Social Safety Net Programs and the Flow of Return Migrants: Evidence from the Public Provision of Health Insurance in Mexico

Melissa Knox[1] Jaime Lara [2]

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[1]Address: Department of Economics, University of Washington, 305 Savery Hall, Seattle, WA, USA. Email: knoxm@uw.edu.

[2]Address: División de Negocios, Universidad de Monterrey, Av. Ignacio Morones Prieto 4500 Pte., 66238 San Pedro Garza García, N.L. México. Email: jaime.lara@udem.edu

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Abstract

We estimate the effect of the introduction of Mexico's health care reform for the poor, Seguro Popular, on the decision of Mexican emigrants in the US to return. Treating low cost health insurance as a social safety net program, we find that access to Seguro Popular increases rates of return migration at the district level, and increases the hazard of return for individual migrants. Additionally, we find that the strength of this effect may not be equal for all demographic sectors, with younger, less educated, and male migrants exhibiting stronger responses to the presence of Seguro Popular in a district.

Insurance should affect migration through its ability to mitigate vulnerability to shocks and change the migrant's expected income. In fact, the availability of informal networks of social support in the destination country has long been studied as an important determinant of migration levels, and we expect to see more migration where such networks exist (**Munshi2003**). The existence of formal social safety nets in migrant receiving countries has also long been considered a draw to migrants (**Borjas1987**). We have not, however, adequately examined how the introduction of similar social protections in the country of origin might affect the decision to return home. This paper explores the effects of

such an introduction on return migration to low and middle-income countries. It does so by studying the impact of the introduction of a large social protection program, Mexico's *Seguro Popular* health care reform, on these flows.

Seguro Popular provides free or highly subsidized health insurance to most of Mexico's poorest residents, and is not tied to employment. Introduced in 2003, the program now provides coverage to over 50 million people in dedicated facilities located all over Mexico. There is strong evidence that the program has a protective effect for households exposed to negative health shocks (**Galarraga2010**; **Garcia-Diaz2011**; **Grogger2015**), and emerging evidence of positive impacts on health, as well (**Conti2014**; **Knox2016**; **Turrini2016**). Even in the absence of health impacts, though, access to Seguro Popular should serve as both an in-kind transfer in the form of free health care, and a reduction in an individual's risk of out of pocket health care payments as a result of potential negative health shocks.

In an expected utility framework, the introduction of Seguro Popular has the potential to alter a migrant's expected outcome on one side of the border, with significant implications for the decision to seek return migration. The spread of government-funded insurance in Mexico may also reduce the salience of social networks within the United States for the Mexican migrant, and may reduce the migrant's incentive to migrate in the first place if they view migration as a form of household insurance. In this paper, we develop a model of the role of insurance in the return migrant's decision to stay in the U.S. or return to

Mexico from both the individual and joint decision-making perspective. In both cases, our models predict that the introduction of formal insurance will induce return migration in the marginal migrant. We also discuss and explore cases where some migrants may be more likely to return home than others. These may include older migrants with greater need for health care, female migrants who may want to take advantage of Seguro Popular's generous childbirth-related benefits (or, conversely, male migrants who are more likely to have left nuclear families behind in Mexico), and unskilled migrants who are more likely to work in the informal sector and see a significant change in their health insurance access after Seguro Popular is introduced.

We then test our model's implications using data from the 2000 and 2010 Mexican Census, 2005 Conteo and 2015 Encuesta Intercensal combined with administration data from the Seguro Popular program. This time period covers the geographic roll-out of *Seguro Popular* across Mexico and also includes the Great Recession, a time period when the U.S. demand for workers in sectors that traditionally employ Mexican migrants, such as construction, fell sharply and rates of Mexican return migration increased accordinglyy (**Villarreal2014**). It is also a time period over which the patterns of Mexican emigration and return migration were changing. Not only was the geography of return migration changing as the sources of emigrants shifted from rural areas to larger cities (**Masferrer2012**), but selection of return migrants became increasingly negative over this time, especially among men (**CamposVazquez2012**). We find that the rate of return migration in a Mexican municipio (district) increases with increasing prevalence of Seguro Popular in the population. This result holds for all return migrants, male return migrants, and migrants with fewer than 12 years of education, even once we control for potential endogeneity using instrumental variables.

To test whether these results hold at an individual level, we then look at our data at the individual level and find that an individual living in a municipio with high prevalence of Seguro Popular is more likely to be return migrant, and that younger and unskilled

individuals are even more likely to be return migrants in high-prevalence municipios. Finally, we use survey data to follow individual migrants to the U.S. over time, using data from the Mexico Migration Project. We find that increasing prevalence of Seguro Popular in a migrant's home municipio increases the migrant's hazard of returning to Mexico from the U.S., but that this result does not hold for heads of household.

Our paper is part of a trend of increasing interest in the role played by Seguro Popular in Mexican's decision of where to locate after a migration event (**LopezGarcia2018**; **Mahe2017**). Our paper confirms these previous findings, and builds upon them in a few ways. First, we construct an economic model that is consistent with our findings. Second, we control for potential endogeneity in our results by using instrumental variables methods to control for potential covariance between return migration rates and the spread of SP. Finally, we investigate heterogeneirty in the impact of SP on migration by separating our analysis by age, sex, and education. Overall, our results are consistent with the model's predictions that access to social insurance in the migrant's country of origin will increase return migration and will have differential effects depending on the migrant's demographic characteristics. Our results have implications for designers of social programs who should consider not only those currently in the country when designing programs, but also those who may return. We see additional implications for Mexico's health sector if those who return are sicker or more in need of health care, although we cannot directly measure those outcomes with our data. In the present context, with low rates of health insurance enrollment among Latino migrants living in the U.S., and with potential changes in the U.S. health care system on the horizon, access to insurance through Seguro Popular could become an even stronger draw in the coming years.

1 Background on Mexico's Health Reform

Since the 1940s, only formal sector (tax paying, wage earning) workers and their families were part of Mexico's formal social security program. As a result, by 2000, only 50% of the population had protection, and those Mexicans who worked in informal markets had very little access to public forms of social insurance. Partly as a result, out of pocket health care spending was high given Mexico's level of development (**Knaul2012**). For example, between 2001 and 2006, around 50% of health expenditures were paid for out of pocket (Garcia-Diaz and Sosa-Rubi 2011), and 66% of out of pocket health spending was spent on medicines (**Wirtz2012**). In 2002, 3.9% of households incurred "catastrophic" spending (**Garcia-Diaz2011**).

In response to these issues, Mexico's health care system was reformed in 2002. One portion of Mexico′s health reform created a health insurance system that was to exist in parallel with the health insurance offered to the formal sector through IMSS, ISSSTE, and other employer-provided programs. This new program, Seguro Popular, would cover all of those that were previously ineligible for formal social security (i.e. the unemployed and those employed in the informal sector). Seguro Popular provided free access to newly built or remodeled health care clinics for basic health care needs. The program covers preventive, primary, secondary, and tertiary care (including hospitalizations), including diagnosis, treatment and medications for what was initially 91 essential health interventions, but was expanded to 284 interventions by 2012 (**Knaul2012**).

Due to the large costs associated with providing health insurance and building new health facilities, Seguro Popular's introduction was staggered within states by municipio (or district). Of the approximately 2,400 municipios in Mexico, some were accredited by the program and able to affiliate residents as early as 2003[1], while a few were not accredited until 2012. Figure **??** shows the number of municipios accredited by the year the municipio

[1]Technically, some municipios affiliated their first beneficiaries in 2002. They were part of the pilot of Seguro Popular, and many reverted to zero beneficiaries in 2003. For the purposes of this study, we set all beneficiaries to zero in 2002.

affiliated its first beneficiaries. The density of affiliates is shown in the Appendix in Figure **??**. By 2012, over 50 million individuals had affiliated with the program, suggesting that nearly all Mexicans without formal sector benefits received health insurance coverage through Seguro Popular (**Knaul2012**).

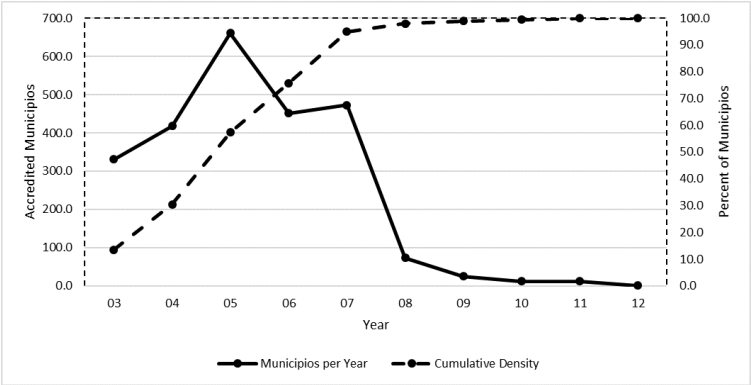

Figure 1: Accredited Municipios by Year of First Year of Affiliating Beneficiaries

Since families were not eligible for SP affiliation until their district had an accredited SP health care facility, there was geographic variation in SP eligibility over this time period. This geographic roll-out has been treated as a natural experiment in several studies measuring the impact of Seguro Popular. We follow this practice, the justification for which is discussed in Section **??** below.

A program as extensive as Seguro Popular is likely to have wide-ranging impacts on household and aggregate outcomes. The most notable effect of the program measured so far is the large reduction out of pocket spending on health care and medicines detected among poor households that affiliate with the program (**Galarraga2010**; **Garcia-Diaz2011**). However, these impacts are heterogeneous, and mostly found in urban areas (**Grogger2015**). The health impacts of the program are also important, but have so far been harder to detect. Researchers found little evidence of increased health care utilization and improved health outcomes in the early years of the program (King et al., 2009). More recent studies of the longer term impacts of the program have found health improvements due to Seguro Popular, though they are mostly concentrated among women and children (**Conti2014**; **Knox2016**;

Turrini2016).

For the purposes of the present study, we focus on the impact of Seguro Popular in reducing out of pocket spending on health care and the risks of facing catastrophic spending due to negative health shocks. As discussed in Section **??** below, we model these reductions as a change in the variance of individual health care spending.

2 The Role of Migration as Insurance

The literature on migration, risk, and insurance is extensive. Many papers focus on the role of the migrant as a form of insurance for family members who remain behind in the sending country. The reality of migration, however, is that it is often a joint decision between family members, all of whom have their own levels of risk tolerance and distribution of potential outcomes.

The most basic model of the migration decision will consider the expected costs and benefits of migrating for an individual decision-maker. The migrant considers the risks associated with migration, and cares about the utility of potential outcomes rather than the outcome itself. From here, we can predict the migrant's decision based on the distribution of potential outcomes for the migrant and the migrant's tolerance for risk (**Katz1986**). In this model, the role of insurance is to reduce risk of less favourable outcomes and increase the expected utility of one side of the migration decision.

Since we are specifically discussing health insurance here, it is also important to examine the role that health plays in the return migration decision. There are two ways in which health can affect the models discussed here. First, an adverse health event for a migrant may push the migrant to return home in order to receive care from her family or treatment in her native culture (**Razum2005**). Recent findings confirm that Mexican migrants conform to this "salmon bias" and Mexicans in the U.S. who experience poor health are more likely to return to Mexico than those who do not (**Arenas2015**), and this bias may be particularly

pronounced for older adults (**Riosmena2014**). The availability of less expensive and higher quality health care in Mexico (in the form of Seguro Popular) could exacerbate this trend by giving migrants in need of health care an even stronger incentive to return after experiencing a reduction in health.

Alternatively, and especially relevant when we consider migration as a form of joint insurance, migrants may choose to return home in order to care for an elderly parent or other relative who experiences poor health (**Zimmer2010**). If migrants are, in fact, returning home to care for sick relatives, the introduction of SP should reduce the need for both the physical work of elder care and the financial contribution that the migrant would otherwise be expected to make to the patient's medical bills (**Amuedo-Dorantes2011**). Finally, we must consider whether SP affects rates of emigration from Mexico. Emigration could be reduced if families with SP have less of a need to send a family member abroad to help pay for excessive out of pocket health expenditures. On the other hand, emigration could potentially increase if SP acts like an income transfer for poor families and increases their ability to pay to send a family member abroad, similar to the increase in emigration attributed to the Oportunidades cash transfer program (**Angelucci2015**). The effect of SP on emigration has been studied in recent work by López García and Orraca Romano (**LopezGarcia2018**). They find that SP affiliation does not reduce the number of emigrants per household. They also find suggestive evidence that the number of returnees in affiliated households does increase, however, in accordance with the findings of this study.

2.1 Modeling the Migration Decision

Following (**Borjas1987**), we model the migration decision as a choice based on the expected utility from living in one of two locations: Country 0 and Country 1. Since we are primarily looking at the migrant′s return decision, we consider the decision to move from Country 1 to Country 0. Country 0 can be the migrant′s home country, Mexico, while Country 1 is the United States.

Since the introduction of publicly financed health insurance is our focus, we consider earnings net of health care spending instead of simply earnings, as in Borjas **Borjas1987**. We call this quantity disposable income. The contribution of health care spending to disposable income comes from both the mean level of spending on health care in Country i, and a random component ϵ_i. The random component has a mean of zero and a variance that can be quite large due to the potential for some negative health shocks to be very costly [2].

For example, Mexicans working in the United States have disposable income

$$ln\, w_1 = \mu_1 - h_1 + \epsilon_1 \tag{1}$$

Where μ_1 are average earnings, h_1 is the average health care spending for Mexicans in the US, and spending due to health shocks is $\epsilon_1 \sim N(0, \sigma_1^2)$. Meanwhile, the disposable income of migrants if they return to Mexico would be

$$ln\, w_0 = \mu_0 - h_0 + \epsilon_0 \tag{2}$$

Where μ_0 are their average earnings in Mexico, h_0 is average health care spending, and $\epsilon_0 \sim N(0, \sigma_0^2)$ reflects the potential for variations in spending due to health shocks. Since the origin of the health shocks is at least partially due to the migrant$'$s underlying health and behavior, ϵ_1 and ϵ_0 are correlated with correlation coefficient ρ. In a standard decision-making framework under uncertainty, the migration decision will be made based on a comparison of expected utilities in Countries 0 and 1. The Mexican worker in the US, then, will decide to return to Mexico if the following holds

$$E[U(ln\, w_0)] > E[U(ln\, w_1)] \tag{3}$$

[2]Earnings are also affected by health care needs either as an explicit cost that decreases net income or as lost earnings due to untreated health conditions if the migrant can't afford to purchase health care. We don't explicitly consider these pathways here, but, if they exist, they would tend to complement the effect of Seguro Popular on migration that we are investigating

We additionally assume that migrant's are risk averse, or that $U'(lnw) > 0$ and $U''(lnw) < 0$.

This decision rule becomes return to Mexico if

$$E[U(\mu_0 - h_0 + \epsilon_0)] > E[U(\mu_1 - h_1 + \epsilon_1)] \tag{4}$$

Performing the Taylor expansion and taking expected utilities of both sides yields an approximation of the decision rule

$$(\mu_0 - h_0) + \frac{\sigma_0^2}{2}U''(\mu_0 - h_0) > (\mu_1 - h_1) + \frac{\sigma_1^2}{2}U''(\mu_1 - h_1) \tag{5}$$

And in equilibrium, then, we would have equality between the expected utilities

$$(\mu_0 - h_0) + \frac{\sigma_0^2}{2}U''(\mu_0 - h_0) = (\mu_1 - h_1) + \frac{\sigma_1^2}{2}U''(\mu_1 - h_1) \tag{6}$$

With the introduction of a social protection program on one side of the border but not the other, we should see σ^2 on that side of the border fall. Since $U''(\mu_i - h_i) < 0$, we predict an increase in expected utility in the country that introduces the program. In a system that was formerly in equilibrium, the equality in (**??**) will become and inequality, with expected utility in country 0 greater than expected utility in country 1. This will induce movement to country 0 (return migration to Mexico).

The above suggests that an individual agent motivated by self-interest will be more likely to return to Mexico after the introduction of Seguro Popular. Many migrants, however, are not solely interested in their own well-being, but in that of other people – including family members who do not themselves engage in migration. Hence, migration from Mexico is often modeled as a joint decision between the potential migrant and a person who stays in Mexico (the stayer). The migrant and the stayer decide whether the migrant should move to the United States, or return home to Mexico, based on maximizing the expected sum of their utility functions. Each party's utility is based on their individual consumption, but total

consumption is constrained by their joint income. We explore this scenario in the Appendix, in Section **??**. The relevant prediction in this section is the same as that found above: All else equal, migrants will be more likely to return to their sending country if that country introduces a social protection program.

We would note that these considerations apply with to migration within and between states within a single country if there is geographic variation in access to social protection, as was the case with Seguro Popular during its introductory period. In the case of interstate migration, Country 1 would be the migrant′s home state and Country 0 is the destination state in the models described in Section **??** and Section **??**. Another potential outcome of our model is that access to SP might reduce the migrant's incentives to leave Mexico in the first place. If this is the case, we could have potentially lower return migration to affected areas due to fewer people leaving in the first place. We cannot directly detect this outcome with our data, but if this is happening, it would only serve to downwardly bias our results and lead us to understate the impact of SP on the desirability of remaining in Mexico. Both of these questions have been investigated by Mahe (**Mahe2017**), who uses a different data set to find a positive effect of the program of SP on internal, but not international migration, without studying return migration. Since all eligible Mexicans had an expectation of receiving access to Seguro Popular within a few years of its introduction (as Figure **??** shows, the majority of municipios had been accredited by 2006) and our data do not allow us to detect migrants within states, we choose to focus only on international return migrants for this study.

2.1.1 Selection among Return Migrants

In the preceding discussion, we have assumed that migrants are homogeneous in their risk of health care expenses and income loss due to illness. However, this is not true for at least two reasons. The first is the rather obvious point that some people are healthier than others. Overall, Mexican immigrants in the U.S. enjoy a mortality and health advantage over native born non-Hispanic whites. This advantage could be attributed to self-selection

into migration by the healthiest Mexicans. It can also at least partially be explained by the "salmon bias" hypothesis, the claim that the least healthy immigrants return to Mexico rather than receive health care in the U.S., and therefore only the healthy migrants remain in the U.S. long enough to appear in mortality statistics (**Arenas2015**). If this hypothesis is true, the introduction of SP could increase the flow of the unhealthy, exacerbating the bias. Whether or not it is true, however, we should observe that the return migrants in SP-accredited districts are older and have lower health status than the average return migrant.

The second source of risk is the type of employment agreement that the migrant is able to enter. In both Mexico and the U.S., the out of pocket costs related to health care depend heavily not only on the whether the migrant has health insurance but on the quality of their health insurance. In the U.S., health insurance is frequently obtained as a benefit of employment, and may not be easily obtained by immigrants, especially those without at least permanent resident status. In fact, in 2014 (after the introduction of the Affordable Care Act and its individual mandate), 31 percent of non-citizen immigrants in the U.S. Census had no health insurance at all, while only 9 percent of native born citizens had no insurance (**Smith2015**). In Mexico, before the Seguro Popular reform, about half of the population had no health insurance, faced large out of pocket costs, and lower quality of care than those with health insurance. We should then expect to see that the migrants who are less likely to have access to formal health insurance in Mexico would face a greater risk of economic loss due to illness in both countries.

Overall, we should then predict that, among return migrants, those with poor health and those in the informal labor market should be more likely to return to areas where they have the ability to affiliate with SP to insure against health-related risk. Additionally, we may see that migrants in poor health and those unable to obtain health insurance in the U.S. will be more likely to return to Mexico once SP is introduced. Since both health and formal sector employment are correlated with education, this additionally means that we should see return migration among the less educated increase in areas where SP is introduced.

3 Estimation Strategy

3.1 Data

Our primary data are from Mexico's 2000 and 2010 Census, the 2005 Conteo de Población y Vivienda, and the 2015 Encuesta Intercensal. The data sources include a host of personal characteristics for each individual counted, including a measure of every person over the age of five whose place of residence changed in the last five years. The migrant's previous Mexican state or country is recorded. For our purposes, if a respondent lived outside of Mexico five years before data collection, they are counted as a return migrant. We combine this data with *municipio*- (or district-) level data on literacy, education, and other measures of social and economic development from CONEVAL, Mexico's Council for the Evaluation of Social Development Policy. These latter variables serve as control variables in our regressions.

The change in access to social insurance is measured by data on the number of Seguro Popular beneficiaries affiliated to the program by year and district between 2002, when the program began, and 2014. Due to the cost of the program and the need for state governments to contribute to its financing, SP was rolled out over time and by region. Figure **??** shows the accreditation of municipios over time. As a consequence of this geographic roll out, eligible Mexicans gained access to the program on a rolling basis, only as their municipio of residence became accredited to the program. Additionally, not all eligible Mexicans chose to affiliate as soon as they were able to do so, and so there is additional variation in the prevalence of the program even within accredited municipios, over time. We discuss this further in Section **??**.

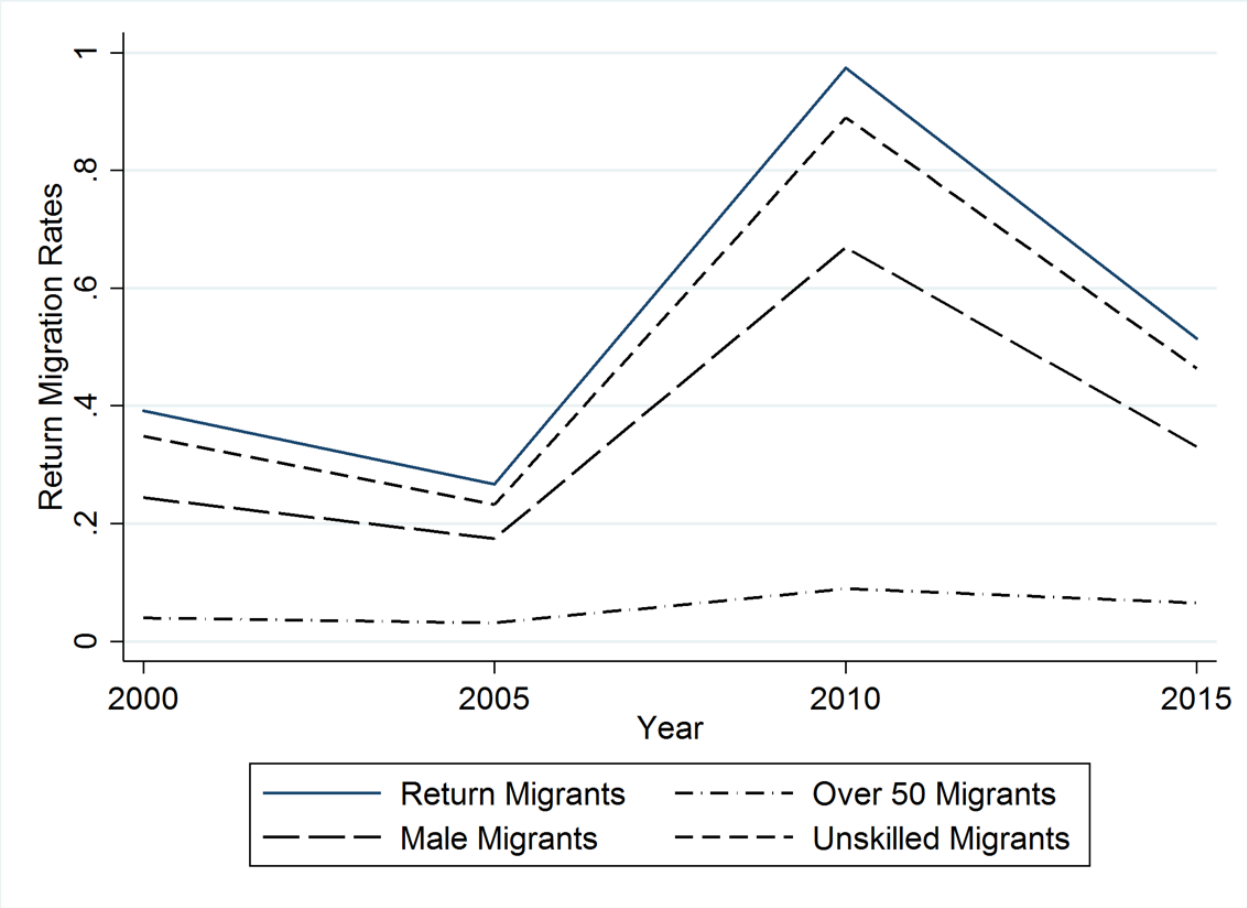

Figure 2: Municipality Level Migration by Year

Table ?? gives characteristics of the 2,457 *municipios* that existed in Mexico in 2000, weighted by the population of the *municipio*. And in Figure ??, we show the population-weighted average return migration rates across all Mexican municipios in each of the four data years available, as well as return migration rates broken down by age, sex, and education. In the figure, we see large increases in all types of return migration except migration of adults over 50, between 2005 and 2010, a time period that corresponds to the 2008 U.S. economic downturn. After 2010, rates of return migrants in the population decline.

Table 1: Weighted Municipio Summary Statistics in 2000

	Mean	Std. Dev.	Min	Max
Proportion of Population SP Eligible	56.8%	19.7%	0%	100%
Proportion of Return Migrants in Last 5 Years	0.39%	0.51%	0.0%	5.8%
% No School for 6-14 Year Olds	7.7%	4.2%	0.0%	56.2%
% No Drinking Water	16.2%	17.2%	0.0%	100%
% No Electricity	11%	12.5%	0.0%	98.8%
% Living in Rural Area (pop<2500)	24.9%	29.7%	0.0%	100%

Source: 2000 Census and Coneval for 2,442 municipios. Statistics are population weighted.

Table 2: Summary Statistics for MMP161 Data

	1 Return Migrants	2 Migrants in the US
N	3608	4424
Male	0.81	0.70
Age at Interview	43.1	36.4
Schooling	7.11	7.95
Household Head	0.60	0.13
Year Last Migration	1994	1996
Undocumented Migrant	0.77	0.75
Total US Trips	1.68	1.30
Agricultural Worker in the US	0.19	0.07
Community Migration	0.16	0.17
Household Migrants	2.43	3.69

Source: Mexico Migration Project. Migration information only for last trip. Data from 2002-2016.

We also perform supplementary analysis on individual-level data from the Mexican Migration Project (MMP). This collaborative research project has gathered data on Mexican migrants and their households since 1982 [3]. The current version of this data, called MMP161, consists of 27,113 households surveyed from 161 Mexican communities. Household members are surveyed both in Mexico and the United States and contains detailed migration histories. Table **??** shows the summary statistics for this sample, with Column 1 showing statistics for migrants who have returned from their most recent trip to the U.S. and Column 2 showing statistics for migrants who are still in the U.S. We combine the migration histories for respondents who have ever migrated to the United States with community-level data, including the number of SP beneficiaries in the migrant's home municipio.

3.2 Aggregate Migration Model

We begin by calculating the rate of return migration in *municipio* m in year t for each year of data available

$$r_{mt} = \frac{\#Returners_{mt}}{Population_{mt}} \tag{7}$$

We can then estimate the effect of Seguro Popular access on rates of return migration for the four years we observe using the following empirical model

$$r_{mt} = \alpha + \beta_1 SP_{mt} + \beta_2 X_{mt} + \gamma_m + \phi_t + \epsilon_{mt} \tag{8}$$

Where SP_{mt} is the prevalence of *Seguro Popular* in municipio m at time t. The control variables included in X_{mt} are municipio-level characteristics that reflect local infrastructure, and population density measured as the proportion of the population that lives in a town with fewer than 2,500 individuals. *Municipio* fixed effects are represented by γ, and control for time-invariant differences in migration patterns and economic conditions across the country,

[3] Data available at: mmp.opr.princeton.edu

while year fixed effects, ϕ, control for yearly trends that affect return migration in the country as a whole. In this regression and those that follow, standard errors are clustered by *municipio*, the geographic unit at which the program was introduced.

This approach has a few limitations. The first is that we will not be able to count any person as a return migrant who left Mexico and then chose to return within the last five years. So, we might not catch the most temporary of migrants. We are also measuring migration with such a large lag that our measure of prevalence of Seguro Popular in the observed year may not be reflective of the migrant′s access to the program at the time they chose to migrate. We risk biasing our results due to this measurement error.

As discussed in the previous section, we also use this model to estimate the effect of Seguro Popular on interstate migrations. Because of the design of the questions in the census and conteo, we are unable to identify any interior migrants that moved between *municipios* but within a single state. This limitation means that we are severely underestimating internal migration, and are likely to be underestimating the impact of SP on this type of migration.

3.3 Individual Migration Model

The aggregate model is capable of showing that migration increases in areas with greater access to SP, but does not rule out the hypothesis that the change is only on the intrinsic margin and migrants shift their destination, but not their decision to migrate, based on access to SP. The following set of models seek to explore the individual migrant's characteristics in order to understand the decision more fully. First, to test the impact of SP on the individual characteristics of return migrants, we use individual-level Census and Conteo data for the years 2000 to 2015. We have education, sex, and age for every individual over five in each *municipio*. We also know where that individual lived five years previously, and assign them to the status of "return migrant" if they lived outside of Mexico or "interstate migrant" if they lived in a different state. This data is combined with the same set of indicators for SP access used in the previous section as well as the CONEVAL *municipio*-level poverty data.

The following equation is estimated on the individual-level census data

$$r_{imt} = \alpha + \beta_1 SP_{mt} + \beta_2 Z_{imt} + \beta_3 Z_{imt} * SP_{mt} + \beta_4 X_{mt} + \gamma_m + \phi_t + \epsilon_{imt} \tag{9}$$

We perform a linear regression with a dummy outcome variable, r_{imt} that is 1 for a person that is classified as either a return or internal migrant. In addition to SP_{mt}, the prevalence of SP in the municipio at time t, we include individual-level explanatory variables, Z_{imt}. These are age, years of education, and a dummy variable for sex. We also include interactions between these three individual characteristics and SP access in the year studied in the person's municipio of residence, given by SP_{mt}. As in equation **??**, we also include the CONEVAL poverty measures for the municipio of residence, and year and municipio fixed effects to control for time trends and regional differences in mean migration.

Since our data do not contain information about the migrants who chose to stay in the US, this analysis does not allow us to claim anything about the characteristics of return migrants relative to the migrants who do not return. We also cannot detect whether the introduction of SP in a migrant′s home town increases their likelihood of returning home. We can, however, interpret the coefficient β_1 as the impact of SP access on any particular individual in a *municipio* being a return (or internal) migrant. The analysis in Equation **??** also gives us information about the characteristics of all return (and internal) migrants relative to all non-migrants, indicating whether there is selection in migration, even if we cannot draw conclusions about all migrants as a group. It also tells us if this selection is different for migrants returning to areas with SP access. The coefficients on the individual's demographic characteristics, β_2 provide insight into whether return migrants are younger or older, more or less educated, and more or less likely to be male than the typical Mexican.

To address potential selection, the coefficients on the interaction terms, β_3, measure the impact of SP on the demographics of return migrants. For example, from the discussion in Section **??**, we expect that the coefficient on the interaction between age and SP to be

positive since we have predicted that older people will be more attracted than a younger person to a region with free health insurance, all else equal. Since we control for both age and SP access in the regression, a positive coefficient on the interaction can be interpreted as the additional impact that age has on migration within regions with SP access.

3.4 Hazard Model with Survey Data

Finally, we are able to estimate the relationship between SP access and an individual's propensity to return by analyzing individual-level panel data from the Mexican Migration Project (MMP161). We estimate a hazard model to measure the effect of the prevalence of Seguro Popular in a migrant's home town on the length of time that the migrant chooses to remain in the United States. There is information about 169,945 individuals in 161 communities across the country. For the purposes of our study, we only look at communities surveyed after 2002, and individuals who began their last trip to the U.S. after 1960. This gives us a total of 8,032 individuals. Out of these, 2,019 are heads of the surveyed households, 3,892 are adult children of the heads, and another 2,121 are either spouses or grandchildren of the heads.

Table **??** shows the summary statistics for this population, broken down by those who had returned at the time of the survey (Column 1- Return Migrants) and those were still in the U.S. (Column2 - Migrants in the US). We see from this table that in both cases, the majority of migrants are male, have an average education level of around 7 years, and are mostly undocumented in the U.S. and therefore less likely to have health insurance. The migrants who have had returned from their last trip are also older than those still in the U.S. (43 years vs. 36 years), are much more likely to be head of household (60 percent vs. 13 percent), and are much more likely to be agricultural workers (19 percent vs. 7 percent)

Using data on the length of these migrants' last trips to the U.S., we estimate a Box-Cox hazard model to find the impact of SP prevalence on the migrant's hazard of returning to Mexico.

We estimate

$$h(t|z) = h_0(t)e^{(z(t)\beta)} \tag{10}$$

Where z(t) is a vector of individual and community characteristics at time t including the prevalence of SP in the migrant's municipio of origin as well as the migrant's age, sex, education, and U.S. documentation. In this model, $h_0(t)$ is the baseline hazard.

4 Identification

In order for the models in Equations **??**, **??**, and **??** to produce causal estimates of the impact of SP on return migration, we need to assume that the prevalence of SP in a municipio is exogenous to pre-existing migration trends and any economic factors that might drive migration. A priori, we have no reason to believe that this is true. Most studies that claim to measure causal impacts of the SP program on health or economic outcomes have instead used the introduction of SP or the duration of exposure to SP as measures of SP access. These studies take advantage of the natural experiment created by the staggered geographic roll out of the SP program between 2003 and 2012. In our case, however, due to the timing of the Census and Conteo data, we find that there is not enough variation in this access variable if we only look at it every five years. Figure **??** shows the timing of accreditation of the 2,447 Mexican municipios studied. It shows that about 60% of municipios were accredited between 2000 and 2005 (the first post-SP year in our data) and nearly all of the remaining municipios were affiliated by 2010. The spread of SP within accredited municipios has much more variation in time, however. In Figure **??**, the prevalence of SP is shown to vary widely by municipio in both 2005 and 2010. We further break down SP prevalence by municipio accreditation period for the three time periods of interest in our data: Pre-2005 accreditation, accreditation between 2005 and 2010, and post-2010 accrediation. The

variation in prevalence over time is shown for municipion in these three groups in Figure **??**.

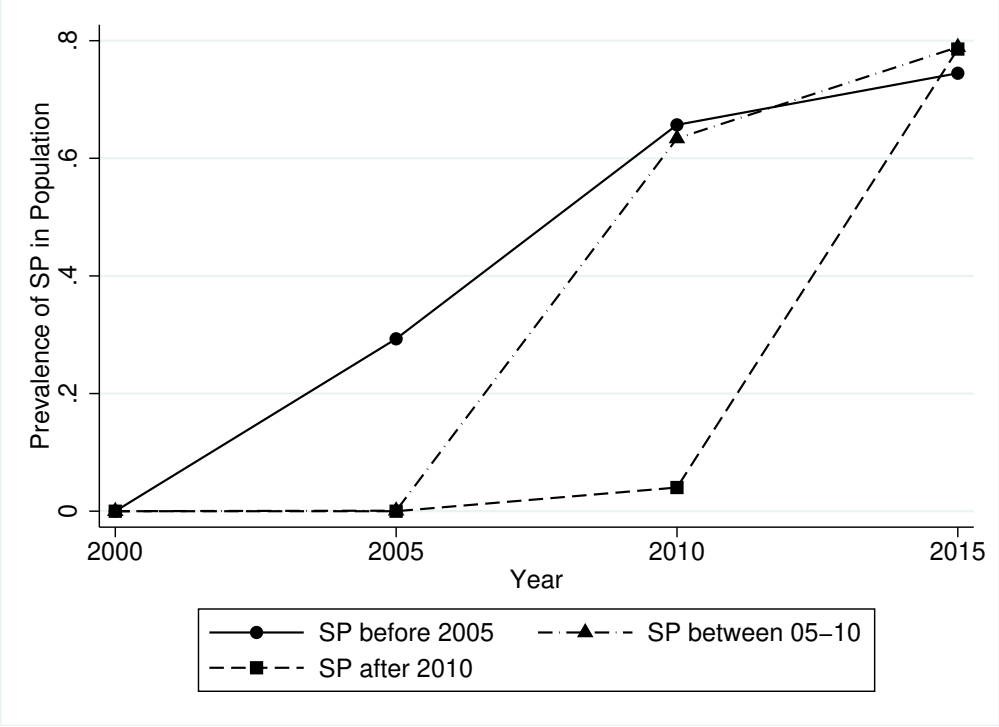

Figure 3: SP Prevalence over Time by Municipio Accreditation Period

In order to use prevalence as our primary indicator of SP access while still maintaining causal identification assumptions, we choose to use the natural experiment of staggered roll out as an instrument for SP prevalence in an instrumental variables estimation of the models described in the previous section. As stated above, the treatment of the staggered roll out of SP as exogeneous to economic and health outcomes is common in the literature on SP's causal impacts. In Bosch and CamposVazquez (**Bosch2014**), the authors explicitly test whether economic, demographic, and political conditions in a municipio before 2000 can predict the timing of a municipio's entry into the Seguro Popular program. They find that municipio and state populations have some predictive power, but the share of the population covered by formal social security (and thus not eligible for SP), industry shares, schooling, and poverty indices have no effect. Some effect of wages and unemployment on SP accreditation were found, but only for the group of municipios that accredited during the pilot phase of the program. These results suggest little to no economic influence on a state's decision to accredit one municipio over another. On the other hand, municipio-level SP accreditation has been found to be tied to political motivations, including political ties of the state governor at the time of accrediation (**Barros2008**) and the desire to fully affiliate the populations of as many municipios as possible in advance of the 2006 election (**RiveraHernandez2016**).

In Table **??**, we create our own version of the test performed by Bosch and Campos-Vazquez. We estimate the impact of municipio-level characteristics in 2000, including rates of return and internal migration, log population, proportion of the population without formal social security (IMSS, ISSSTE, etc.), proportion of the population that is rural, and socio-economic deprivation index created by CONEVAL on several outcomes. The first two columns of Table **??** show the effect of these variables on the year of SP adoption in the municipio, and on the adoption of SP in the municipio before 2006, a presidential election year in Mexico. In both of these columns, we see that municipios with larger populations join SP earlier, while those with fewer covered by social security, and greater deprivation join later. There is no measurable relationship between rates of either return or internal

migration and timing of SP adoption, however. Unfortunately, our data do not allow us to measure any difference in migration trends between early and late adopters due to the lack of a migration question in the 1995 Conteo.

In this same table, we also explore whether there is a relationship between migration rates in 2000 and SP prevalence. In Columns 3-5 of Table **??**, we see that internal migration in 2000 is predictive of SP prevalence in 2010 and 2015 and return migration is predictive of prevalence in 2015. This is only weak evidence of the endogeneity of prevalence, especially with return migration, our main result. This conclusion is supported by López García and Orraca Romano (**LopezGarcia2018**) as well, who find that there is no relationship between the average number of migrants per household in 2000 and the expansion of SP at the state and municipio level. In what follows, we show both instrumental variables results and results that treat SP prevalence as exogenous and discuss the difference between the two.

Table **??** shows the first stage of a two stage least squares regression that uses years of exposure to SP as an instrument for SP prevalence. This is similar to the IV techniques used by Rivera-Hernandez and co-authors (**RiveraHernandez2016**) and by Knox (**Knox2018**). As we discuss further in Section **??**, this first stage meets the criteria for a valid instrument in that we reject the null hypothesis of weak instruments and we show evidence of its exogeneity in Table **??**. We also consider using only years of exposure to SP as our excluded instrument, however this is a weak instrument, especially in the case of the aggregate estimates. In unreported results, we find that using this single omitted instrument gives coefficients of similar magnitude, but with larger standard errors and therefore fewer significant findings than the case with two instrumental variables.

Table 3: Return Migration in 2000 and Seguro Popular Adoption

	1 Year of Intro	2 Intro before 2006	3 2005 SP Prev	4 2010 SP Prev	5 2015 SP Prev
Rate of Return Migration, 2000	-0.04	0.02	-0.00	0.01*	0.02***
	[0.04]	[0.01]	[0.01]	[0.01]	[0.00]
Rate of Internal Migration, 2000	-0.00	-0.01*	-0.00	-0.01***	-0.01***
	[0.01]	[0.00]	[0.00]	[0.00]	[0.00]
Log of Municipio Population, 2000	-0.27***	0.08***	0.01***	-0.01	-0.02***
	[0.03]	[0.01]	[0.00]	[0.00]	[0.00]
Share of Pop. with No Social Security, 2000	6.45***	-0.88***	-0.26**	-0.27**	-0.05
	[0.80]	[0.27]	[0.12]	[0.11]	[0.08]
Share of Pop. that is Rural, 2000	-0.49***	0.20***	0.09***	0.11***	0.12***
	[0.11]	[0.04]	[0.02]	[0.01]	[0.01]
CONEVAL Socio-Economic Index, 2000	0.28***	-0.11***	-0.01*	0.07***	0.09***
	[0.04]	[0.01]	[0.01]	[0.00]	[0.00]
Observations	2,442	2,442	2,442	2,442	2,442
R-squared	0.20	0.13	0.02	0.26	0.54

Source: Census/Conteo/Intercensal data from 2000-2015. Linear regression with year and municipio fixed effects. Estimates weighted by municipio population. Robust SE in brackets, clustered at municipio level. ***p<0.01, ** p<0.05, * p<0.10

5 Results

5.1 Aggregate Results

To address potential endgogeneity between SP prevalence and migration rates, we estimate the model in Equation ?? above using instrumental variables, as described in Section ??. In Table ??, we show these results along with a the results of the first stage of the instrumental variables regression. Column 1 shows the first stage, while Columns 2 through 5 shows regression results for all return migrants, return migrants over 50, male return migrants over 5 years, and adult return migrants with fewer than 12 years of education, who we designate as "unskilled". All four models include year and municipio fixed effects and are weighted by municipio size. Standard errors are clustered at the municipio level. The results in Table ?? show that there is a positive and significant relationship between return migration for the population as a whole and for all sub-groups except migrants over 50. The coefficients shown indicate an increase in percent of return migrants in the population when SP prevalence goes from zero to 100 percent in a municipio. The effects are positive and significant for all return migrants and all sub-groups of return migrants, except for migrants over 50. For reference, the weighted average rates of return migration from 2000 are also given in Table ??. The IV estimates suggest that a 100% increase in SP prevalence would produce an average increase in return migration of 374% for all migrants, 483% for male migrants, and 502% for unskilled migrants.

The F-statistic for the first stage is 836, well above the numbers conventionally required for instrument relevance. We additionally perform two tests to show the validity of our IV model: Hansen's J statistic is a test of overidentifying restrictions and we fail to reject the null hypothesis that the excluded instruments are uncorrelated with the error term in all columns. The Kleibergen-Paap LM statistic is a test of instrument relevance and for this test we reject the null hypothesis that the instruments are weak (**Cameron2015**).

The estimated coefficients in this table appear to confirm that it is access to SP that is

Table 4: Effect of SP Prevalence on Municipio Level Migration Rates

	1	2	3	4	5
	First Stage	All Return	Over 50	Males	Unskilled
SP Prevalence		1.46*	-0.1	1.16**	1.76**
		[0.80]	[0.15]	[0.57]	[0.78]
Years of SP	0.05***				
	[0.00]				
% Rural Population	-0.59***				
	[0.14]				
% 6-14 Years Not in School		0.96	-0.8	0.63	1.89
		[2.84]	[0.53]	[2.02]	[2.75]
% No Drinking Water		0.49**	-0.03	0.40**	0.60***
		[0.23]	[0.04]	[0.16]	[0.22]
% No Electricity		1.40*	0.01	1.10**	1.63**
		[0.76]	[0.13]	[0.53]	[0.74]
OLS Estimates of SP Prev		0.44***	0.02	0.37***	0.47***
		[0.08]	[0.02]	[0.05]	[0.07]
2000 Mean Dep Variable		0.39	0.04	0.24	0.35
R-squared		0.37	0.11	0.38	0.31
Number of mpio		2,456	2,456	2,456	2,456
Hansen's J (p-value)		0.82	0.52	0.9	0.9
LM Stat (p-value)		0.001	0.001	0.001	0.001

Source: Census and Conteo data from 2000-2015. IV regression with year and municipio fixed effects. Excluded instruments are years in SP and % rural. Estimates weighted by municipio size. Robust SE in brackets, clustered at municipio level. ***p<0.01, ** p<0.05, * p<0.10.

driving return migration and not economic conditions or reverse causality. We also show the OLS coefficients on SP prevalence in Columns 2 to 5. These are considerably smaller than the IV coefficients, but still statistically significant and economically meaningful, with the exception of migrants over 50. This could suggest that the OLS estimates are downwardly biased due to omitted variables. This is plausible if we consider that the municipios with the greatest prevalence of SP are also more likely to be poor municipios that attract fewer return migrants, as suggested by the positive coefficients in Columns 4 and 5 in Table **??**. Our null results on older return migrants might be partially explained by the results discussed in Section **??**. As we will discuss in that section, household heads are much less responsive to the introduction of SP than their adult children, suggesting that those who are well-established in the U.S., potentially with documentation and access to health insurance, are not attracted by the benefits offered by SP. It is reasonable to expect that this group is much more likely to be over 50 years old.

5.2 Individual Results

5.2.1 Results from Census Data

The results for the individual level estimation of SP's impact are seen in Table **??**. Following the aggregate specification, to instrument SP prevalence and their interactions we use years of SP exposure, rural population and their interactions with age, schooling and gender. These results bolster the findings of the aggregate results, showing that individuals in regions that move from zero SP prevalence to 100 percent SP prevalence are 0.9 percentage points more likely to be return migrants than to be stayers in a fixed effects estimation and even higher with instrumental variables. This is the additional effect of SP introduction over reference group prevalence of return migration, and is similar to findings by López García and Orraca Romano (**LopezGarcia2018**), who find that the average household in areas with high SP coverage is more likely to contain a return migrant than the average household in areas with low SP coverage.

We also include interactions between the prevalence of SP and age, schooling and gender for all individuals. The coefficients on these interaction terms show that return migration in SP regions is associated with lower levels of schooling, younger ages and being males, with the instrumental variables specification introducing no substantive changes in the sign and significance of the effects.

5.2.2 Hazard Model Results

These results are in Table **??**. In addition to SP prevalence, we include controls following Lindstrom (1996). They show that SP prevalence does have a positive impact on the hazard of return migration to Mexico from the U.S., although this result appears to be driven mainly by the adult children of household heads and not the heads themselves. Additionally our results indicate that men, older, more educated and undocumented have more hazard to return. To further explore the impact of Seguro Popular on return migration we estimate the survival function with and without the presence of the program for adult children of household heads in Figure**??**. This figure shows significantly lower survival for migrants from municipalities with high Seguro Popular prevalence, meaning a higher probability of return migration. We estimate the same function for household heads, shown in the Appendix in Figure **??**. As expected from our regression results, there is no obvious difference in survival for migrants from high prevalence regions.

6 Discussion

We have approached the question of whether Seguro Popular induces return migration to Mexico in several ways. We have looked at both the aggregate and individual level impacts of the program on return migration, and have found them to be strong and significant. Given that the evidence for endogeneity in the spread of Seguro Popular is weak, we present both OLS and IV results. Our main results suggest that a move from zero to 100% prevalence of

Table 5: Seguro Popular Prevalence and Individual Migration Outcomes

	FE	FE Instrumental Variables
SP Prevalence	0.919***	2.059***
	[0.084]	[0.205]
SP Prevalence*Schooling	-0.023***	-0.038***
	[0.004]	[0.006]
SP Prevalence*Age	-0.024***	-0.039***
	[0.002]	[0.002]
SP Prevalence*Sex	0.954***	1.634***
	[0.065]	[0.087]
Schooling	0.007***	0.015***
	[0.002]	[0.003]
Age	-0.007***	-0.004***
	[0.001]	[0.001]
Sex	0.325***	0.138***
	[0.029]	[0.034]
F First Stage		
SP Prevalence		24.90
SP Prevalence*Schooling		368.53
SP Prevalence*Age		485.13
SP Prevalence*Sex		446.17
Year Fixed Effects?	Yes	Yes
Municipio Fixed Effects	Yes	Yes
Observations	30,329,155	30,329,155
Number of Municipios	2,457	2,457

Source: Census and Conteo data from 2000-2015. : Individual level includes individuals with age>=21. Excluded instruments: years in SP, years in SP x Schooling, years in SP x Age, years in SP x sex, % Rural, % Rural x Schooling, %Rural x Age and % Rural x sex. Additional controls: % no drinking water, % no school for 6-14 year olds, % no electricity, % rural. Effects in percentage points. Robust SE in brackets, clustered at municipio level. ***p<0.01, ** p<0.05, * p<0.10.

Table 6: Effect of SP Prevalence on Hazard of Returning to Mexico

	1 All	2 Household Heads	3 Adult Children
SP Prevalence	0.23***	0.04	0.74***
	[0.08]	[0.09]	[0.26]
Sex (Male=1)	0.12**	0.23**	0.40***
	[0.05]	[0.10]	[0.11]
Age	0.05***	0.01***	0.07***
	[0.002]	[0.004]	[0.005]
Years of Education	0.03***	0.01*	0.06***
	[0.007]	[0.007]	[0.02]
Undocumented	0.66***	0.61***	0.99***
	[0.09]	[0.10]	[0.19]
Observations	52039	7310	40754
Subjects	6494	2019	3892

Hazard model estimated based on last U.S. trip for household heads and adult children of household heads using MMP161. Additional controls: number of trips to US, agricultural worker, rate of community migration, number of migrants in household, indicators of survey year, no drinking water, electricity or school for 6-14 years old at municipality level. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

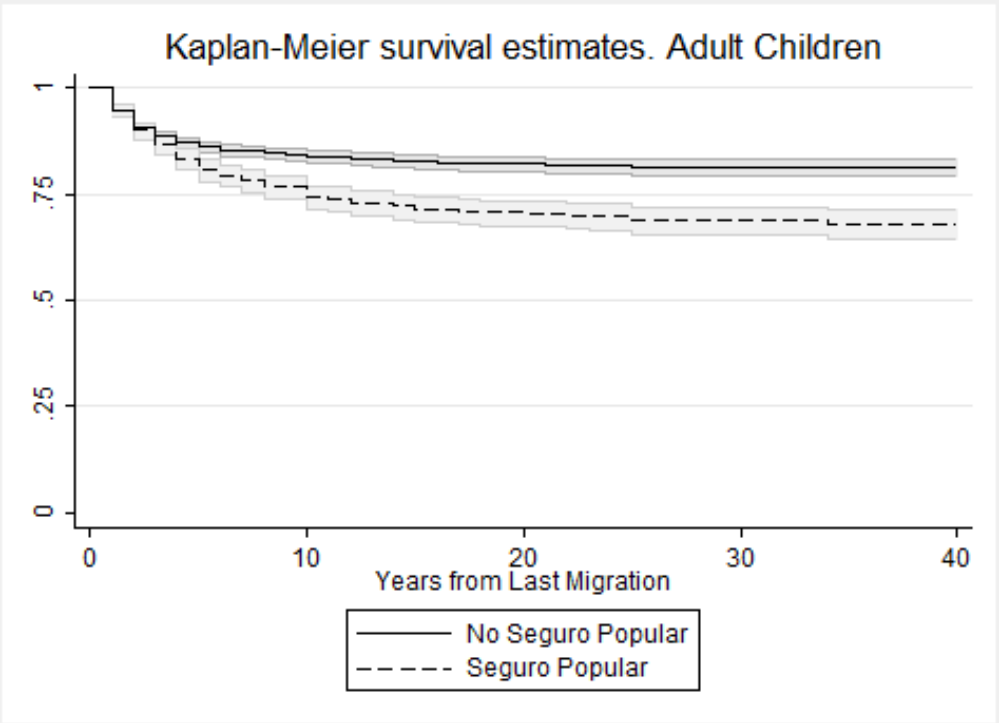

Figure 4: Kaplan Meier Results for Children of Household Heads

SP in a municipio would increase return migration by somewhere between 0.44 percentage points (OLS results) and 1.46 percentage points (IV results). To put the size of this effect in context, average SP prevalence increased from 12% to 42% between 2005 and 2010. In that same period, the share of the population that was return migrant in the last 5 years went from 0.27% to 0.97%. Our estimated coefficients suggest that between 19% and 63% of this change can be attributed to the increase in prevalence of SP.

These results conform with previous findings that access to informal insurance networks increase migration and are consistent with theories that claim that migrants are attracted to receiving countries that offer social safety nets (**Borjas1987**; **Munshi2003**). However, there have been far fewer inquiries into the impact of social safety nets on return migration to a low or middle income country.

Our findings can take a step further than this literature, however, by directly addressing the income elasticity of return migration in response to increased access to insurance, a concept not previously explored in the literature. Previous research has found that takeup of SP reduces the likelihood of catastrophic out of pocket health expenditure by 43-46% (**Grogger2015**; **Galarraga2010**). Using a definition of catastrophic health spending as spending at least 30% of disposable income on health care expenses, we can translate these results into an expected savings of at approximately 13% of disposable household income for affiliated families facing potential catastrophic expenses We calculate an income elasticity of return migration of +6.7, at least for those facing catastrophic medical expenses. This is a conservative estimate of savings, of course, as catastrophic spending is not the only type of spending reduced by SP affiliation. Galarraga and co-authors (**Galarraga2010**), for example, find that the average affiliated households saves $600 pesos per year relative to the uninsured, while only 10% of SP eligible households suffered catastrophic expenditures. We are also unable to address potential health impacts of SP access here, although improved health outcomes should also bring with them an additional financial advantage. What is clear from these results is that there is a strong migration response to the type of security

provided by SP, potentially over and above what would be expected from an equivalent income transfer. While not directly comparable, previous studies of the income elasticity of outmigration (that is, the responsiveness of out migration to an income shock that relieves liquidity constraints and makes migration easier) find estimates ranging from 0.25 to 2.3 (**Angelucci2015**; **Bazzi2017**).

Eventually, as the Seguro Popular program spreads and provides nearly full insurance coverage across Mexico, we may see a reduction in the push factors driving migrants out of Mexico and use of remittance money to support health care spending among family members left behind in Mexico (**Amuedo-Dorantes2011**). This outcome becomes increasingly likely as health care protections for non-residents in the U.S. remain elusive. On the other hand, as the discussion above highlights, if SP has acts as an income transfer to families, then we could see an increase in migration of some family members, especially among those who were formerly constrained from migrating by lack of credit.

7 Conclusions

We investigate the relationship between access to social insurance in the migrant's home country and return migration by estimating the impact of Mexico's Seguro Popular program on return migration to Mexico between 2000 and 2015. We look at both aggregate trends in return migration and individual level data from Mexico's Census, Conteo, and Intercensal. We take advantage of the natural experiment created by the geographic roll-out of SP by using years since introduction as an instrument for municipio-level prevalence of the program. Our results show that Seguro Popular has had a measurable effect on rates of return migration to Mexico at the aggregate level, and that individuals are more likely to be return migrants when they live in municipios with high SP prevalence. These results are heterogeneous, with the impact of SP being stronger for males and the unskilled. Results on heterogeneity by age are mixed, but they suggest that older migrants are less likely to return migrate in

response to the spread of SP. Additionally, we supplement our findings by investigating the relationship between SP prevalence and the hazard of returning among a sample of Mexican migrants who have migrated to the US since 2002, when SP was introduced. We find that SP prevalence in a migrant's home municipio will increase the hazard of returning to Mexico, but only for the adult children of household heads and not the heads themselves.

Our results suggest that policy makers in countries with high rates of migration should consider the effects of the policies they introduce on the migration decisions of their country's citizens. Social safety net policies like Seguro Popular have the potential to not only increase return migration (or decrease out-migration), but to affect selection among migrants and return migrants. These impacts may have long run consequences for the economic and political sustainability of such projects. With many low and middle income countries moving to introduce universal health care programs, we should expect to see that the patterns detected in Mexico may repeat themselves all over the world, with demographic and labor market consequences in both high and low income countries.

A Appendix

A.1 Modeling Migration as a Joint Decision

We assume, for simplicity, that income is pooled and both parties receive an equal share, regardless of their place of residence. Moreover, migrants have access to an insurance network in the United States that reduces their shocks by a factor w, that is between zero and one and depends negatively on the size of their network n. Stayers also have access to an informal insurance network that reduces the size of their shocks with the same mechanism. Total income for persons i and j, living in countries k and l, would then be

$$I_{ij} = \mu_{ik} + \mu_{jl} - h_{ik} - h_{kl} + w(n_{ik})\epsilon_{ik} + w(n_{jl})\epsilon_{jl} = c_{ik} + c_{jl} \tag{11}$$

$$c_{ik} = c_{jl} = \frac{1}{2} I_{ij} \tag{12}$$

In the case where persons i and j are identical in their expected earnings and health care spending, we can simplify income to depend only on country of residence in the following way

$$I_{ij} = \mu_k + \mu_l - h_k - h_l + w(n_k)\epsilon_k + w(n_l)\epsilon_l \tag{13}$$

Then, using $y_{kl} = \mu_k + \mu_l - h_k - h_l$ the joint expected utility of persons i and j can then be written

$$E[U(c_i) + U(c_j)] = E[2U(c_i)] = E[2U(\frac{1}{2}(y_{kl} + w(n_k)\epsilon_k + w(n_l)\epsilon_l))] \tag{14}$$

Taking the Taylor series expansion gives the approximate value for the expectation $E[2U(c_i)]$ as

$$E[(y_{kl} + (w(n_k)\epsilon_k + w(n_l)\epsilon_l))U'(y_{kl}) + \frac{(w(n_k)\epsilon_k + w(n_l)\epsilon_l)^2}{2} U''(y_{kl})]$$

or, the expected joint utility with individuals in countries k and l, assuming that the covariance ρ is zero, is

$$E[U_{kl}] = y_{kl} + \frac{w^2(n_k)\sigma_k^2 + w^2(n_l)\sigma_l^2}{2} U''(y_{kl}) \tag{15}$$

The migrant will return to country zero if the expected joint utility of both parties will be increased by their return. Otherwise, they will choose to stay. The decision rule for returning is then, move if

$$y_{00} + w^2(n_0)\sigma_0^2 U''(y_{00}) > y_{01} + \frac{w^2(n_0)\sigma_0^2 + w^2(n_1)\sigma_1^2}{2} U''(y_{01}) \tag{16}$$

As in the previous section, we see that the derivative of the expected joint utility with respect to σ^2 should be negative, implying that the left hand side of (14) will increase as σ_0^2 decreases due to the introduction of health insurance, and return migration to Mexico is expected to increase. Furthermore, if all else is equal, the right hand side will be larger for migrants with a larger network in the United States, and these individuals will require a larger reduction in σ_0^2 to be induced to return.

An interesting consequence of this framework could be seen if n_0 and n_1 are related; the model might suggest that higher migration might emerge in response to previous migration undermining the informal insurance network available in the country of origin (**Munshi2016**). This is a complication we put to one side at present, however. We put aside, similarly, the thought that our model might be able to predict the temporal duration of a migrant's sojourn in another society or another region. While these ideas are worthy of further inquiry, we restrict ourselves in the present paper to examining the effects of programs like Seguro Popular on the decision-making of return migrants.

A.2 Supplementary Figures

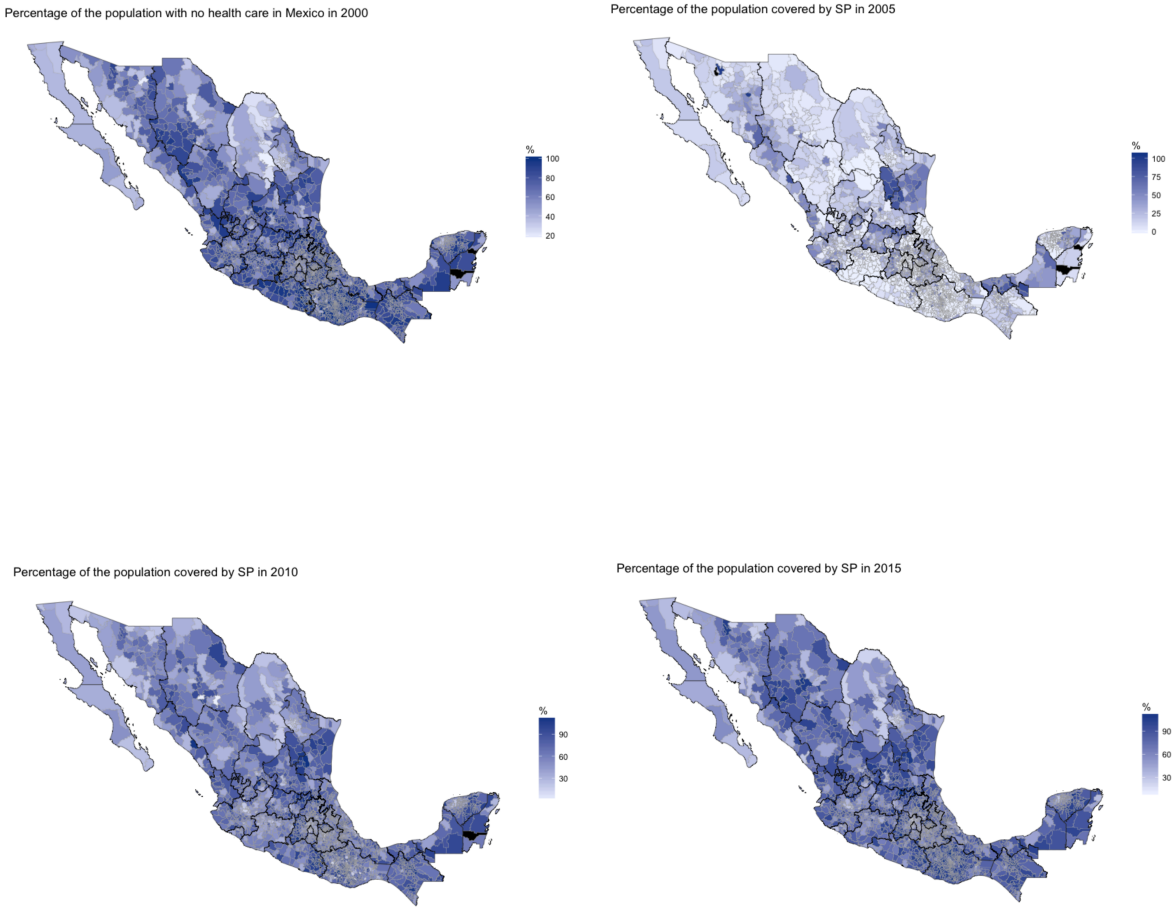

Figure 5: History of SP Coverage by Year

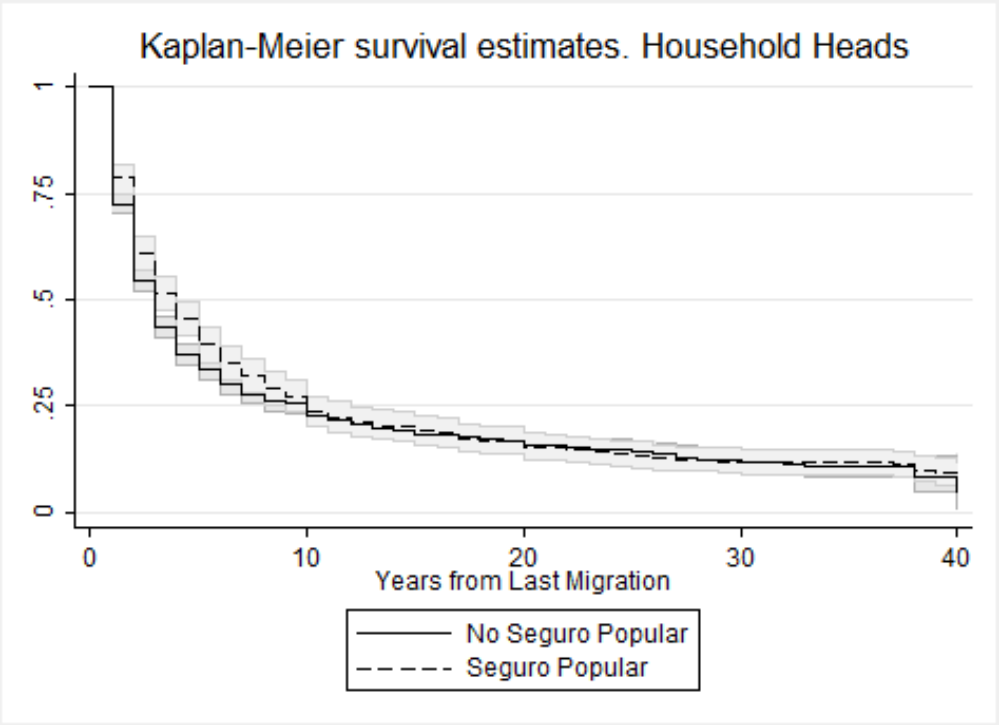

Figure 6: Kaplan Meier Results for Household Heads