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# International migration and universal healthcare access: evidence from Mexico's 'Seguro Popular'

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## ABSTRACT



Although 'Seguro Popular' (SP), a healthcare programme for the uninsured, has been in place in Mexico for more than a decade, its consequences for international migration both to and from the country have received little scholarly attention. Using the spatial variation in the programme's coverage generated through the rollout over time, this paper examines the effects of SP on the number of emigrants and return migrants per household. Based on data from Mexico's National Survey on Demographic Dynamics for 1997–2014, the analysis confirms that being affiliated to SP does not reduce the number of emigrants per household, but such affiliation is, however, positively related to the number of returnees per household. These results are valid across different subsamples of the population and time periods and are robust to omitted variable bias. Our findings have important implications for understanding the effects of social protection policies on international migration patterns.

## KEYWORDS


International migration; return migration; healthcare; SP; informality; Mexico

## 1. Introduction

For decades, only those Mexicans who worked in the formal sector and were, therefore, affiliated to state social security institutions had access to public healthcare. For many uninsured households in the country then, international outmigration had long been a tool of social protection. Since 2004, however, the universal right to healthcare has been legally enshrined in the Mexican Constitution. Although Mexicans are free to use private healthcare services, the state is now responsible for providing access to public healthcare to all of its citizens. To fulfil this obligation, the federal government implemented in 2001 the 'Seguro Popular' (SP) programme, which provides access to public healthcare to the uninsured – including those who are unemployed, self-employed or who work outside the formal sector. While in 2000 some 50% of the Mexican population had been uninsured, by 2015 nearly 45% thereof were now affiliated to this healthcare plan (INEGI, 2017). Interestingly, as the number of SP beneficiaries has increased, the number of Mexican immigrants entering the USA has simultaneously steadily dropped, and the volume of Mexican migrants now leaving the USA has also increased (Passel, Cohn, & González Barrera, 2012). Yet, despite these developments, little is currently known about the consequences of the expansion of healthcare access for the dynamics of international migration decisions by Mexicans.

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In light of these changing circumstances, a key question is: to what extent does this social programme influence the probability of Mexican households' members emigrating from, as well as returning to, the country? The answer is relevant to the on-going policy and scholarly debate on international migration and development in migrant-sending countries.

Using data from Mexico's National Survey on Demographic Dynamics (ENADID, in Spanish) for the years 1997, 2006, 2009 and 2014, this paper shows that the programme's coverage has no effect on the number of international emigrants per household – but it is, however, positively related to the number of returnees therein. These results cast doubt on the effectiveness of universal healthcare programmes in curbing international outmigration in developing countries like Mexico, where the quality of public healthcare is faltering, and informality is pervasive. Yet, the evidence presented suggests that this type of programme can encourage return migration, particularly when the beneficiaries lack access to healthcare abroad because they are largely undocumented and/or participate in the informal sector of the economy.

The paper proceeds as follows: [Section 2](#) offers background information on international migration patterns to and from Mexico and SP. [Section 3](#) reviews the existing literature on the relationship between international migration and access to public healthcare in Mexico. [Section 4](#) lays out the data and methods used in the analysis. [Section 5](#) presents the results obtained through a series of linear regression models. [Section 6](#) concludes by discussing the main findings and suggesting new avenues of research.

## **2. Background information**

### ***2.1 International migration patterns in Mexico***

Mexico has one of the largest emigrant populations in the world. Around 10.5% (12.2 million) of the country's citizens live abroad – of whom, 98% reside in the USA (BBVA Bancomer and CONAPO, 2016). Unsurprisingly, Mexico is one of the world's largest recipients of remittances and the largest in Latin America (BBVA Bancomer and CONAPO, 2016). As of 2010, 1.3 million Mexican households received monetary transfers from abroad (CONAPO, 2010; BBVA Bancomer and CONAPO, 2016, p. 136). Since the turn of the last century, however, international migration dynamics in the country have shifted. According to the 2010 Mexican Census, between 1995 and 2000, a total of 3 million Mexicans entered the USA; however, between 2005 and 2010, only 1.4 million Mexicans did so (Passel et al., 2012). Following the estimates of the Pew Research Centre, between 2009 and 2014 only 870,000 Mexican nationals arrived in the USA (Barrera, 2015). As immigration flows from Mexico to the USA have fallen, the number of Mexican returnees heading home has increased. According to the 2010 Mexican Census, a total of 1.4 million Mexicans returned to the country between 2005 and 2010 – double the number of those who made the same choice between 1995 and 2000. Between 2005 and 2014, meanwhile, nearly 2.5 million Mexicans returned (Passel et al., 2012; Barrera, 2015). Presently, the number of Mexican returnees surpasses that of their compatriots arriving in the USA.

The new dynamics of international migration in Mexico can be attributed to a variety of factors, including: the economic recession that the USA underwent from 2007 to 2009; Mexico's steadily waning birth rates; the introduction of tougher immigration controls along the USA–Mexico border; and the implementation of more restrictive immigration policies, such as the unprecedented number of deportations that occurred during the two administrations of President Barack Obama. However, the question of whether (and to what extent) the new patterns of international migration in the country can be attributed to changes in state healthcare policies remains unanswered. This is an important query if one of the purposes of Mexico's government policy is to improve the well-being of the population while also deterring international emigration.

## 2.2. *The Seguro Popular programme*

SP is a programme that provides healthcare access to households that have no members currently registered with a Mexican social security institution. Its beneficiaries are households composed of the unemployed, the underemployed or those working in the informal sector.<sup>1</sup> The programme covers the costs of a range of surgical procedures, medications and clinical tests related to 95% of the country's global burden of disease. Affiliation to SP is voluntary and not conditional on age, health status or pre-existing illnesses. Since 2010, Mexican migrants living abroad have been able to enrol themselves or their families in the programme, although health services must be provided to Mexico, and not abroad. Obviously, return migrants can request affiliation with SP locally. All beneficiary families of the programme who are not among the 40% of the poorest households must pay an annual subsidiary fee.<sup>2</sup>

SP is a decentralised social programme. It is financed by the federal government, but its funds are managed by state authorities; healthcare services, meanwhile, are delivered by municipal governments. The implementation of this programme was rolled out in stages across the country. It was first introduced in 2001 in the federal states of Aguascalientes, Campeche, Colima, Jalisco and Tabasco, but by 2005, SP had become active in all 32 Mexican federal states. The number of people enrolled in the programme jumped from 1 million in 2001 to 57 million in 2017 (INEGI, 2017). The range of benefits offered by this healthcare programme has also expanded: it covered 91 medical procedures in 2003 compared with 266 in 2012, for example (OECD, 2015).

Due to this state intervention in Mexico, medical consultations have increased, and both child mortality rates and the incidence of contagious diseases have fallen (García Junco, 2015; Posma, 2014). In addition, total public health expenditure as a share of Gross Domestic Product (GDP) increased from 2.6% in 2000 to 3.2% by 2013 (Frenk, Knaul, Gomez, & Gonzalez, 2012; OECD, 2015), while levels of inequality in the distribution of public funds between social security affiliates and non-affiliates have significantly declined over the years (Junco, 2015).<sup>3</sup> Since the implementation of the programme, out-of-pocket expenses in healthcare and impoverishment rates due to catastrophic healthcare expenditures have decreased in the country, by 55% and 24%, respectively (OECD, 2015, 2016). Various academic studies corroborate these outcomes (Barofsky, 2011; Barros, 2009; King, 2009; Sosa-Rubí, Salinas-Rodríguez, & Galárraga, 2011). Overall, SP has succeeded in providing a safety net to beneficiary households, therefore, improving their capacity to mitigate the impact of catastrophic health expenses.

## 3. Literature review

The New Economics of Labour Migration (NELM) is an approach that sees international migration as a strategy devised by households to compensate for a lack of access to capital or to insurance markets (Stark, 1991; Stark & Bloom, 1985). Accordingly, families strategically send one or more members to live in a labour market abroad that is not correlated with the one at home. Through the financial remittances that migrant family members send back, households subsequently overcome restricted access to labour, insurance or credit markets – thereby promoting investment activities and unstaining consumption in times of difficulty. From this perspective, migrants will only return once the capital and insurance needs of their household have been met.

Following the NELM, we would expect that the implementation of programmes for the uninsured – such as SP – would both reduce outmigration from and increase return migration to, sending countries. By reducing out-of-pocket expenditure on healthcare by migrant households, SP should have a positive effect on their disposable income. As the material well-being of SP beneficiary households improves, they have fewer income risks – and therefore fewer incentives to send members to live abroad. By extension, migrant members of SP beneficiary households have stronger incentives to return too, since household insurance needs are now covered by the state.

We, therefore, hypothesise that enrolment in SP discourages households from sending members abroad and encourages household migrant members to return.

Previous research on Mexico confirms that households lacking access to social security institutions are more likely to send members abroad, and to use international remittances to cover healthcare expenses at home. For example, using data from the Mexican Migration Project (MMP), Amuedo-Dorantes, Sainz & Pozo (2007) find that 46% of migrants surveyed who send remittances back to Mexico do so to cover healthcare expenses. Based on data from the MMP, Sana and Hu (2006) show that members of uninsured households in Mexico are more likely to immigrate to the USA. Other accounts, based on Mexico's National Survey of Household Income and Expenditure (ENIGH, in Spanish), show that: i) remittance-recipient households spend a larger share of their income on healthcare than non-remittance-recipient households do; and ii) most remittance-recipient households in Mexico are uninsured (Airola, 2007; Amuedo-Dorantes & Pozo, 2011; Taylor & Mora, 2006; Valero-Gil & Treviño, 2010). Similarly, based on a survey of Mexican migrant residents of Los Angeles, González-Block, De la Sierra De la Vega, and Vargas-Bustamante (2013) show that 72% of those surveyed send remittances back home to be spent on healthcare-related expenses.

However, other studies demonstrate that the impact of SP on a household's tendency to receive remittances or to spend them on healthcare-related expenses is weak, if not negligible. For instance, based on a survey conducted in the most marginalised localities of Mexico, Escobar Latapí and González de la Rocha (2012) show that affiliation to SP does not diminish the probability of emigration by members of beneficiary households. Using data from the ENIGH, Orraca-Romano (2015) reveals that a household's affiliation to SP does not alter the probability of it receiving remittances from abroad. Other studies corroborate that migrant households affiliated to this healthcare still use international remittances to cover healthcare expenses (Valero-Gil, 2009; Ochoa Lupián & Ayvar Campos, 2015; González-Block et al., 2013, p. 461). Thus, previous research suggests that SP has no effect on a household's income or decision to send members abroad or not.

Nonetheless, the available evidence does indicate that the number of uninsured among return migrants in Mexico has declined since the implementation of the programme. According to data from the Mexican Census, between 2000 and 2010 the proportion of uninsured return migrants dropped from 80% to 54% (Wassink, 2016, p. 848). As of 2005, 69.7% of Mexican returnees lacked health insurance, 20.7% were beneficiaries of public social security, while 9.5% had private insurance (Masferrer & Roberts, 2016, p. 246). By 2010, however, 39.6% of Mexican returned migrants were affiliated to SP, according to the Mexican Census (Wassink, 2016). The degree to which this universal health programme influences the migration patterns of Mexican households thus warrants further investigation.

## 4. Research design

### 4.1. Data structure

To examine the impact of SP on the international migration patterns of Mexican uninsured households, we use data from Mexico's ENADID for the years 1997, 2006, 2009 and 2014. The ENADID is a nationally representative survey, which compiles socio-economic and demographic information on Mexican households – including the number of members who immigrated to the USA over the past 5 years and of those who lived in the USA 5 years ago. The survey is conducted by INEGI.<sup>4</sup> To keep the sample homogeneous, the analysis is restricted to those households that are eligible to enrol in SP – i.e. those with no members currently registered with any social security institution. Out of all households participating in the ENADID survey, 45.5% are uninsured and eligible for SP. This proportion has remained fairly constant since the programme was implemented nationwide in 2006.

SP coverage rates were computed using data from the National Commission on Healthcare Social Protection (CNPSS, in Spanish) on the number of SP affiliates per federal state and per year. We calculated the coverage rate by dividing the number of affiliates by the total number of individuals eligible to enrol in the SP. Data on the number of eligible individuals were obtained from the National Occupation and Employment Survey (ENOE, in Spanish). SP coverage rates were computed specifically for the years 1997, 2006, 2009 and 2014.

Table 1 below provides summary information on the households included in the sample and their heads across different years.

## 4.2. Identification strategy

As mentioned above, SP was rolled out over a period of 4 years across the different municipalities and federal states of the country. This means that the programme's availability, coverage and, therefore, the share of eligible individuals and households varies across time and space in Mexico. A series of studies conclude that the introduction of SP was close to random (Bosch, Cobacho, & Pagés, 2012). Given this, most quantitative studies on SP use exogenous variation in the availability and coverage rate of the programme to identify its causal effects (Aterido, Hallward-Driemeier, & Páges, 2010; Azuara & Marinescu, 2013; Bosch & Campos-Vásquez, 2014; Grogger, Arnold, León, & Ome, 2015; Grogger et al., 2015; Orraca-Romano, 2015; Pfütze, 2015). In this study, we follow a strategy similar to the ones used by Grogger et al. (2015), Orraca-Romano (2015) and Pfütze (2015). Thus, we estimate the following model using Ordinary Least Squares (OLS):

$$y_{hst} = \gamma SP_{st} + X_{hst}\beta + Z_{st}\lambda + \sum_t \delta_t + \sum_s \mu_s + \epsilon_{hst} \quad (1)$$

Table 1. Descriptive statistics: means overtime.

Variable	1997	2006	2009	2014
<i>Individual-level</i>				
Male (%)	83.3	79.3	78.4	75.0
Age	43.5	45.3	44.8	46.2
Maximum educational level				
Elementary education (%)	53.9	50.0	45.4	43.7
Secondary education (%)	15.0	19.4	23.3	26.5
High school education (%)	5.2	8.9	11.6	10.9
Undergraduate or graduate studies (%)	6.6	7.6	8.0	7.1
Married (%)	64.0	58.0	59.4	49.3
Employed (%)	83.3	74.9	79.3	76.7
<i>Household-level</i>				
Affiliated to Seguro Popular (%)	0.0	21.3	45.6	75.3
Number of household residents	4.6	4.3	4.2	3.7
Number of international emigrants × 10	1.53	1.04	0.94	0.33
Number of international return migrants × 10	0.15	0.09	0.17	0.25
Remittance recipient (%)	3.2	4.3	4.1	3.6
Affiliated to Prospera (%)	0.0	29.1	28.1	33.6
Good-quality floor (%)	73.3	86.2	91.4	93.9
Drinking water (%)	77.4	82.5	84.1	88.7
Rural (%)	44.7	42.1	32.7	39.2
Highly urban (%)	27.3	27.5	34.8	27.1
<i>State-level</i>				
Seguro Popular coverage rate (%)	0.0	30.2	52.7	86.4
Medical facilities per 10,000 inhabitants	1.87	2.10	2.30	2.39
Homicide rate per 10,000 inhabitants	1.33	0.87	1.74	1.60
Observations (N)	34,634	17,197	33,187	40,814

Source: Authors' own elaboration based on data from the ENADID, SIMBAD and Policía Federal (2015). SP coverage rate calculated according to the number of households that are eligible to enrol in the programme.

where when examining international migration,  $y_{hst}$  is the number of members of household  $h$  in state  $s$  in year  $t$  who emigrated to the USA over the past 5 years; when analysing international return migration,  $y_{hst}$  denotes the number of household members who lived in the USA 5 years prior to being surveyed.  $SP_{st}$  represents the SP coverage rate in state  $s$  in year  $t$ ;  $X_{hst}$  is a vector containing a battery of household-level variables that can influence the number of international migrants per household;  $Z_{st}$  is a vector of state-level variables;  $\delta_t$  represents a series of temporal variables that help control for time trends in the outcome variable;  $\mu_s$  are state-level dummies that capture state-specific characteristics that do not vary over the time but could influence the availability or coverage of SP in a given state; and,  $\epsilon_{hst}$  is a random error term, which we assume is uncorrelated with  $SP_{st}$ ,  $X_{hst}$  or  $Z_{st}$ .

At the household level, the control variables in Equation (1) include: the number of household residents, its affiliation to Prospera (a cash-transfer programme for the poor), indicators about the quality of housing (such as the type of dwelling and access to running water), and whether the household is located in a rural or urban area. Covariates related to the household's head include: age, birth cohort, gender, marital status, employment status and educational attainment level. At the state level, covariates include: the number of medical facilities per 10,000 inhabitants, the homicide rate per 10,000 inhabitants, the political affiliation of the governor and state dummies.

State dummies are intended to account for the correlation of observations within states. State governments oversee the management and distribution of the SP programme's resources across municipalities. Also, state characteristics such as the partisan affiliation of the governor or the level of economic development can affect the availability or coverage of SP at the state level. Standard errors are clustered by state to account for possible correlation between households there.

## 5. Results

### 5.1 The exogeneity of SP's expansion

This section examines the validity of the identification strategy employed in the study. By using the expansion of SP as a source of identification, we assume that this variable is not correlated with the outcomes of interest. Thus, we examine the exogeneity of SP expansion by testing whether the programme's coverage rates in 2006, 2009 and 2014 are effectively predicted by the pre-programme municipal- and state-level characteristics in 2000. Data for these variables were obtained from Mexico's 2000 Population Census.<sup>5</sup>

The test is, thereafter, performed by estimating the following model by OLS:

$$SP_m = X_m\alpha + W_s\theta + (Y_m \times Z_s)\psi + \sum_s \mu_s + \epsilon_m \quad (2)$$

where  $SP_m$  is a continuous variable between zero and one that indicates SP's coverage rate (or the proportion of eligible individuals enrolled in the programme) in municipality  $m$  (or state  $s$ ) in 2006, 2009 or 2014.  $X_m$  and  $W_s$  are vectors of municipal- and state-level characteristics in the year 2000;  $Y_m \times Z_s$  is a vector of municipal- and state-level interaction terms and  $\mu_s$  is state-level dummies, both of which are introduced in the municipal-level analysis;  $\epsilon_m$  is the error term.

The municipal-level covariates included in Equation (2) are the natural logarithm (log) of the population, the share of urban population, the share of the male population, the average years of schooling, the log of the average wage and income per worker, the share of the population under 24 years of age, the share of population between 24 and 40 years of age and the unemployment rate. At the state level, we use the same controls alongside a series of state dummies and variables indicating whether the governor is affiliated to the Partido Revolucionario Institucional (PRI) or to the Partido de la Revolución Democrática (PRD). Equation (2) includes variables at the municipal and state levels on the average number of international emigrants and international return migrants per household, as well as the share of households that receive international remittances.<sup>6</sup>

As seen in Table 2, the expansion of SP at the municipal and state levels is not related to the average number of international emigrants or return migrants per household, or to the share of them that receive international remittances. Nevertheless, models in Tables S1 and S2 (Online Resource 1) show that some variables are in fact related to the programme's expansion. At the municipal level these are: the log of the population in 2006 and 2009; the share of the population that resided in urban localities in 2006, 2009 and 2014; the share of the population without social security and the unemployment rate in 2006; and a binary variable indicating whether the governor was affiliated to the PRI in 2006 and 2009 and the PRD in 2006 and 2014. At the state level, these variables include: the log of the population in 2006, 2009 and 2014; the unemployment rate in 2006 and 2009; and whether the governor was affiliated to the PRD in 2009 and 2014.

To corroborate whether the programme's expansion was exogenous, for every control variable, we ran separate regressions on the treatment (i.e. the SP coverage rate) including state effects and the control variable in question. This strategy is used to check the extent to which controls are correlated and whether they neutralise each other when included in the regression models. As seen in Table 3, the number of international emigrants per household and the share of remittance-receiving households in a municipality are not related to the SP municipal coverage rate.<sup>7</sup> We could also see that, at the state level, none of the main variables of interest are related to the programme's expansion. Tables S3 and S4 (Online Resource 1) present the results obtained when regressing all control variables. Overall, results confirm previous findings on the programme's expansion having a faster expansion in smaller municipalities and states.

Of course, the implementation of SP was not entirely exogenous. However Table 2 provides no evidence that the programme was targeted in specific municipalities or federal states in relation to the outcomes of interest. These results thus support the identification strategy used in the study. However, since there was no randomisation in the implementation of SP, we cannot rule out the existence of other potential threats to the identification strategy used for assessing the programme's effects.

## 5.2 Main results

Table 4 presents the results for Equation (1). Column 1 reports the effects of SP on the number of international emigrants per household, whereas Column 2 details the impact of the programme on the number of international return migrants therein.

**Table 2.** Determinants of Seguro Popular's expansion by municipality and state. OLS regressions with a full set of control variables.

	<i>Municipal-level</i>			<i>State-level</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Control variables	2006	2009	2014	2006	2009	2014
International emigrants per HH	-0.011 (0.010)	0.005 (0.009)	0.002 (0.014)	0.028 (0.331)	-0.167 (0.169)	-0.180 (0.104)
International return migrants per HH	-0.090 (0.208)	-0.302 (0.217)	-0.719 (0.564)	7.783 (6.558)	0.494 (3.779)	-1.727 (0.104)
Share of HH that receive remittances	0.087 (0.421)	-0.219 (0.408)	0.967 (1.197)	-28.111 (19.187)	-0.402 (11.773)	7.968 (8.558)
Municipal-level controls	Yes	Yes	Yes	No	No	No
State-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Municipal- and state-level interactions	Yes	Yes	Yes	No	No	No
State fixed effects	Yes	Yes	Yes	No	No	No
F-test	13.94	13.16	3.35	5.76	7.53	13.11
R-squared	0.223	0.213	0.065	0.534	0.727	0.794
Observations (N)	2,328	2,328	2,324	32	32	32

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Table presents regressions where the dependent variable is the proportion of eligible individuals covered by SP at the municipal level (columns 1–3) and the state level (columns 4–6) in 2006, 2009 and 2014. Explanatory variables are drawn from Mexico's 2000 Census of Population and Housing. HH denotes household. Robust standard errors are in parentheses.



**Table 3.** Determinants of Seguro Popular's expansion by municipality and state. OLS regressions with a single control variable.

Single control variable	Municipal level			State level		
	(1)	(2)	(3)	(4)	(5)	(6)
	2006	2009	2014	2006	2009	2014
<b>A. International emigrants per HH</b>	0.001 (0.007)	0.012* (0.007)	0.014 (0.011)	-0.029 (0.086)	0.022 (0.066)	0.017 (0.046)
Municipal- and state-level controls	No	No	No	No	No	No
State fixed effects	Yes	Yes	Yes	No	No	No
Observations ( <i>N</i> )	2,329	2,329	2,325	32	32	32
<b>B. International return migrants per HH</b>	-0.131 (0.161)	-0.192 (0.163)	-0.125 (0.211)	-0.611 (2.536)	-0.795 (1.993)	-1.160 (1.162)
Municipal- and state-level controls	No	No	No	No	No	No
State fixed effects	Yes	Yes	Yes	No	No	No
Observations ( <i>N</i> )	2,329	2,329	2,325	32	32	32
<b>C. Share of HH that receive remittances</b>	-0.075 (0.253)	-0.038 (0.257)	0.890 (0.667)	-1.330 (3.961)	0.906 (3.272)	-0.304 (2.125)
Municipal- and state-level controls	No	No	No	No	No	No
State fixed effects	Yes	Yes	Yes	No	No	No
Observations ( <i>N</i> )	2,329	2,329	2,325	32	32	32

\* $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Table presents regressions where the dependent variable is the proportion of eligible individuals covered by SP at the municipal level (columns 1–3) and the state level (columns 4–6) in 2006, 2009 and 2014. Regressions do not include municipal- and state-level interactions. Explanatory variables are drawn from Mexico's 2000 Census of Population and Housing. HH denotes household. Robust standard errors are in parentheses.

Column 1 shows that the expansion of SP does not affect the average number of international emigrants per household. Although the estimated coefficient is negative, it is not statistically significant. This supports the results of previous studies suggesting that the implementation of the programme has had no consequences for households' emigration decisions (Escobar Latapí & González de la Rocha, 2012).

With regard to other controls, being a male-headed household is associated with having fewer emigrants ( $p < 0.01$ ). Households headed by respondents who are married or employed also have fewer members living abroad. Although the number of emigrants per household is not significantly related to the age of the household head, households headed by young individuals have a larger number of emigrants ( $p < 0.01$ ) than other households. The number of emigrants per household becomes larger as the number of household residents ( $p < 0.01$ ) increases. There is also a negative association between the number of emigrant members per household and the level of education of the household head, and household's affiliation to the Prospera programme ( $p < 0.10$ ), which is consistent with previous research (Fernández-Huertas, 2011; Stecklov, Winters, Stampini, & Davis, 2005). Finally, households located in rural areas have a larger number of outmigrants ( $p < 0.01$ ), while those located in urban areas have fewer migrant members ( $p < 0.01$ ).

Column 2 shows that SP has a positive and statistically significant effect on the number of international return migrants per household ( $p < 0.01$ ). This confirms that this programme increases the incentives for members of migrant households to return to Mexico.

As for other control variables, male-headed households have on average a larger number of return migrants ( $p < 0.01$ ). Although the age of the household head is not significantly associated with the number of returnees per household, cohort effects show that households headed by individuals aged between 32 and 47 years have a larger number of returnees ( $p < 0.10$ ). There is also a positive association between the level of education of the household head and the number of return migrants per household.<sup>8</sup> Households with married and employed heads have fewer return migrants ( $p < 0.01$ ). Likewise, the number of the latter is lower among those households that are beneficiaries of the Prospera programme ( $p < 0.01$ ). That said the households situated in rural localities do have a larger number of returnees ( $p < 0.05$ ). Also, and as expected, the number of return migrants per

**Table 4.** The impact of Seguro Popular on international migration.

Variable	(1)	(2)
	Emigrants	Return migrants
SP coverage rate at the state level	-0.0034 (0.0698)	0.0207*** (0.0069)
Male	-0.0696*** (0.0105)	0.0169*** (0.0027)
Age/100	-0.0308 (0.0326)	-0.0042 (0.0079)
Elementary education	0.0099* (0.0054)	0.0017* (0.0008)
Secondary education	-0.0007 (0.0044)	0.0054*** (0.0014)
High school education	-0.0038 (0.0048)	0.0082*** (0.0018)
Undergraduate and graduate education	-0.0143** (0.0053)	0.0078*** (0.0024)
Married	0.0406*** (0.0063)	-0.0050*** (0.0008)
Employed	-0.0666*** (0.0084)	-0.0067*** (0.0016)
Number of HH residents	0.0035*** (0.0008)	-0.0001 (0.0003)
Other HH residents in labour force	0.0091*** (0.0023)	0.0027*** (0.0009)
HH affiliated to Prospera	-0.0082 (0.0049)	-0.0072*** (0.0016)
Number of international emigrants in HH	-	0.0502*** (0.0040)
Medical facilities per 10,000 inhabitants	-0.0004 (0.0021)	0.0001 (0.0001)
Homicide rate per 10,000 inhabitants	-0.0011 (0.0008)	0.0001 (0.0001)
Rural locality	0.0429*** (0.0087)	0.0028** (0.0011)
Highly urbanised locality	-0.0376*** (0.0076)	-0.0034* (0.0018)
Cohort effects	Yes	Yes
State fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations (N)	125,814	125,811

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Authors' own elaboration based on data from ENADID, SIMBAD and Policía Federal (2015). SP coverage rate at the state level calculated based on the number of individuals who are eligible to enrol in the programme. HH denotes household. Standard errors clustered at the state level.

household is positively associated with the number of members who emigrated in the past 5 years ( $p < 0.01$ ). Finally, the number of return migrants per household is not meaningfully related to the number of available medical facilities and to the homicide rate per 10,000 habitants.

Overall, results show that enrolment in SP does not affect the number of international emigrants per household – but is positively related to the number of return migrants therein.

### 5.3 Sensitivity analysis

As a robustness check, we examine whether the impact of SP on outmigration and return migration varies when using different criteria for SP eligibility. In Panel A of Table 5, SP eligible households are those headed by individuals working in the informal sector, whereas in Panel B, SP eligible households are those with no members working in the formal sector. Results do not differ from those reported above and hold even when using different eligibility criteria for SP. That is,

Table 5. Different measures of Seguro Popular household eligibility.

	Eligible		Ineligible	
	(1) Emigrants	(2) Return migrants	(3) Emigrants	(4) Return migrants
<i>A: Eligibility based on household head</i>				
SP coverage rate state level	-0.0034 (0.0698)	0.0207*** (0.0068)	0.0377 (0.0248)	0.0072 (0.0045)
Observations (N)	125,814	125,811	150,994	150,990
<i>B: Eligibility based on any household member</i>				
SP coverage rate state level	0.0026 (0.0634)	0.0212*** (0.0065)	0.0373 (0.0223)	0.0048 (0.0052)
Observations (N)	147,117	147,144	129,691	129,687
Individual-level controls	Yes	Yes	Yes	Yes
Municipal-level controls	Yes	Yes	Yes	Yes
Cohort effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Authors' own elaboration based on data from ENADID, SIMBAD and Policía Federal (2015). (A): if household head has social insurance, household is assumed ineligible for SP. (B): if any household member has social insurance, household is assumed ineligible for SP. Control variables are the same as those included in Table 4. Standard errors clustered at the state level.

SP is not a strong predictor of the number of outmigrants per household; yet, it has a positive and strongly significant effect on the number of return migrants per household ( $p < 0.01$ ). We also see in Columns 3 and 4 (in Table 5) that, among ineligible households, SP is not a strong predictor of the number of emigrants and return migrants.

We also investigated whether our results were robust to omitted-variable bias. To do this, we used the method developed by Oster (2017), which examines whether coefficients and  $R$ -squared values shift after including additional controls. This is done by estimating bounding values for both the treatment effect and the bias-adjusted coefficient. Under certain assumptions, we could compute an approximation of the bias-adjusted treatment effect as follows:

$$\beta^* \approx \tilde{\beta} - \delta \frac{(\hat{\beta} - \tilde{\beta})(R_{max} - \tilde{R})}{(\tilde{R} - \hat{R})} \quad (3)$$

where  $\delta$  represents the relative degree of selection on observed and unobserved variables – that is, the explanatory power of the unobserved variables as a share of the explanatory power of the observed variables.  $\beta^*$  denotes either the bias-adjusted coefficient or the treatment effect;  $\hat{\beta}$  captures the baseline effect and is the coefficient resulting from the regression that includes the treatment variable as a control (in this case, the SP coverage rate at the state-level), with  $\hat{R}$  being the corresponding  $R$ -squared.  $\tilde{\beta}$  captures the controlled effect and is the coefficient of the regression that includes the treatment variable and the set of all other relevant observed controls, with  $\tilde{R}$  being the  $R$ -squared from that regression.  $R_{max}$  is the  $R$ -squared of a hypothetical regression that includes the treatment variable and the set of all other relevant observed and unobserved controls. If the outcome is entirely explained by the treatment and the full set of controls, then  $R_{max} = 1$ .

Since both  $\delta$  and  $R_{max}$  have bounding values, we could estimate an identified set for the treatment effect. Following Oster (2017), equal selection (i.e.  $\delta = 1$ ) is a proper upper bound on  $\delta$ . This implies that the effect of the unobservables on the outcome variable has the same magnitude as the influence of the observables. For  $R_{max}$ , they suggest using a value of  $R_{max} = 1.3\tilde{R}$ .<sup>9</sup> Using the elements presented in the standard regression tables, we then calculate Equation (3). The result of this equation is a close approximation of the consistent unrestricted estimator (Oster, 2017).<sup>10</sup>

Table 6 presents the identified set  $[\tilde{\beta}, \beta^*(R_{max} = 1.3\tilde{R}, \delta = 1)]$  for the effects of SP on the number of outmigrants per household, on the one hand, and the number of return migrants per household, on the other. With regard to the programme's effect on the number of emigrants per household, we could see that the identified set  $[-0.0034, 0.0426]$  includes zero; which confirms that the above results on SP having no effect on households' outmigration decisions are robust to omitted-variable bias. As for the programme's effect on the number of return migrants per household, the identified set  $[0.0207, 0.0235]$  only includes positive values. This suggests that the finding on SP having a positive impact on the number of return migrants per household is robust to omitted-variable bias.

Additionally, we examine whether the effects of SP on household's international migration patterns vary across different subsamples of the population. As seen in Table 7, the programme has no effect on the number of emigrants per household. This result holds true even after splitting the sample into a series of population groups. To corroborate the above results on the effects of SP on return migration, we re-ran the analysis after splitting the sample into subgroups (Panels A-G). As seen, SP only affects the number of return migrants in households where the head is low-skilled or lacks a college degree ( $p < 0.01$ ) (Panel A), and in those households headed by males ( $p < 0.01$ ) (Panel B). The effects of SP on return migration do not vary according to whether the household is enrolled in Prospera or not (Panel C). However, the impact of this programme on the number of return migrants holds for those households situated in both urban ( $p < 0.05$ ) and rural localities (0.10) (Panel D), households located in states with strong international migration networks ( $p < 0.01$ ) (Panel E),<sup>11</sup> and households with no internal migrants ( $p < 0.10$ ) (Panel F). Thus, we could argue that SP affects the incentives of migrant members to return home only for households with certain characteristics. As for the impacts of this programme overtime, Panel G shows that the effects of the programme are slightly smaller, but still significant ( $p < 0.05$ ) even after restricting the analysis to the period 1997 to 2009 (during which time the programme still had not achieved full coverage across Mexican territory).<sup>12</sup>

Overall, we can conclude that SP has no consequences on the number of uninsured household's members abroad but has a positive effect on the number of returnees therein, and that these findings are robust across eligibility criteria, subsamples and time periods, and to omitted-variable bias.

## 6. Discussion of results

This study has explored whether the international migration patterns of Mexican uninsured households can be attributed to the making available of the Seguro Popular programme. Based on data from the ENADID, the analysis confirms that the number of international emigrants per

Table 6. Sensitivity of the effects of Seguro Popular on migration to omitted variable bias.

Description	(1)	(2)
	Emigrants	Return migrants
Baseline effect ( $\hat{\beta}$ )	-0.1213*** (0.0204)	0.0120*** (0.0024)
R-squared ( $\hat{R}$ )	0.012	0.001
Controlled effect ( $\tilde{\beta}$ )	-0.0034 (0.0698)	0.0207*** (0.0068)
R-squared ( $\tilde{R}$ )	0.053	0.032
Identified set $[\tilde{\beta}, \beta^*(R_m = 1.3\tilde{R}, \delta = 1)]$	$[-0.0034, 0.0426]$	$[0.0207, 0.0235]$
Identified set includes zero?	Yes	No

\* $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Authors' own elaboration based on data from ENADID, SIMBAD and Policía Federal (2015) and econometric method developed by Oster (2017). Effects denote the coefficient of the SP coverage rate at the state-level. Baseline effect estimated using SP coverage rate at the state-level as the only control variable. Controlled effect estimated using the same control variables as those included in Table 4. Standard errors clustered at the state-level.

Table 7. Impact of Seguro Popular on international migration: Subsamples.

Sample	(1)	(2)
	Emigrants	Return migrants
<b>A. High-skilled–Low-skilled</b>		
High-skilled ( $N = 9,136$ )	–0.0392 (0.0294)	–0.0066 (0.0203)
Low-skilled ( $N = 116,675$ )	–0.0022 (0.0745)	0.0223*** (0.0080)
<b>B. Male–Female</b>		
Male ( $N = 99,052$ )	–0.0181 (0.0760)	0.0237*** (0.0074)
Female ( $N = 26,759$ )	0.0379 (0.0735)	0.0095 (0.0133)
<b>C. Household enrolled in Prospera</b>		
Yes ( $N = 28,620$ )	0.0679 (0.0652)	0.0255* (0.0139)
No ( $N = 97,191$ )	–0.0135 (0.0816)	0.0177** (0.0076)
<b>D. Urban–Rural</b>		
Urban ( $N = 76,240$ )	0.0118 (0.0414)	0.0194** (0.0081)
Rural ( $N = 49,571$ )	–0.0209 (0.1199)	0.0191* (0.0108)
<b>E. State networks</b>		
High ( $N = 42,482$ )	–0.2404 (0.1387)	0.0360*** (0.0100)
Medium ( $N = 34,888$ )	0.0370 (0.0771)	0.0358 (0.0262)
Low ( $N = 48,442$ )	0.0159 (0.0357)	0.0086 (0.0091)
<b>F. Without internal migrants (<math>N = 121,158</math>)</b>		
	–0.0083 (0.0696)	0.0158* (0.0079)
<b>G. 1997–2009 (<math>N = 85,000</math>)</b>		
	–0.0001 (0.0831)	0.0149** (0.0060)
Individual-level controls	Yes	Yes
Municipal-level controls	Yes	Yes
Cohort effects	Yes	Yes
State fixed effects	Yes	Yes
Year fixed effects	Yes	Yes

\*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Source: Authors' own elaboration based on data from ENADID, SIMBAD and Policía Federal (2015). Coefficients refer to the SP coverage rate at the state level. Control variables are the same as those included in Table 4. Standard errors clustered at the state level.

household is not statistically related to household affiliation to SP. This result contradicts the predictions derived from the NELM. However, it is in-line with the previous research showing that SP has no effects on the probability of impoverished uninsured households choosing to send migrants abroad (Escobar Latapí & González de la Rocha, 2012), or on that of households receiving financial remittances from abroad (Orraca-Romano, 2015). If international migration has long been a social protection tool for uninsured Mexican households, the key question becomes: Why has SP been ineffective in curbing outmigration from the country?

One possible reason is that this scheme is insufficient to cover the healthcare needs of those affiliated to it fully. Although the coverage of the programme has expanded across time and space, levels of government spending on healthcare per capita are still lower for SP beneficiaries than they are for those affiliated to other social security institutions in Mexico. Moreover, public spending on healthcare infrastructure and personnel has remained unchanged overtime in the country (CNN México, 2012b; Fuentes, 2014). In fact, most states and municipalities in Mexico still lack qualified medical staff (Posma, 2014). Of course, the quality of public healthcare remains

lower in rural areas than in urban localities and complaints about the low quality of the healthcare services provided through SP are common (Ortuño, 2015).

All of this suggests that affiliation to this programme does not guarantee free, effective and timely access to healthcare to the uninsured. As such, SP is unlikely to influence Mexican households' incentives to send members abroad. This could also explain why migrant households that are affiliated to SP still use international remittances to cover their healthcare expenses (Valero-Gil, 2009; Ochoa Lupián & Ayvar Campos, 2015; González-Block et al., 2013, p. 461). In effect, despite SP having been in place for more than a decade now, Mexico continues to be the country with the highest levels of out-of-pocket spending on healthcare and the lowest levels of public spending of all of the member countries of the Organisation for Economic Cooperation and Development (OECD) (Méndez Méndez, 2016; OECD, 2015).<sup>13</sup> If the quality of the healthcare services provided continues to be dismal, universal healthcare programmes like SP will remain ineffective means of reducing international outmigration in sending countries.

Furthermore, various studies demonstrate that the initial allocation (and the spatial distribution) of the SP programme had been uncorrelated to economic development levels, healthcare needs, the size of the informal sector or average salaries in selected states and municipalities (Aterido et al., 2010; Azuara & Marinescu, 2013; Barros, 2009; Bosch & Campos-Vásquez, 2014; Díaz-Cayeros, Estévez, & Magaloni, 2006). But, these studies do show that the implementation of the SP is highly vulnerable to discretionary management and political manipulation.<sup>14</sup> Hence, it is very likely that SP is not targeting the neediest households and communities, whose members continue to have incentives to emigrate. To date, irregularities in the allocation of SP benefits have been cited in 30 of the country's 32 federal states.<sup>15</sup> These biases might owe to the centralised structure of state revenues in Mexico, where federal funds are allocated to municipalities only provided that the state legislatures give their prior approval. However, states and municipalities that belong to the same political party frequently collude in the distribution of central government benefits.<sup>16</sup>

Overall, evidence from Mexico's SP suggests that extending healthcare insurance to the uninsured does not necessarily decrease international outmigration. As argued above, this finding might be influenced by the specificities of the programme in question (including its design, management and quality of service) (Hagen-Zanker & Himmelstine, 2013). However, it is also possible that the outmigration incentives of Mexican uninsured households are driven by other incentives related to the characteristics of the informal sector rather than to their lack of access to public healthcare. From this viewpoint, international migration from Mexico is driven by the low wages, low-status jobs, temporary positions and poor working conditions that are characteristic of the country's informal sector. This is consistent with previous research showing that members of households headed by informal workers are more likely to emigrate than formal ones are (Sana & Hu, 2006). Villarreal & Blanchard, 2013). Hence, neoclassical theories of international migration can provide a better explanation than the NELM about the incentives of Mexican households to send members abroad (Todaro, 1969).<sup>17</sup>

On the other hand, the evidence that has been presented here shows that the number of international return migrants per household is positively related to the latter's enrolment in the SP. Although this finding holds only for a particular set of households, this might rather be related to the vulnerable healthcare situation that many Mexican migrants face in the USA, where half of all Mexican migrants are undocumented (Zong & Batalova, 2016) and lack access to the social protection benefits provided by the US government. Mexican immigrants also tend to have low-wage jobs or work in the informal economy. Therefore, they cannot afford health insurance purchased from the US market, and consequently have limited access to health services.<sup>18</sup> As of 2014, for instance, 47% of Mexican immigrants in the USA were uninsured (Zong & Batalova, 2016). In this context, many Mexican immigrants have strong incentives to return to their country of origin for medical treatment when faced with a major health crisis.<sup>19</sup> Their return intentions should be stronger now that they are entitled to access free healthcare in their native country and

can register to SP from abroad. Seen in this way, the incentives for many Mexicans to return are driven by the extent to which migrants abroad can access healthcare in the USA, but also by the expansion of health services for the uninsured within their home country.<sup>20</sup>

Of course, this study has various limitations. To begin with, the ENADID, the survey which our analysis is based on, captures a relatively small sample of the population. Likewise, this survey only considers those households having at least one member living in Mexico, therefore, we are unable to include Mexican families that are entirely composed by outmigrants or returnees (McKenzie & Rapoport, 2010, p. 814). This attenuation bias resulting from measurement error could explain why SP was not a significant predictor of the number of outmigrants per household in our analysis. While the 1997 edition of the ENADID survey allows the municipality in which a household is in to be identified, this cannot be done in the subsequent editions. Consequently, the coverage rate of SP was only introduced as a control variable at the state level and not the municipal one. None of the editions of the ENADID survey was conducted around the period of the programme's introduction and initial expansion. The lack of longitudinal data restricts our capacity to control for time-invariant unobserved factors affecting migratory patterns at the household level. And, the ENADID does not include information on household members' reasons for emigrating or for returning either. Thus, future studies should validate the results obtained herein with alternative data and estimation strategies.

Further research could extend this analysis by considering other types of social protection interventions, such as access to unemployment benefits for the uninsured or non-contributory pensions. Scholars could also examine whether the propositions of this study hold true across other sending countries worldwide, ones where international migration has long been an effective way to improve the welfare of the uninsured and where universal healthcare programmes are in place. These future undertakings will allow us to better understand the impact of welfare provision on international migration in Mexico and beyond.

## Notes

1. As of 2015, 58% of Mexico's economically active population worked in the informal sector (Migueles, 2016).
2. In practice, however, very few families pay this premium.
3. As of 2002, two out of every three Mexican pesos (MXN) spent on public healthcare had been allocated to social security institutions (Junco, 2015).
4. The 2006 ENADID survey data were collected by Mexico's National Public Health Institute in cooperation with the Ministry of Health, the National Population Council and INEGI.
5. A similar analysis is performed by Azuara and Marinescu (2013) as well as by Bosch and Campos-Vásquez (2014), who all examine whether SP affects participation rates in the informal sector, and by Orraca-Romano (2015), who examines the effects of the programme on domestic and international private cash transfers.
6. The regressions were estimated for all municipalities in which it was possible to construct all of the control variables.
7. Although the average number of international emigrants per household in 2000 (i.e. before the SP was implemented) is correlated with the SP's municipal coverage rate in 2009, this relationship is weakly significant and potentially spurious.
8. Campos-Vasquez & Lara (2012) find evidence that the selection patterns in observable skills of return migrants from the USA to Mexico changed overtime, going from positive selection in 1990 to negative selection in 2010.
9. See Oster (2017), for further details.
10. The unrestricted estimator could be calculated using the Stata command **psacalc**. In our analysis, we obtain similar results for the bias-adjusted treatment effects and the identifying sets using Equation (3) and **psacalc**.
11. Following Massey, Goldring, and Durand (1994), a state migration network can be measured as the proportion of all individuals in a given federal state who are over 15 years old and who have migration experience to the USA.
12. We also ran the analysis with consideration of those households that have social security, and who are, therefore, ineligible to enrol in the SP. As expected, within this group SP coverage has no effect on the number of emigrants or return migrants per household.
13. As of 2015, out-of-pocket spending on healthcare amounted to 45% of total health spending (OECD, 2015).

14. For instance, Díaz-Cayeros et al. (2006) demonstrate that SP first achieved universal coverage in the smallest states of the country, so that the incumbent presidential party could benefit from the expansion of this programme in the 2006 presidential elections. By way of contrast, they show that the expansion of SP was slower in the states ruled by the PRD – whose candidate was one of the main contenders in the presidential race that year. Similar findings are attained by Bosch and Campos-Vásquez (2014), who show that the programme's expansion had been correlated with the party affiliation of governors and municipal mayors.
15. These anomalies include a lack of monitoring or evaluation of the programme results, no transparency in the allocation of funds, no reliable registry of the people enrolled, premium charges for people who qualify as poor, exemptions for families who do not even qualify as poor and the diversion of funds (Ángel, 2017a; Bosch et al., 2012; CNN México, 2012c; Escobar Latapi & González de la Rocha, 2012).
16. A case in point is that of the former governor of the state of Veracruz, Javier Duarte, who has recently been accused of diverting 2.3 million MXN from SP funds for private purposes (Ángel, 2017b; Raphael, 2007).
17. Neoclassical economics assume that international migration is motivated by wage differentials among countries. In this approach, migrants are seen as individuals who maximize their earnings.
18. Following estimates by the Migration Policy Institute (MPI), most Mexican immigrants in the USA have lower education levels, lower incomes and, therefore, are more likely to experience poverty than the total foreign- and native-born populations (Zong & Batalova, 2016).
19. It should be noted that the Mexican government offers healthcare services to Mexican emigrants at its consulates throughout the USA and at the Institute of Mexicans Abroad (IME). Additionally, in some states of the USA like California, Mexican undocumented migrants do have access to healthcare. Nonetheless, these options are by no means comprehensive healthcare programmes.
20. Between 2007 and 2014, the number of Mexican undocumented immigrants living in the USA declined by more than 1 million (González Barrera & Krogstad, 2017, March 2).

## Disclosure statement

No potential conflict of interest was reported by the authors.

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