 and 2012 reduced the proportion of their investment in liquid, low return investments, compared to uninsured households. The results for the sample of households excluding participants in *Oportunidades* show that this decrease in liquid investment translates into a larger proportion of total investment in human capital. The empirical analysis is restricted to households whose head was between 25 to 65 years and had not yet retired.

6.1 OLS Estimates of the Effect of Enrollment in *Seguro Popular* on Investment and Savings

The OLS estimates of equation (13), which measure the effect of a change in the proportion of household members enrolled in *Seguro Popular* on the different investment and savings measures, are presented in Tables 5a and 5b. The tables report the coefficients of the effect of increasing the proportion of the household members affiliated with *Seguro Popular* on the different types of investment, for three different groups: all households, low income households, and rural households. Table 5a summarizes the coefficients of interest for the whole sample, while the results summarized in Table 5b exclude households participating in *Oportunidades*.

²¹ In order to perform sensitivity analysis, the same procedure was carried out but using an alternative definition of household enrollment to *Seguro Popular*. In this case the affiliation to *Seguro Popular*, other types of health insurance or uninsured was taken from the head of the household's health insurance affiliation status.

The OLS estimates indicate that *Seguro Popular* negatively affects investment in liquid, low return assets. Moreover, the trade-off between low and high return assets is mainly explained by a decrease in the proportion of the investment allocated to social capital, low return savings or human capital. An increase in the proportion of household members enrolled in *Seguro Popular* decreases the proportion of the investment allocated to low return assets by 1.11 percent in both specifications. The effect is larger for low income and rural households, with an estimated significant decrease of 3.35 percent for low income households in the whole sample and 4.38 percent for low income households excluding households participating in *Oportunidades*.

Investment in the household network and low return savings is negatively related to the proportion of members of the households enrolled in *Seguro Popular*. The effect in strengthening networks investment is negative and significant for low income households. The effect is larger when excluding households participating in *Oportunidades* (-2.12 percent vs. -1.79 percent). On the other hand, the effect of *Seguro Popular* on low return savings is negative and significant when analyzing all households. For this measure, the effect is also larger when excluding households participating in *Oportunidades* (-1.16 percent vs. -1.07 percent). The effect on consumer durable goods is ambiguous.

The effects on the illiquid, high return investments show a positive relationship between the proportion of household members enrolled in *Seguro Popular* and investment in human capital. Within the illiquid investments, the direction of the effect in investment in durable assets and high return savings is not the one expected, but the effect of *Seguro Popular* on human capital investment is positive and significant. An increase in the proportion of household members enrolled in *Seguro Popular* increases the proportion of the investment allocated to human capital by 2.55 percent for all households in the whole sample and 2.77 percent when excluding households participating in *Oportunidades*. The effect is larger for low income and rural households in both specifications. In the case of low income households the effect for the whole sample reflects an increase of 3.82 percent when increasing the proportion of household members with *Seguro Popular*, and when excluding households participating in *Oportunidades* the effect is 5.12 percent. For rural

households the effect is 2.30 percent for the whole sample and 3.18 percent when excluding households participating in *Oportunidades*.

The results suggest that an increase in the proportion of household members enrolled in *Seguro Popular* has significant effects on the reallocation of liquid investments to human capital. The results are robust to different specifications, and the effects are larger when excluding households participating in *Oportunidades*.

6.2 DID Estimates of the Effect of Access to Seguro Popular on Investment and Savings

The DID estimates of equation (14) measure the effect of beginning to receive *Seguro Popular* in the analyzed period (with respect to uninsured households) on the different investment and savings measures. The results are summarized in Tables 6a and 6b. As in the OLS specification, the results were estimated for all households, low income households and rural households. Table 6a summarizes the coefficients of interest for the whole sample, while the results summarized in Table 6b exclude households participating in *Oportunidades*.

The results for the whole sample show no significant evidence of an early effect *Seguro Popular* on most of the investment and savings measures, although the sign of the coefficient for liquid investments aggregate is negative. The only significant effect is found on high return savings measure for all households; gaining access to *Seguro Popular* increased the proportion of investment allocated into high return savings in 2.25 percent compared to uninsured households.

In contrast, when excluding households participating in *Oportunidades*, the results are significant and in line with the OLS findings. As shown in Table 6b, the DID estimates indicate that *Seguro Popular* negatively affects investment in liquid, low return assets. Gaining access to *Seguro Popular* decreases the proportion of the investment allocated to low return assets in 2.88 for all households, as well as for low income and rural households (2.89 percent and 6.70 percent, respectively). The effect is significant for the aggregate level of liquid investments, but within the group of low return investments, the effect is not significant.

The effects on the illiquid, high return investments show a positive relationship between the gaining access to *Seguro Popular* and investment in human capital. Similar to the OLS results, within the illiquid investments, the direction of the effect in investment in durable assets and high return savings is not the one expected, but the effect of *Seguro Popular* on human capital investment are positive and significant.

Gaining access to *Seguro Popular* increases the proportion of the investment allocated to human capital by 3.71 percent for all households and 3.62 percent for low income households. The effect is larger for rural households, with an increase of 8.56 percent when comparing households that are new to *Seguro Popular* and uninsured households.

The results suggest that households that were new to *Seguro Popular* and were not participating in *Oportunidades*, have significant effects on the reallocation of liquid investments to human capital.

7. Concluding Remarks

The investment decisions of the households in an economy are potentially one of the most important determinants of its long term growth. This paper studies the effect of access to public health benefits on the allocation of households' savings to different types of investment.

First, it shows in a simple model where a household faces financial constraints, the quantity of short term income risk affecting the household's optimal allocation of its savings into liquid assets. The larger short term risk that a household faces, the larger the savings that it will devote to liquid assets which can be used to face those risks. Second, using the introduction of a large public health system in Mexico, *Seguro Popular*, the paper estimates the effect of obtaining access to a public health on the investment allocations of households.

The estimations suggest that there is a statistically and economically significant change in the allocation of savings to illiquid, high return investments, relative to liquid,

low return investments for households that obtain access to the *Seguro Popular* program compared to uninsured households. Households invest more of their savings in illiquid, high return assets than they did before. In particular, the results suggest that households invested more of their savings in the development of their human capital than before. These results are limited to the population that does not have alternative insurance nor participates in *Oportunidades*, and is subject to a set of assumptions, most importantly, that the logistic regressions that identify the treatment and control groups are accurate.

These results suggest that, beyond improving the health and welfare of the population, the provision of public health benefits or health insurance has the potential to increase the long term growth of the economy by allowing credit constrained agents to invest their savings in high return assets.

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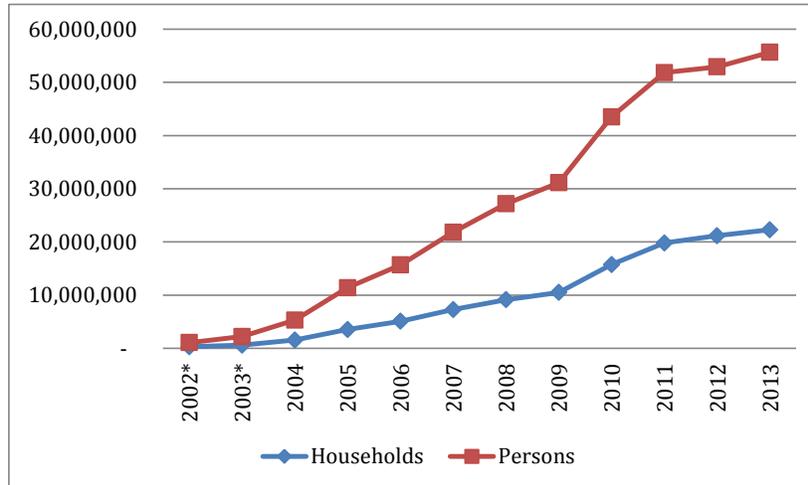
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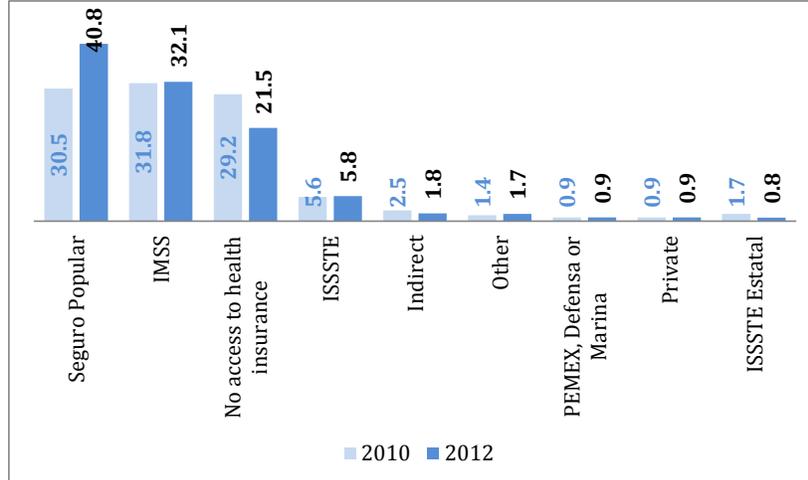
Figures and Tables

Figure 1 – Number of persons and households enrolled in *Seguro Popular*



Data: *Seguro Popular* administrative records
The years when the program was a pilot are marked with an asterisk *.

**Figure 2 – Types of health insurance
% of the population**



Source: CONEVAL, 2013.

Table 1 – Seguro Popular Annual Fee 2013

Income Decile	Annual Fee as a percentage of the GDP per capita
I, II, III, IV	-
V	1.6%
VI	2.2%
VII	2.8%
VIII	4.3%
IX	5.7%
X	8.6%

Source: Author's estimations based on Ley General de la Salud, Capitulo 5 and World Development Indicators.

Table 2 – Proportion of Households with Different Types of Health Insurance

	2008	2012
All Households		
Seguro Popular	17.5	38.7
Other Health Insurance	43.5	37.4
Uninsured	39.1	23.9
Low Income Households		
Seguro Popular	27.2	55.2
Other Health Insurance	25.6	19.6
Uninsured	47.2	25.2

Source: Authors' estimations using ENIGH.

Table 3 – Different Types of Investment as a Proportion of Total Investment

	All Households		Low Income Households	
	2008	2012	2008	2012
Human Capital	0.437	0.405	0.475	0.444
Durable Assets	0.051	0.049	0.018	0.013
Savings High Rtr.	0.117	0.109	0.062	0.064
Productive Capital	0.121	0.116	0.152	0.144
Social Capital	0.179	0.162	0.221	0.186
Savings Low Rtr.	0.095	0.159	0.072	0.149

Source: Authors' estimations using ENIGH.

Table 4 – Summary Statistics

	All Households				Households with Seguro Popular			
	2008		2012		2008		2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Head of the Household								
Age	46.28	14.41	46.91	14.90	43.76	13.71	44.96	14.73
Female	0.23	0.42	0.23	0.42	0.22	0.41	0.21	0.41
Educational Attainment ^A	2.79	1.76	2.55	2.06	1.97	1.27	1.74	1.63
Household								
Number of household members	4.21	1.97	4.08	1.96	4.80	1.95	4.56	2.10
Children aged 0 to 5	0.47	0.73	0.44	0.70	0.68	0.84	0.57	0.77
Children aged 5 to 18	1.33	1.31	1.15	1.23	1.89	1.43	1.51	1.33
Adults 65+	0.20	0.50	0.22	0.53	0.16	0.44	0.20	0.51
Number of women of childbearing age (15 to 49 years)	1.28	0.88	1.23	0.90	1.36	0.84	1.32	0.87
Live in urban area	0.81	0.39	0.80	0.40	0.53	0.50	0.63	0.48
Proportion of informal workers	0.29	0.38	0.27	0.38	0.07	0.20	0.09	0.22
Number of income earners	2.43	1.35	2.50	1.40	2.93	1.57	2.86	1.61
Maximum educational attainment	3.74	1.53	3.71	1.70	2.98	1.08	3.01	1.37
Proportion of children enrolled in school	0.72	0.37	0.71	0.39	0.73	0.35	0.71	0.37
Oportunidades	0.11	0.31	0.11	0.31	0.37	0.48	0.24	0.43

A: Educational Attainment is classified into the following groups: 0 = No elementary Education 1 = Incomplete Elementary Education 2 = Complete Elementary Education 3 = Incomplete Secondary Education 4 = Complete Secondary Education 5 = Some Higher Education 6 = Complete Higher Education 7 = Post-Graduate Education

Table 4 – Summary Statistics, continued

	Households with Other Types of Health Insurance				Uninsured Households			
	2008		2012		2008		2012	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Head of the Household								
Age	46.91	14.40	48.37	15.06	46.63	14.59	47.49	14.61
Female	0.22	0.42	0.23	0.42	0.25	0.44	0.27	0.44
Educational Attainment	3.40	1.79	3.37	2.09	2.44	1.65	2.50	2.09
Household								
Number of household members	3.90	1.73	3.68	1.71	4.32	2.16	4.01	1.98
Children aged 0 to 5	0.38	0.65	0.33	0.61	0.48	0.76	0.39	0.69
Children aged 5 to 18	1.09	1.12	0.89	1.06	1.37	1.38	1.02	1.18
Adults 65+	0.22	0.52	0.25	0.56	0.20	0.50	0.20	0.50
Number of women of chilbearing age (15 to 49 years)	1.22	0.84	1.14	0.89	1.31	0.93	1.23	0.95
Live in urban area	0.94	0.24	0.93	0.26	0.79	0.41	0.84	0.37
Proportion of informal workers	0.52	0.39	0.52	0.42	0.12	0.26	0.16	0.29
Number of income earners	2.27	1.18	2.25	1.15	2.40	1.38	2.36	1.30
Maximun educational attainment	4.27	1.55	4.36	1.72	3.46	1.46	3.71	1.70
Proportion of children enrolled in school	0.77	0.36	0.76	0.39	0.67	0.38	0.67	0.41
Oportunidades	0.02	0.14	0.02	0.13	0.09	0.29	0.05	0.22

A: Educational Attainment is classified into the following groups: 0 = No elementary Education 1 = Incomplete Elementary Education 2 = Complete Elementary Education 3 = Incomplete Secondary Education 4 = Complete Secondary Education 5 = Some Higher Education 6 = Complete Higher Education 7 = Post-Graduate Education

Table 5a - - Effects of Enrollment in *Seguro Popular* on Types of Investment

Dependent variable:	All Households	Low Income Households	Rural Households
Liquid Assets - Aggregated ^a	-0.0115 (0.0077)	-0.0335*** (0.0119)	-0.0143 (0.0140)
Consumer durable goods	0.0035 (0.0056)	-0.0080 (0.0085)	-0.0022 (0.0097)
Networks	-0.0043 (0.0061)	-0.0179* (0.0095)	-0.0082 (0.0121)
Savings Low Rtr.	-0.0107** (0.0052)	-0.0075 (0.0077)	-0.0039 (0.0091)
Human Capital	0.0255*** (0.0077)	0.0382*** (0.0118)	0.0230* (0.0139)
Durable Assets	-0.0140*** (0.0030)	-0.0047* (0.0028)	-0.0087** (0.0036)
Savings High Rtr.	0.0053 (0.0877)	-0.0780 (0.0921)	-0.0525 (0.1282)
Observations	32,667	10,223	7,531

Robust standard errors clustered at the municipality level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

a: Alpha low return is the sum of alpha productive capital, alpha network, and alpha low return savings.

Note: the sets of covariates include:

Characteristics of the Head of the Household: gender, age, educational attainment, and employment status.

Characteristics of the Household: urban status, number of household members, proportion of informal workers out of the income earners of the household, participation in *Oportunidades*, and dummy variables for the type of household: one-person household, single family household, and extended family household.

State fixed effects

Table 5b - - Effects of Enrollment in *Seguro Popular* on Types of Investment
Excluding households in the *Oportunidades* program

Dependent variable:	All Households	Low Income Households	Rural Households
Liquid Assets - Aggregated ^a	-0.0113 (0.0087)	-0.0438*** (0.0137)	-0.0183 (0.0170)
Consumer durable goods	0.0025 (0.0065)	-0.0116 (0.0108)	-0.0055 (0.0136)
Networks	-0.0022 (0.0069)	-0.0212* (0.0111)	-0.0048 (0.0157)
Savings Low Rtr.	-0.0116** (0.0057)	-0.0110 (0.0089)	-0.0080 (0.0117)
Human Capital	0.0277*** (0.0085)	0.0512*** (0.0135)	0.0318* (0.0168)
Durable Assets	-0.0164*** (0.0036)	-0.0074** (0.0037)	-0.0135** (0.0054)
Savings High Rtr.	-0.0163 (0.1093)	-0.1390 (0.1173)	-0.1361 (0.1678)
Observations	28,216	7,547	4,643

Robust standard errors clustered at the municipality level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

a: Alpha low return is the sum of alpha productive capital, alpha network, and alpha low return savings.

Note: the sets of covariates include:

Characteristics of the Head of the Household: gender, age, educational attainment, and employment status.

Characteristics of the Household: urban status, number of household members, proportion of informal workers out of the income earners of the household, and dummy variables for the type of household: one-person household, single family household, and extended family household.

State fixed effects

Table 6a - Effects of the Affiliation with *Seguro Popular* on Types of Investment

Dependent variable:	All Households	Low Income Households	Rural Households
Liquid Assets - Aggregated ^a	-0.0098 (0.0209)	-0.0083 (0.0249)	-0.0261 (0.0332)
Consumer durable goods	-0.0125 (0.0091)	-0.0118 (0.0157)	-0.0196 (0.0165)
Networks	-0.0117 (0.0129)	-0.0127 (0.0217)	-0.0175 (0.0196)
Savings Low Rtr.	0.0144 (0.0177)	0.0162 (0.0218)	0.0110 (0.0218)
Human Capital	-0.0121 (0.0229)	0.0020 (0.0279)	0.0345 (0.0316)
Durable Assets	-0.0006 (0.0055)	-0.0011 (0.0065)	0.0010 (0.0054)
Savings High Rtr.	0.0225** (0.0086)	0.0074 (0.0115)	-0.0094 (0.0152)
Observations	23,681	7,206	5,572

Robust standard errors clustered at the municipality level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

a: Alpha low return is the sum of alpha productive capital, alpha network, and alpha low return savings.

Note: the sets of covariates include:

Characteristics of the Head of the Household: gender, age, educational attainment, and employment status.

Characteristics of the Household: urban status, number of household members, proportion of informal workers out of the income earners of the household, participation in *Oportunidades*, and dummy variables for the type of household: one-person household, single family household, and extended family household.

State fixed effects

**Table 6b - Effects of the Affiliation with *Seguro Popular* on Types of Investment
Excluding households in the *Oportunidades* program**

Dependent variable:	All Households	Low Income Households	Rural Households
Liquid Assets - Aggregated ^a	-0.0288* (0.0154)	-0.0289 (0.0406)	-0.0670* (0.0383)
Consumer durable goods	-0.0096 (0.0121)	-0.0045 (0.0282)	-0.0004 (0.0289)
Networks	-0.0198 (0.0153)	0.0197 (0.0345)	-0.0432 (0.0344)
Savings Low Rtr.	0.0006 (0.0150)	-0.0441 (0.0287)	-0.0234 (0.0261)
Human Capital	0.0371** (0.0153)	0.0362 (0.0404)	0.0856** (0.0384)
Durable Assets	-0.0083 (0.0076)	-0.0073 (0.0088)	-0.0186 (0.0125)
Savings High Rtr.	-0.2540 (0.3450)	-0.0801 (0.2932)	-0.0234 (0.0261)
Observations	19,982	5,172	3,392

Robust standard errors clustered at the municipality level in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

a: Alpha low return is the sum of alpha productive capital, alpha network, and alpha low return savings.

Note: the sets of covariates include:

Characteristics of the Head of the Household: gender, age, educational attainment, and employment status.

Characteristics of the Household: urban status, number of household members, proportion of informal workers out of the income earners of the household, and dummy variables for the type of household: one-person household, single family household, and extended family household.

State fixed effects

Appendix I – Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)

The main objective of ENIGH is to provide information for the statistical analysis of the behavior of the households' income and expenditures. Data includes information on income and expenditure amounts, sources, and distribution; in addition to socio-demographic and labor occupational characteristics of the household members and dwelling infrastructure.²² The households are surveyed during 7 consecutive days between August 21st and November 28th of the particular year.

The ENIGH is available for the following years: 1984, 1989, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2005, 2006, 2008, 2010, and 2012. The new methodology for the ENIGH was introduced in 2008, featuring a socioeconomic conditions section which was designed to provide estimates of a multidimensional measure of poverty.

The survey is representative at the national level, but for some particular years it is also representative at the state level for some particular States. The 2012 ENIGH has fewer observations than the 2008 and 2010 ENIGHs, and it is representative only at the national level. In 2008 the survey was designed to be representative at the national level and at the state level for: Distrito Federal, Guanajuato, Jalisco, México, Sonora, Querétaro and Yucatán. For the case of the 2010 survey, it was designed to be representative at the national level and at the state level for Distrito Federal, Chiapas, Guanajuato, México, and Yucatán.

Sections included in the New ENIGH

Six questionnaires are applied to each household surveyed in the ENIGH. We used information included on questionnaires 1, 3, 5, and 6. Table I.1 shows the sections within the different questionnaires included in our analysis and the use of the information in our analysis. For example, we used a particular question from the *"1. Household Expenditure Questionnaire, Section I – Monthly Expenditures, Subsection 1.3 – Education, Culture, and Recreation"* to estimate the household annual investment on Education.

²² <http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/regulares/enigh/>

The new ENIGH features a health section for each household member (Questionnaires 5 and 6); the question regarding enrollment in *Seguro Popular* was introduced in 2006, but additional questions regarding other types of health insurance and medical attention were added in 2008.

Table I.1 – New ENIGH Questionnaires and Sections

Questionnaire	Section	Subsection	Variables
1. Household Expenditure	I. Monthly Expenditures	1.3 Education, Culture, and Recreation	Investment on Education
		1.5 Dwelling and services	Mortgage
	III. Semi-annually Expenditures	3.1 Household Equipment and Dwelling Maintenance	Household Productive Capital
		3.3 Transportation	Vehicle Payments
		3.4 Other Expenditures	Social Capital
	3.5 Financial Expenditures	Savings	
<hr/>			
2. Daily Expenses ^a			
<hr/>			
3. Household and dwelling	III. Sociodemographic Characteristics		Relationship to the Head of the Household, Age, Gender, Educational Attainment, and Labor Force Participation for each member of the household
	VI. Time to the Closest Hospital		Time, in minutes, to the closest hospital
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4. Household businesses ^a			
<hr/>			
5. Persons aged 12 years old and above	X. Health		Affiliation with Seguro Popular or other Health Care Providers
<hr/>			
6. Persons aged less than 12 years old	X. Health		Affiliation with Seguro Popular or other Health Care Providers

a: Questionnaire not included in this paper.

Appendix II – Logistic Regressions

A. 2012 – Potential Participants of Seguro Popular

Table II.A shows the results for the logistic regression that estimates the probability of affiliation to *Seguro Popular* in 2012.

Table II.A – Logistic regression, Affiliation to Seguro Popular in 2012

Dependent variable: Household enrollment in Seguro Popular	Whole Sample	Excluding households with Oportunidades
One person household	-0.7567*** (0.2142)	-0.6409*** (0.2140)
Proportion of formal workers in the household	0.1627 (0.2517)	0.2496 (0.2846)
Proportion of household members with other types of health insurance	-6.3124*** (0.2011)	-6.2506*** (0.1894)
Formality status of the head of the household	0.4986* (0.2723)	0.3803 (0.3075)
Self-employed status of the head of the household	-0.1317 (0.1367)	-0.2134 (0.1398)
Female head of the household	-0.174 (0.1676)	-0.2099 (0.1771)
Age of the head of the household	-0.0079 (0.0068)	-0.0078 (0.0074)
Educational attainment of the head of the household	-0.1617*** (0.0341)	-0.1648*** (0.0353)
Number of household members	0.0404 (0.0427)	0.0572 (0.0444)
Number of household members (5 to 25 years old) enrolled in school	0.1251** (0.0560)	0.1306** (0.0519)
Number of household members (19 to 25 years old) enrolled in school	-0.4222*** (0.1540)	-0.4424*** (0.1564)
Number of women of childbearing age (15 to 54 years old) in the household	0.0227 (0.0767)	0.0202 (0.0753)
Number of household members (17 to 18 years old)	0.0965 (0.2061)	0.1422 (0.2216)
Oportunidades	0.9484*** (0.1661)	
Size of the city	0.2512*** (0.0515)	0.2978*** (0.0515)
Constant	0.4904 (0.4021)	0.3426 (0.4108)
Observations	5,321	4,309
Pseudo - R ²	0.461	0.426

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

B. 2008 – Permanent Participants of Seguro Popular

Table II.B shows the results for the logistic regression that estimates the probability of affiliation to *Seguro Popular* in 2008, for those households classified as potential participants of *Seguro Popular*.

Table II.B – Logistic regression, Affiliation to Seguro Popular for Potential Participants in 2008

Dependent variable: Household enrollment in Seguro Popular	Whole Sample	Excluding households with Oportunidades
Proportion of formal workers in the household	-0.9162** (0.3697)	-0.9030** (0.3698)
Proportion of household members with other types of health insurance	6.8353*** (1.3270)	13.3263*** (1.3924)
Formality status of the head of the household	-0.1467 (0.2763)	-0.4833* (0.2612)
Self-employed status of the head of the household	0.1313 (0.1190)	0.4432** (0.1857)
Female head of the household	0.1357 (0.1548)	0.4171*** (0.1330)
Age of the head of the household	0.0076 (0.0051)	0.0127** (0.0059)
Educational attainment of the head of the household	0.3366*** (0.0362)	0.4566*** (0.0570)
Number of household members	-0.1864*** (0.0569)	-0.1471*** (0.0461)
Number of household members (5 to 25 years old) enrolled in school	-0.0192 (0.0581)	-0.2390*** (0.0649)
Number of household members (19 to 25 years old) enrolled in school	0.4994** (0.2530)	1.2378*** (0.3076)
Number of women of childbearing age (15 to 54 years old) in the household	0.1354 (0.1091)	0.0928 (0.0953)
Number of household members (17 to 18 years old)	-0.1315 (0.1054)	-0.4200*** (0.1148)
Number of household members (0 to 5 years old)	0.2804*** (0.0891)	0.2425** (0.0984)
Oportunidades	1.0672*** (0.1274)	
Expenditure decile	-0.0511** (0.0210)	-0.0992*** (0.0225)
Constant	0.8861*** (0.2289)	1.2307*** (0.3255)
State Dummies	YES	YES
Observations	5,362	3,410
Pseudo - R ²	0.147	0.221

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1