

Extended abstract

Can Health Insurance improve Health and reduce Mortality?:

Evidence from the Seguro Popular program in Mexico.

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1. Introduction

Social security in Mexico has historically provided health benefits to only a fraction of the population in Mexico, those participating in the formal sector. Those without social security coverage or private coverage have typically relied on the Secretary of Health institutions and out of pocket expenditures to cover health events. To address this lack of basic health coverage among the majority of the Mexican population, the Mexican government began the health insurance program Seguro Popular as a pilot in 2002, transitioning to a formal program in 2003. Since then, the Seguro Popular has expanded at an impressive rate, this health insurance program now covers approximately 51 million individuals, nearly half of the population of Mexico and is nearing its goal of covering nearly all of the population without formal sector health insurance. Over the span of a decade then, a large fraction of Mexico's population has transitioned from being uninsured to being covered by the Seguro Popular health insurance program.

Several previous studies of the Seguro Popular have begun to demonstrate that the program has significant effects on improving health usage indicators, including clinic and doctor visits, reducing catastrophic expenditures and increasing diagnostic tests and the probability of being in treatment, conditional on having a chronic disease. This paper studies whether these positive impacts of the program on utilization and increases in treatment are now leading to an effect on actual health outcomes and on mortality after a decade of the program.

The MHAS is an excellent option for studying mortality and health because of its large sample of the aging population, its detailed and extensive health information including biomarkers and the important fraction (over 20%) of the population who pass away over the span of the panel.

Furthermore, the 2001 round of the MHAS provides a convenient pre program round given the Seguro Popular program began in 2002. We study the impacts of Seguro Popular on health behaviors, the onset of chronic diseases and mortality.

2. Previous Literature

There are few previous studies of the Seguro Popular which study health status and none to our knowledge which study impacts on mortality. Two previous studies of the Seguro Popular program have documented an increase in the use of health services (Sosa-Rubí et al. 2009; Harris and Sosa-Rubí, 2009, Barros 2008) and a reduction in the probability of catastrophic health expenditures (Grogger et al. 2012, Galarraga et al. 2008, Barros 2008). With respect to impacts on health status, Barros, 2008 using the 2000 and 2006 round of the Mexican National Health Survey finds no impact of Seguro Popular on health outcomes. His empirical strategy relies on variation in coverage across states over time and between eligible and ineligible individuals.

Knox, 2008 uses the longitudinal evaluation surveys from the urban Oportunidades conditional cash transfer program (2002-2004) to study the health impacts of the program. She uses difference in difference methods to study the impacts for those who choose to affiliate versus those who did not. While her evidence suggests that the Seguro Popular program increases health care utilization, Knox does not find any impacts on reported health outcomes.

Bleich et al 2007 study the impact of the program for treatment of hypertension using propensity score matching methods and what database. The authors report that individuals with hypertension are 50% more likely to be receiving treatment with Seguro Popular coverage than without. The effect of doctor and nursing supply on coverage of antihypertensive treatment was

not significant but there was a significant interaction between Seguro Popular insurance and the supply of health professionals. In particular, impacts of Seguro Popular were greater in areas with a higher supply of health professionals.

Sosa-Rubi et al. 2009 analyze the impact of the Seguro Popular on access to health resources, treatment and blood glucose control among poor adults with diabetes using the cross-sectional 2006 National Mexican Health Survey. They use propensity score matching to compare individuals with and without the Seguro Popular and find that those enrolled in the Seguro Popular were more likely to report having had regular blood glucose control tests. However, while there was a higher likelihood of beneficiaries with diabetes being in control, the difference between beneficiaries and non-beneficiaries was not significant.

Parker, Saenz y Wong, 2014 study the impacts of the Seguro Popular program on utilization, use of diagnostic tests and treatment conditional on having a chronic illness. Their results show significant impacts on increasing doctor visits, on the probability of having a number of different diagnostic tests, including tests for diabetes and hypertension. Interestingly the impacts results are larger and more significant for residents of rural areas and for those living in areas with a greater supply of health services relative to having a lower supply of health services.

In summary, available studies suggest significant positive impacts of the Seguro Popular program on increasing the utilization of care measured by clinic and doctor visits, and a reduction in catastrophic health expenditures. A couple of studies are beginning to suggest that the program does impact for sick individuals the likelihood of their being in treatment for their disease/illness particularly in the cases of hypertension and diabetes. Over the longer period, one would expect these impacts on being in treatment to significantly impact health status. Our study,

which spans a decade after the Seguro Popular program, provides an opportunity to estimate the medium to long term effects of the Seguro Popular on health status and on mortality.

3. Program Description: Seguro Popular

The Seguro Popular is part of the Social Health Protection System (SPSS) that provides health coverage to individuals who are not affiliated to any social health institution such as IMSS (Mexican Social Security Institute) and ISSSTE (Social Security for Government Workers). The program is voluntary and public and covers 284 interventions as well as more than 1500 illnesses. The list of covered illnesses/procedures is published in a catalog by the Secretary of Health, (Catálogo universal de servicios de salud or CAUSES). The Seguro Popular began as a pilot in 2002 and was formally created on May 15, 2003.

The requisites to enroll in the Seguro Popular are: 1- be a resident of Mexico; 2- not be entitled to any other social security program; 3- have a Clave Unica de Registro de Poblacion or a birth certificate; 4- be able to pay the corresponding fee (see table below); 5- and attend one of the affiliated modules. To apply, the individual must attend to the nearest registration center (Módulo de Afiliación y Orientación), where a socioeconomic evaluation is realized. The following table shows the annual fees per family to the Seguro Popular according to their socioeconomic background. Coverage is also available on an individual level basis, at half the family level fee.

Seguro Popular beneficiaries are assigned to a health center that provides medical care or redirects to another center for further treatment. Any other health center will provide health care

in the case of an emergency or if the individual is not near the preassigned center. The following table shows how the affiliation to Seguro Popular has increased since it began.

4. Data

Our main data source is the Mexican Health and Aging Survey (MHAS). The Mexican Health and Aging Study (MHAS) is a prospective study of aging that includes a national sample of Mexicans aged 50 and older. The study uses protocols and survey instruments that are highly comparable to the U.S. Health and Retirement Study (HRS), and is funded by the National Institute on Aging/National Institutes of Health (NIA/NIH).

The baseline survey in 2001 was a national representative survey in Mexico of individuals born prior to 1951. Follow-up visits to the same individuals were conducted in 2003 and 2012. The sample for the MHAS baseline was selected from residents of both rural and urban areas, from the National Employment Survey (Encuesta Nacional de Empleo, ENE), carried out by the INEGI (Instituto Nacional de Estadística y Geografía) in Mexico; 11,000 households with at least one age-eligible resident were selected to be part of the MHAS baseline sample. The selected person and their spouse (regardless of age) were recruited to be part of the longitudinal study. The baseline survey was completed in the summer of 2001 with a sample size of 15,186 respondents. A direct interview was sought with each individual, and proxy interviews obtained when poor health or temporary absence precluded a direct interview. A follow-up survey was carried out in the summer of 2003; all age-eligible subjects from the 2001 wave were targeted even if they had moved. If the subject had died, an interview was conducted with an informed respondent. New spouses of respondents from 2001 were interviewed and included in the 2003 follow-up study for a total of 14,250 interviews including 546 on deceased persons that were

completed by next-of-kin interviews. A third wave survey was completed in 2012. During the 2012 survey 18,465 interviews were completed including 2,742 on deceased persons that were completed by a next-of-kin. Response/follow-up rates for 2001, 2003 and 2012 were 91.8%, 93.3% and 88.1%, respectively.

The MHAS provides excellent information on health expenditures, health facility utilization and health status, including biometric indicators and mortality. In particular, the MHAS includes detailed information on self-reported health and symptoms of illness, health care utilization in the different sub-systems of health in Mexico, life-style behaviors, depression, cognitive health and biomarkers including measurement of blood pressure, glucose, height and weight. The MHAS also provides a number of economic variables, including a labor history, all income sources, assets and wealth. The first round of the survey was carried out before the Seguro Popular program began and thus provides a convenient baseline for our analysis.

5. Methodology

We use two alternative strategies to estimate impacts of the Seguro Popular. To estimate impacts on mortality, we merge to the MHAS municipal level measures of the proportion of the population with Seguro Popular in the municipality overtime. The following equation demonstrates the strategy:

$$Y_{ist} = a + BS_{st} + CX_{ist} + e_{ist}$$

where Y_{ist} is the impact indicator of interest for individual i in municipal s in time t , S_{st} represents the proportion of individuals in municipal s in time t covered by the Seguro Popular program, X_{ist} are control variables and e_{ist} is the error term. The model then relates the proportion covered in a municipality to the probability of mortality over the panel period. The information on individuals affiliated derives from administrative records on the Seguro Popular which were provided by the Mexican National Commission on Social Protection in Health and the population numbers used to construct proportions from state level census data from the Mexican Statistical Institute (INEGI).¹

As a second strategy, we carry out difference in difference propensity score matching using before and after program information on health indicators (2001 and 2012) and self-reported information on participation in the Seguro Popular program. We use individual-level difference in difference matching estimators that take into account differences in observed characteristics between the beneficiary and non-beneficiary samples (Heckman et al. 1998). The approach is analogous to the standard regression estimator but does not impose functional form restrictions in estimating the conditional expectation of the outcome variable and reweights the observations according to the weighting functions implied by the matching estimators.

The propensity score matching estimators have two stages. In the first stage, the propensity score is estimated using a logistic model and a set X consisting of pre-program (2001) individual level, household-level and locality level characteristics. The second stage uses nearest-neighbor

¹ Censuses are carried out in 2000, 2005 and 2010. INEGI constructs population figures in between years by using a geometric model to extrapolate between years. Note that the National Population Council provides its own population series, adjusting for possible under-reporting of adjusts census numbers. Results using either the INEGI series or the CONAPO series are extremely similar.

matching and local-linear regressions to construct matched no-treatment outcomes for each treated individual. The difference-in-difference estimators have the advantage over after-program difference estimators of allowing for selectivity into the program to be based on unobserved fixed attributes (analogous to fixed effects). We use local linear matching and bootstrapping to calculate standard errors.

To judge the reliability of self-reported information on Seguro Popular participation, we carried out an exercise comparing the number of Seguro Popular beneficiaries in the weighted MHAS data with the actual numbers of beneficiaries in 2012 according to administrative data. Table 2 shows the results of this exercise by age group and gender. This exercise shows that Seguro Popular receipt is quite comparable in the MHAS and in the administrative data for the population 50 to 65. For the population over 65, the numbers of beneficiaries are somewhat lower in the MHAS, on the order of about 16% less, than according to administrative information. This is perhaps suggestive of a greater recall bias for the older population.

6. Preliminary Analysis

Graphs 1a and 1b present data on coverage by health insurance among the different providers in Mexico 2001 and 2012, by gender. Graph 1a shows that almost half of the population aged 50 (49.3% of men and 45.1% of women) in 2001 reports having no health insurance. About 40% of women and 35% of men are affiliated to IMSS (the Mexican Social Security Institute) and about 10% of men and women are affiliated to ISSSTE (the social security institution for government workers). By 2012, there are drastic changes in the health insurance status for this same population, interviewed 11 years later. Only about 17% of men and 14% of women report having

no health insurance. The Seguro Popular is clearly the main factor increasing the coverage of this population, with about 30% of both men and women reporting affiliation to the Seguro Popular in 2012. Proportions affiliated to IMSS and ISSSTE remain similar over this period. This analysis confirms that a substantial proportion of the population aged 50 and over without health insurance in 2001 had in fact obtained health insurance by 2012, due to the Seguro Popular program.

Figure 2 divides, by urban and rural residence, the population into four groups, those with any form of health insurance in both 2001 and 2012, those only with health insurance in 2001, those only with health insurance in 2012 and those without health insurance in both years. Figure 2 makes clear that the largest increases in health insurance coverage between 2001 and 2012 occurred for the rural population. For the urban population, 72 percent report having coverage in both years versus only 35 percent for the rural population. The population without coverage in 2001 and with coverage in 2012 is 20 percent for urban areas and 46 percent for rural areas. Thus, we may expect impacts of the Seguro Popular program to be stronger in rural areas than in urban areas.

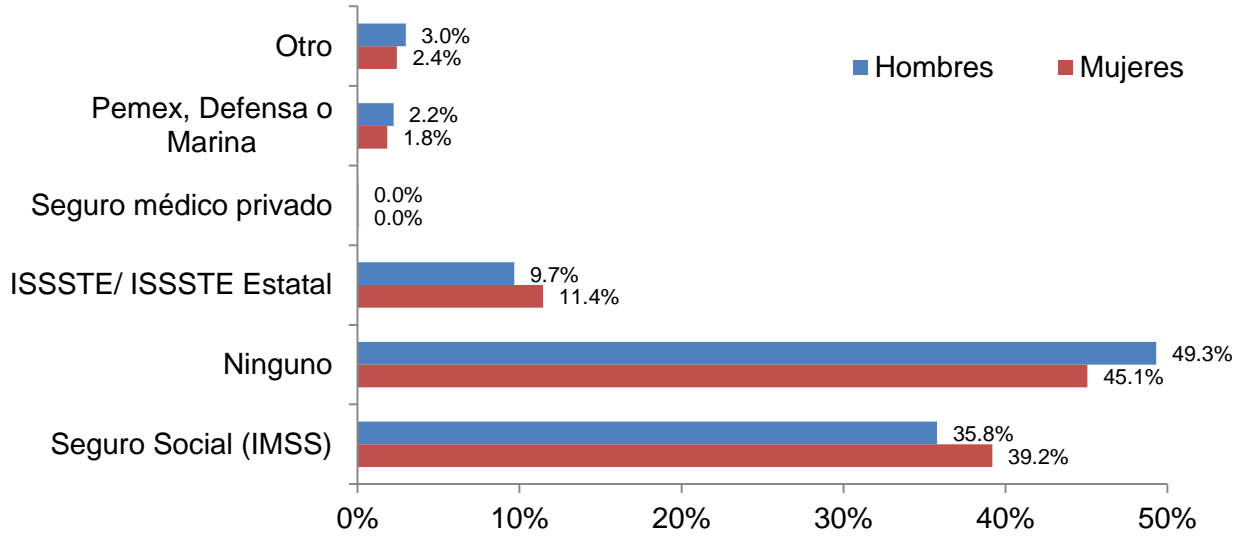
Table 1: Growth in the Seguro Popular program		
Year	Affiliated families	Affiliated individuals
2002*	295,513	1,094,236
2003*	613,938	2,224,411
2004	1,563,572	5,318,289
2005	3,555,977	11,404,861
2006	5,100,000	15,672,374
2007	7,307,173	21,176,914
2008	9,146,013	27,176,914
2009	10,514,325	31,132,949
2010	15,760,805	43,518,719
2011	19,811,349	51,823,314
2012		52,908,011

Table 2: Comparison of Seguro Popular Enrollment Reported in the Mexican Health and Aging Study (MHAS) (2012) with Estimates from Seguro Popular among Older Mexican Adults (Age 51+)

Age Group	<i>Enrolled Population (Seguro Popular Estimates†)</i>			<i>Enrolled Population (MHAS Estimates‡)</i>		
	Male	Female	Total	Male	Female	Total
51-60	1,704,585	2,014,639	3,719,224	1,587,190	2,029,923	3,617,113
61-65	578,045	665,665	1,243,710	701,120	686,474	1,387,594
66+	1,363,062	1,592,508	2,955,570	1,168,372	1,299,388	2,467,760
All (51+)	3,645,692	4,272,812	7,918,504	3,456,682	4,015,785	7,472,467

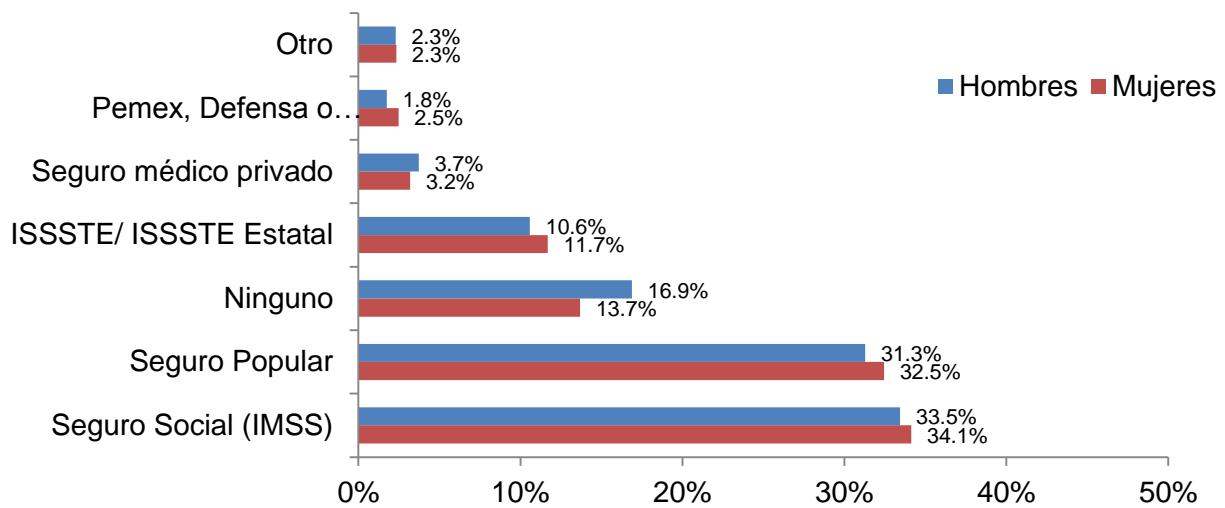
Note: † Estimates of the enrolled population from Seguro Popular are obtained from <http://www.seguro-popular.salud.gob.mx> and come from 2012. ‡ Estimates of the enrolled population from the MHAS are from 2012 and weighted using individual level population weights.

Figure 1a: Population aged 50 and over by type of health insurance, 2001.



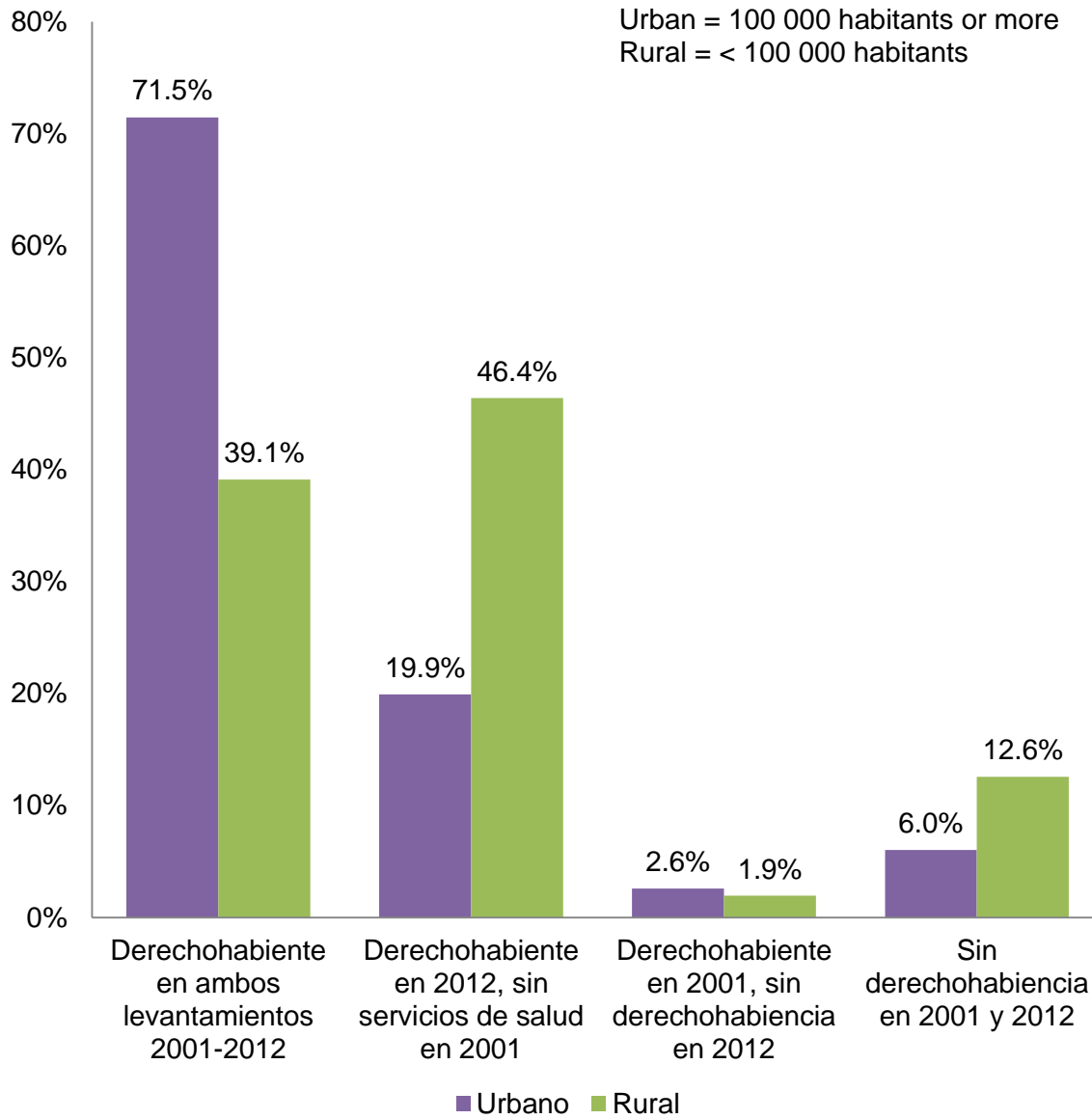
Source: Mexican Health and Aging Survey.

Figure 1b: Population aged 50 and over by type of health insurance, 2012.



Source: Mexican Health and Aging Survey.

Figure 2: Health insurance for MHAS individuals interviewed in 2001 and 2012.



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