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How do migration and remittances affect inequality? A case study of Mexico

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Abstract

The poverty-reducing effects of remittances have been well documented; however, their effects on inequality are less clear. This paper examines the impact of remittances on inequality in Mexico using household-level information on the receiving side. It hopes to speak to their insurance role by examining how remittances are affected by domestic and external crises: the 1994 Mexican peso crisis and the global financial crisis. We find that remittances lower inequality and that they become more pro-poor over time. This also strengthens their insurance effects, mitigating some of the negative impact of shocks on the poorest.

KEYWORDS
inequality, Mexico, migration, remittances

JEL CLASSIFICATION
D31; F22; F24; J61

1 | INTRODUCTION

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A large literature has documented the beneficial effects of remittances on poverty; however, their effects on inequality are much less clear. At the macro level, remittances constitute an important source of external financing for many emerging market and developing economies; at the micro level, they can facilitate investments in health, education or small businesses. Little is, however, known about their effects on inequality. These effects would depend on which households across the income distribution are most likely to receive remittances and how much they receive. The empirical literature is inconclusive on the impact of remittances on inequality, with some studies finding positive and others finding negative or no significant effects.

This paper aims to contribute to this literature by examining the impact of remittances on inequality in Mexico using counterfactual analysis based on several cross-sections of a large-scale representative household survey. It starts off with an examination of the determinants of remittances across income deciles, looking at whether remittances play an insurance role. It then examines explicitly how the likelihood of receiving remittances as well as

received amounts were affected by domestic and external crises, the 1994 Mexican peso crisis and the global financial crisis of 2008–2009. Finally, it constructs counterfactual income distributions in the absence of remittances to examine the impact of remittances on inequality measured using Gini coefficients.

The paper is structured as follows: Section 2 reviews the empirical literature on the effects of remittances on inequality, with a particular emphasis on studies that create counterfactual income distributions, and the related literature on the cumulative causation theory of international migration. Section 3 introduces the household surveys used in the analysis, and Section 4 presents a brief overview of Mexico's migration history. Section 5 outlines the empirical strategy, Section 6 presents the results on the determinants of remittances by income deciles, counterfactual simulations that document their impact on inequality, and how this effect varies during crisis periods. Section 7 concludes the study.

2 | LITERATURE REVIEW

There is a large literature on the poverty-alleviating impact of remittances. As international remittances often represent significant shares of migrant household incomes, and incomes earned working abroad are typically multiples of those earned at home, most studies have found that remittances reduce poverty in home countries (see, e.g., Acosta et al., 2008; Loritz, 2008; Taylor, Adams, Mora, & López-Feldman, 2009, for studies of Latin American countries). Canales (2015) provides a wide-ranging review of the drivers of migration from Latin America, and the effects of migration and remittances on the United States as well as home countries. Focus in the following is on remittances sent by individuals; however, the role of collective remittances for development has been studied extensively in the Mexican case and is thus worth noting here. Although still small in magnitude relative to family or worker remittances, collective remittances (*remesas colectivas*)—money sent by a group of migrants used for investment in social and productive projects in their municipalities of origin—have been used as an example to be emulated with the potential of leveraging developmental results. Canales (2008) examines the potential of collective remittances to reduce inequality; for further analyses of the impact of collective remittances and the *3×1 Para Migrantes* programme, which matches government funds with collective remittances and invests in community projects, see also, for instance, Aparicio and Meseguer (2009), Córdova (2009), Delgado and Rodríguez Ramírez (2001), Fox and Bada (2008), Goldring (2004) and Zamora (2005).

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The empirical literature has not yet reached a consensus on the effects of (individual) remittances on inequality. This effect would depend on which part of the income distribution migrants come from and whether remittances in turn are sent to poorer or richer households. Although some studies found that migration and remittances increase inequality (e.g., Adams, 2006; Adams, Cuecuecha, & Page, 2008a, 2008b; Barham & Boucher, 1998; Bouoiyour & Miftah, 2014; Möllers & Meyer, 2014), others found that they reduce it (e.g., Acosta et al., 2008; Brown & Jimenez, 2007; Gubert, Lassourd, & Mesple-Somps, 2010; Loritz, 2008; Margolis, Miotti, Mouhoud, & Oudinet, 2013; Mughal & Anwar, 2012; Taylor et al., 2009) or have no significant effect (e.g., Beyene, 2014; Yang & Martinez, 2005).

These conflicting findings could be driven by changing effects over time. 'Pioneer' migrants (who face higher costs of migration) may come from relatively richer households than later migrants, who benefit from falling costs of migration due to improved access to labour markets as migrant networks expand (Massey, Goldring, & Durand, 1994; Stark, Edward Taylor, & Yitzhaki, 1988). Migration would thus first increase then decrease inequality in sending countries over time. In the cross-section, one would observe a positive link between outmigration and inequality in sending countries with a more recent migration history (Stark et al., 1988).

Such changing effects over time also relate to the cumulative causation theory of international migration. This theory was proposed as an explanation for changing patterns in international migration from Mexican communities (see, e.g., Mines, 1981, 1984; Mines & Massey, 1985; Reichert, 1979, 1981, 1982; Reichert & Massey, 1979, 1980) and posits that as migratory experience grows within a sending community, this increases the likelihood that other

community members will migrate (see Massey, 1990; Massey et al., 1994, and references therein; see also Fussell, 2010, for more recent empirical evidence on the cumulative causation theory in [rural] Mexico).

Researchers working in Mexican communities in the 1970s found that the earliest migrants tended to be married male household heads of prime working age, usually from a property-owning class, rich enough to be able to afford migration (but not so well off as to make migration unattractive). Within the United States, they went to a few specific locations to work in particular sectors such as agriculture, manufacturing or railroads. Over time, as the proportion of people with experience in the United States increased within the community, migration became more widespread and less selective by class. Within the United States, the array of locations, occupations and sectors migrants worked in also expanded.

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People living in communities where migration has just begun face significant deterrents to international movement—few households have friends or relatives who have been abroad, and information about opportunities and life in the destination country is limited. In contrast, in places with long and well-established histories of migration, information about jobs and housing in the United States becomes widely diffused and many people are related to someone who has been north of the border. Migrants often encourage their family members to migrate with them and provide information and assistance to other community members in making the migratory trip and finding employment and housing in the destination. Such social capital lowers the costs and risks of migration, thus reducing its selectivity over time.

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A number of papers have examined the distributional effects of remittances by comparing income distributions with and without remittances (e.g., Barham & Boucher, 1998) or by using income-source decompositions of inequality measures (e.g., Adams & Alderman, 1992; Stark et al., 1988; Taylor et al., 2009). These estimates are, however, likely to be imperfect if remittances are not a truly exogenous transfer, but a substitute for the earnings that the migrant would have earned at home if they had not decided to migrate and work abroad.

A number of recent studies have thus focused on creating counterfactual income distributions. These studies examine the determinants of income in non-remittance-receiving households to predict what the income of households who send migrants would have been in the absence of outmigration and resulting remittance receipts. The studies then compare resulting Gini coefficients to the ones actually observed in the data to deduce the impact of outmigration and remittances on inequality (see, e.g., Barham & Boucher, 1998, for Nicaragua; Adams, 2006, for Ghana; Brown & Jimenez, 2007, for Fiji and Tonga; Acosta et al., 2008, for Latin American and Caribbean countries; Beyene, 2014, for Ethiopia; and Bouoiyour & Miftah, 2014, for Morocco). These studies rely on parametric reduced-form approaches, typically estimating ordinary least squares regressions of the determinants of per capita or household income, expenditure or consumption levels for households that received remittances on the basis of the determinants of these among households that did not receive remittances. Acosta et al. (2008) focus on 10 Latin American and Caribbean countries including Mexico and find that (in Mexico as well as most other countries in the region) inequality based on such imputed income is lower than inequality based on actual income, so remittances lower inequality relative to a no-remittance, no-migration scenario.[1]

This paper follows a similar empirical strategy but allows for more flexibility by adopting a non-parametric approach, estimating counterfactual incomes using propensity score matching. To the best of our knowledge, there are few other studies adopting this approach—a notable exception is the recent work by Möllers and Meyer (2014), examining the impact of remittances on inequality in Kosovo. As discussed in Section 5 in detail, a key advantage of this strategy relative to simple ordinary least squares lies in (i) not imposing structure on the functional form between income and its determinants and (ii) explicitly enforcing a common support condition, that is, comparing remittance-receiving households only to those non-remittance-receiving households, which are otherwise 'similar' to them.

[1]Beaton et al. (2017) and IMF (2017) examine the effect of remittances on consumption smoothing more broadly relying on country-level analysis. McKenzie and Rappaport (2006) find that migration lowers educational inequality, though the effect is mostly driven by a reduction in schooling at the top of the education distribution, with only a weaker effect of remittances relaxing liquidity constraints and allowing for more schooling at the bottom of the distribution.

We aim to contribute to the literature by furthermore focusing on how the effects of remittances on inequality change during crises. If remittances are pro-poor (and reduce inequality) during good times, does this effect strengthen or weaken as a result of domestic or external shocks? In order to do so, the paper examines the impact of remittances on inequality before, during and in the aftermath of a domestic crisis, the 1994 Mexican peso crisis, and the global financial crisis, which affected both the sender and receiver countries. Focus is on the Gini coefficient as a single measure of the income distribution; however, we also examine remittance behaviour by income decile of the receiving household in order to gain more granular insights into the underlying distribution.

3 | DATA

The paper relies on the National Survey of Income and Expenditure (ENIGH), a nationally representative household survey conducted by the Instituto Nacional de Geografia, Estadistica e Informatica (INEGI). The surveys are conducted broadly every second year in the third and fourth quarter of the year and capture various characteristics of households in Mexico, including income, expenditure, living conditions and assets. Remittances are measured using the following question: 'What was your income from other countries last month? Two months ago? Three months ago?', then aggregated to quarterly and annual amounts.[2]

We focus here on the years 1989, 1994 and 2000 to capture remittances before the crisis, around the 1994 peso crisis (unfortunately, no survey is available for 1995) and after the crisis. For the later period, we rely on the years 2002, 2008 and 2014 as proxies for the precrisis period, the global financial crisis of 2008–2009 and the post-crisis period (unfortunately, no surveys are available for 2007 or 2009). Our crisis years would thus include the build-up of tensions before the crises as well as part of the actual slump.

4 | MIGRATION FROM MEXICO

Mexico has a long history of outmigration, in particular to the United States. The first significant migration wave began in the early years of the 20th century as new industries in the US Southwest—especially mining and agriculture—attracted Mexican migrant labourers. Economic inequality and rural poverty in Mexico and significantly higher wages and better opportunities in the United States acted as push and pull factors throughout the 20th century. Migration increased from 1910 to 1920 due to the political violence and societal chaos caused by the Mexican Revolution. Although in 1900 there were about 100 000 Mexicans living in the United States, by 1930, this had increased to about 640 000 (US Census Bureau). The depression brought a temporary halt to the flow of Mexican labour and anti-immigration sentiment rose.

However, the demand for Mexican immigrants re-emerged due to labour shortages during World War II. The Bracero programme (Mexican Farm Labor Program) was created in 1942, intended to provide the United States with temporary workers. Under this arrangement, millions of Mexican labourers were contracted to complete agricultural work in the United States. Although intended as a wartime arrangement, the Bracero programme continued under pressure from US growers, who feared a continued labour shortage in the booming post-war economy. Although by the 1950s public sentiment had again turned restrictionist (as manifested in Operation Wetback in 1954) and the Bracero programme ended in 1964, this did not bring a stop to Mexican migration to the United States. On the contrary, there was a gradual increase in flows but with two important changes: many more migrants were now undocumented, and flows tended to be more permanent.

[2]This question is often used in the literature as a proxy for remittances received. Although in theory the reported amount could include investment income from abroad, such income is likely to be negligible for the typical household in Mexico. As discussed in the following, such investment income could, however, account for some of this for households at the top of the income distribution.

In the 1970s, migration from Mexico to the United States picked up as a result of both push and pull factors. Changes in US immigration policy, such as the Immigration and Nationality Act (1965), provided incentives for family reunification, whereas migration also intensified as a result of fluctuations in economic activity in Mexico culminating in economic crises in 1976 and 1983 (Rosenblum & Brick, 2011).

Migration flows only slowed recently, with an increase in the number of returning migrants and a significant decrease in outflows. This is the result of a combination of demographic changes in Mexico's population (as the decline in fertility resulted in proportionally fewer young people, hence a smaller pool of potential migrants), improved economic conditions in Mexico (with households increasingly tapping into two salaries in Mexico) and enhanced immigration enforcement by US authorities, thus affecting both the relative costs and benefits of migration (see, e.g., Durand & Arias, 2014; Gonzales-Barrera, 2015). According to the cumulative causation theory of international migration, slowing flows could also be related to the asymptotic stability reached by rural communities that experience negative population growth: most people of working age have already migrated, leaving behind mostly children, elderly and those without sufficient capital to migrate.

The global financial crisis and the associated decline in work opportunities in the United States hastened the erstwhile gradual reduction in the stock of potential migrants (Figure 1). The United States remains by far the largest recipient of Mexican migrants, accounting for 97% of Mexican outmigration (2014).

The profile of migrants has evolved over time (Gonzales-Barrera, 2015). In 1990, Mexican migrants in general were predominantly male, young and typically less educated. Although the typical migrant is still male and less educated, the median age increased reflecting the longer history of migration combined with a recent drop in new (younger) inflows (Table 1).

According to estimates from the American Community Survey, around two thirds of migrants send money home to support their families (2016; estimates across different sources vary). Remittances as a share of gross domestic product (GDP) have been increasing since the 1990s, reaching a peak just before the global financial crisis, in line with migration patterns. The fall in remittances between the global financial crisis and 2014 is consistent with the arrival of fewer new (young) migrants—the likelihood of remitting declines with age as a result of weakening links with the home country and family reunification (Beaton, Koczan, Loyola, & Martijn, 2017). The pickup since 2015, to new historic highs, could be explained by a strong US labour market, a weak peso, front-loading due to concerns about potential taxes on remittances and fears over changes in immigration policy more broadly.

This paper examines how the impact of remittances on inequality varies as a result of domestic and external crises. We focus on the Mexican peso crisis of 1994 and the global financial crisis of 2008. The first refers to the currency crisis sparked by a sudden devaluation of the peso against the US dollar in December 1994, which resulted in

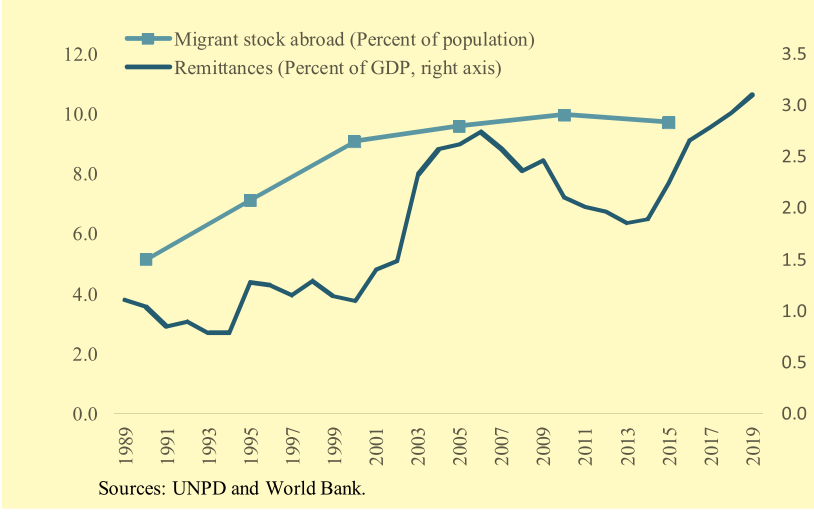

FIGURE 1 Migration and remittances [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 1 Demographic characteristics of Mexican immigrants in the United States

	1990	2013
Male	55	53
Median age (years)	29	39
Age groups		
Younger than 18	15	6
18 to 29	35	19
30 to 39	24	26
40 to 49	13	24
50 to 64	9	18
65 or older	5	7
Educational attainment (ages 25 and older)		
Less than high school diploma	76	58
High school diploma	12	24
Some college or more	13	18
Years in the United States		
5 years or less	30	8
6 to 10 years	20	15
11 to 20 years	31	35
More than 20 years	19	42

Source: Gonzales-Barrera (2015).
Note: Pew Research Center tabulations of 1990 Census and 2013 American Community Survey data. Numbers may not sum to 100 due to rounding. Mexican immigrants are people born in Mexico to two parents who were not US citizens. Per cent unless noted otherwise.

a 6% contraction of the Mexican economy by 1995. Unemployment increased, and the share of informal employment and the wage gap between formal and informal employment rose dramatically (International Monetary Fund [IMF], 2010). The second crisis examined here is the global financial crisis, which unlike the peso crisis, originated in the United States and was propagated into Mexico through the strong economic relationship between the two countries (for instance, around 75% of Mexican exports go to the United States). Although this time Mexico was better equipped to handle the crisis (unemployment, the share of informal employment and the formal–informal wage gap increased less dramatically), this crisis stands in contrast with the peso crisis in that the main migrant destination country as well as the home country were hit.

It should be noted that the two crises occur more than two decades apart, with important changes to migration flows in the meantime. In particular, although we would expect a domestic shock to be more easily insured using remittances from an unaffected host country, a more established migrant community (with a more stable, better integrated position in the host country) or more widespread migration opportunities (lower fixed costs of migration, making migration more accessible to lower deciles of the income distribution as well) could more than offset this and help mitigate shocks. The following analysis indirectly examines which of these effects dominates.

5 | ESTIMATION STRATEGY

The paper starts off by documenting who receives remittances—how the socio-economic characteristics of remittance-receiving households differ from those of non-remittance-receiving households.

We then examine the determinants of remittance behaviour by income decile in order to assess whether different factors influence remittance behaviour at different points of the income distribution. We look at the determinants of receiving remittances (a binary variable), the amount received (in pesos) and remittances received as a share of household income. These regressions examine the roles of household characteristics, such as household composition, location and characteristics of the household head. They are based on two pooled cross-sections, for the earlier period around the peso crisis and for the later period around the global financial crisis. Our focus is on pooled cross-sections as we also attempt to document how remittance receipts and their determinants changed as a result of the two crises. Other results are very similar when examining separate cross-sections.

Finally, we construct counterfactual income distributions in the absence of remittances in order to compare resulting Gini coefficients with those of the original income distribution. As highlighted earlier, simply relying on the non-remittance income of remittance-receiving households is likely to result in biased estimates, because it does not take into account that the migrant may have had positive earnings in the home country in the absence of migration and would thus likely underestimate the 'true' counterfactual income of the household in the absence of migration. Because remittances are the outcome of migration, they do not constitute an exogenous source of income; rather, they replace the income the migrant would have earned at home. Estimating the effect of remittances on inequality thus requires constructing such hypothetical counterfactual incomes for the remittance-receiving households, which take this into account. In line with the work of Möllers and Meyer (2014), we estimate counterfactual incomes using propensity score matching, a non-parametric approach, which not only allows for more flexibility but also explicitly enforces common support, requiring that remittance-receiving households are only compared with non-remittance-receiving households, which are otherwise 'similar enough' to them (see Rosenbaum & Rubin, 1983).

6 | RESULTS

6.1 | Who receives remittances?

This section examines remittance patterns over time, as well as variation in remittance receipts across the income distribution. The share of households receiving remittances increased in the 1990s, from about 4% to almost 6% by 2000 (which could be in line with migration becoming more accessible to lower parts of the income distribution as well), but has declined slightly since (Figures 2 and 3). Households have also become less dependent on them, with remittances declining from 30% to 40% of household income in the 1990s to around 20% in 2014.[3] In 2014, households received on average about 290 USD per month (mean; 140 USD median). Poorer households are generally more likely to receive remittances, though in the 1990s, this was not the case for the poorest decile, as fixed costs of migration may still have been prohibitively high for this group.

Although in the earlier years remittance-receiving households were typically in the middle of the income distribution, we observe a clear shift over time, with remittances becoming increasingly pro-poor. As expected, remittances were higher for households in higher deciles in nominal terms but constituted a larger share of income for poorer households. Remittance-receiving households are on average poorer than non-remittance-receiving households, even when taking remittances into account.

Remittance-receiving households tend to be slightly smaller, but (as expected) tend to have fewer employed household members present, and more children and elderly (Table 2). They are more likely to have a female household head and are relatively less educated compared with non-remittance-receiving households. Both of these patterns become starker over time, in line with predominantly male, low-skilled migration from Mexico to the United States (see also Amuedo-Dorantes, Bansak, & Pozo, 2005). Remittance-receiving household are also more likely to be from rural areas (also in line with Amuedo-Dorantes et al., 2005).

[3]Remittances as a share of GDP have been falling since the global financial crisis (Figure 1)—this could be driven by both fewer households receiving remittances and remittances accounting for a smaller share of household income (though they have increased in nominal terms).

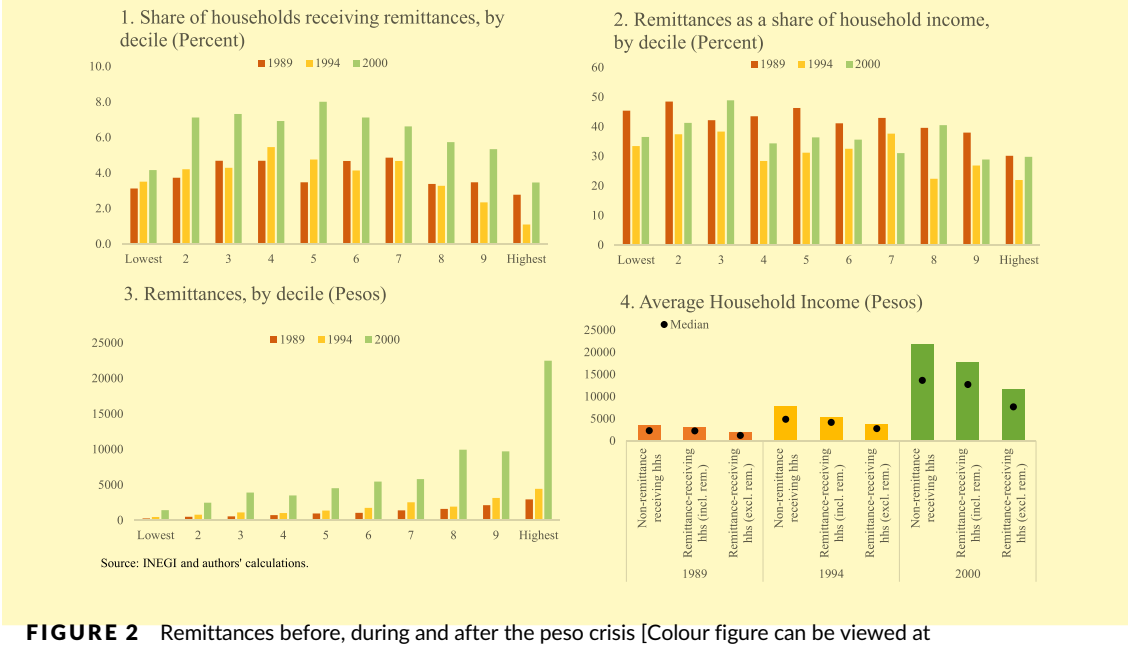

FIGURE 2 Remittances before, during and after the peso crisis [Colour figure can be viewed at wileyonlinelibrary.com]

comparación con crisis

FIGURE 3 Remittances before, during and after the global financial crisis [Colour figure can be viewed at wileyonlinelibrary.com]

6.2 | Do the determinants of remittances vary across the income distribution?

The determinants of remittances are broadly similar for the two periods examined here. However, examining the drivers of remittance receipts by income decile points to differences across the income distribution, especially between the very top and the very bottom (Tables 3 and 4).

TABLE 2 Characteristics of remittance-receiving and non-remittance-receiving households

	1989				2014			
	Remittance-receiving households		Non-remittance-receiving households		Remittance-receiving households		Non-remittance-receiving households	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
No. of household members	4.78	2.58	4.95	2.41	3.62	1.96	3.78	1.87
No. of children	1.62	1.65	1.48	1.50	0.82	1.06	0.85	1.07
No. of elderly	0.33	0.62	0.23	0.53	0.46	0.71	0.26	0.56
No. of employed	1.23	1.16	1.65	1.07	1.41	1.16	1.68	1.06
Age of household head	38.75	27.87	44.47	16.34	53.95	17.68	48.23	15.55
Male household head	0.82	0.39	0.86	0.35	0.58	0.49	0.75	0.43
Education of household head	0.88	1.51	2.43	2.37	0.58	0.49	5.57	2.61
Income decile (total income)	5.38	2.69	5.51	2.88	4.57	2.68	5.54	2.87

Looking at characteristics of the household, the likelihood of receiving remittances falls with the number of employed in the receiving household, except at the very top in the later period, where it is likely pointing to investment motives. It increases with the number of elderly but falls with the number of children in the household (in line with the effects of family reunification), though these effects are less pronounced at the top in the later period.[4] Across all deciles, households with female household heads are more likely to receive remittances, likely reflecting a male migrant. Households with a higher educated household head are less likely to receive remittances, except for the bottom decile where the impact is not significant in the later period. Remittances appear to be more important for rural households, across the income distribution.

Turning to the determinants of the amount of remittances received (results are similar whether looking at the amount of remittances or at remittances as a share of household income), these (as the likelihood to receive) increase with the number of elderly in the household, especially in the earlier period, and fall with the number of children and the number of employed in the household, for male household heads and urban households, across the distribution. Again, education plays a role, except at the very bottom in the later period.

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6.3 | What does this imply for inequality?

This pro-poor pattern of remittances could translate into remittances lowering inequality even at the macro level. A simple comparison of Gini coefficients based on actual income (including remittances for remittance-receiving households) and income excluding remittances would suggest that remittances lower inequality (Figure 4). This, as noted earlier, is, however, not a measure of the true effect, as 'missing' remittances would likely be associated with behavioural responses affecting income: both of the migrant himself and of family members as hours or employment could rise to try and make up for 'missing' remittances, but it is unclear ex ante how this would differ across the income distribution.

[4]The opposite signs on the number of children and the number of elderly could be explained by differences in family composition as a result of family reunification—fewer children in the receiving household might be due to children being in the host country as well, or to fewer children overall, whereas elderly household members may be less likely to move to the host country. Unfortunately, we do not have data on the number of dependents in the host country.

TABLE 3 Determinants of remittances by decile, before, during and after the peso crisis

Determinants of receiving remittances, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	0.0542	0.0638*	−0.00221	0.00747	0.0650**	0.0311	0.0276	0.0243	0.0751**	0.0421
	(0.0445)	(0.0348)	(0.0314)	(0.0294)	(0.0290)	(0.0292)	(0.0300)	(0.0290)	(0.0315)	(0.0353)
No. of children	−0.0365	−0.118**	−0.0321	−0.0827*	−0.0944**	−0.0150	−0.0598	0.0476	−0.0873*	−0.0705
	(0.0611)	(0.0493)	(0.0452)	(0.0441)	(0.0417)	(0.0413)	(0.0442)	(0.0445)	(0.0471)	(0.0563)
No. of elderly	0.387***	0.255***	0.316***	0.128	0.0868	0.202**	0.246***	0.348***	0.294***	0.254***
	(0.0874)	(0.0788)	(0.0857)	(0.0841)	(0.0960)	(0.0834)	(0.0905)	(0.0903)	(0.0888)	(0.0963)
No. of employed	−0.387***	−0.227***	−0.178***	−0.172***	−0.290***	−0.280***	−0.231***	−0.183***	−0.247***	−0.179***
	(0.0819)	(0.0866)	(0.0660)	(0.0591)	(0.0581)	(0.0581)	(0.0548)	(0.0504)	(0.0603)	(0.0556)
Age of household head	−0.0140***	−0.00848***	−0.0107***	−0.00752**	−0.0103***	−0.00839**	−0.0168***	−0.0121***	−0.0155***	−0.0150***
	(0.00354)	(0.00328)	(0.00325)	(0.00345)	(0.00356)	(0.00339)	(0.00342)	(0.00383)	(0.00387)	(0.00449)
Male household head	−0.540***	−0.344***	−0.419***	−0.323***	−0.351***	−0.177	−0.245**	−0.377***	−0.557***	−0.314**
	(0.109)	(0.104)	(0.107)	(0.105)	(0.104)	(0.109)	(0.110)	(0.113)	(0.110)	(0.143)
Education of household head	−0.102***	−0.0430**	−0.100***	−0.116***	−0.131***	−0.117***	−0.194***	−0.173***	−0.106***	−0.0897***
	(0.0302)	(0.0212)	(0.0215)	(0.0216)	(0.0200)	(0.0181)	(0.0212)	(0.0213)	(0.0153)	(0.0164)
Urban household	−0.410***	−0.572***	−0.665***	−0.582***	−0.630***	−0.633***	−0.641***	−0.594***	−0.640***	−0.340**
	(0.134)	(0.109)	(0.1000)	(0.0815)	(0.0836)	(0.0808)	(0.0873)	(0.0881)	(0.101)	(0.139)
1994 dummy	0.0512	0.0199	−0.145	0.00576	0.101	−0.100	−0.128	−0.0199	−0.257**	−0.357***
	(0.105)	(0.0958)	(0.0941)	(0.0897)	(0.0990)	(0.0946)	(0.0964)	(0.107)	(0.114)	(0.134)
2000 dummy	0.365***	0.351***	0.512***	0.546***	0.934***	0.726***	1.031***	1.048***	0.716***	0.687***
	(0.134)	(0.126)	(0.124)	(0.119)	(0.130)	(0.122)	(0.133)	(0.151)	(0.153)	(0.165)
Number of obs.	3422	3403	3413	3410	3415	3426	3415	3423	3433	3425

(Continues)

TABLE 3 (Continued)

Determinants of the amount of remittances received, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	−248.6 (585.7)	1542.6 (1404.5)	40.60 (1166.4)	561.5 (1729.0)	2735.5 (2056.8)	1104.9 (2122.3)	5983.1* (3281.7)	3339.1 (2622.2)	3859.1 (3186.5)	2478.6 (4484.3)
No. of children	389.4 (818.6)	−2785.2 (1870.2)	−1300.7 (1536.0)	−2070.3 (2094.7)	−4575.9* (2604.7)	−85.39 (3290.6)	−11622.6** (5750.8)	−1463.5 (3918.8)	−13344.0** (5575.3)	−18255.6* (9848.7)
No. of elderly	4660.8*** (1765.6)	11701.2*** (3564.2)	13431.7*** (3977.9)	14734.3*** (5593.5)	18646.5*** (6769.6)	28732.4*** (10909.6)	39439.0*** (15222.6)	26691.4** (12409.8)	21374.8 (13240.6)	40815.2 (27341.5)
No. of employed	−2555.4*** (854.6)	−5369.5*** (2008.9)	−7448.5*** (2170.2)	−9208.5*** (3231.4)	−12438.5*** (4043.0)	−16180.1*** (4116.3)	−13784.9*** (4724.3)	−14870.2*** (4333.3)	−22775.7*** (6617.5)	−11037.0** (5535.0)
Age of household head	−248.0** (98.83)	−783.4*** (225.9)	−868.0*** (262.7)	−1022.4*** (355.3)	−1552.5*** (475.6)	−1418.7** (567.3)	−2783.2*** (805.1)	−2057.0*** (784.7)	−3721.2*** (1320.3)	−4459.1** (1895.4)
Male household head	−1807.3 (1329.1)	−4158.7 (2639.5)	2505.2 (2325.4)	−7132.8 (5159.7)	−17317.8*** (6538.1)	673.0 (5999.9)	299.9 (5621.3)	−9903.5 (8255.3)	−24061.2 (15129.9)	−44704.4 (32252.6)
Education of household head	−858.4** (342.2)	−2832.3*** (744.0)	−3800.4*** (871.6)	−4462.1*** (1158.9)	−5650.2*** (1396.0)	−6888.8*** (1686.4)	−9299.7*** (2054.7)	−7578.5*** (2168.8)	−13639.2*** (4060.7)	−11451.3*** (4290.1)
Urban household	−3806.1*** (1236.0)	−8727.5*** (2410.5)	−11522.1*** (3078.2)	−16676.7*** (4397.8)	−11358.0** (4862.0)	−21103.1*** (6556.5)	−40525.5*** (10563.6)	−35813.9*** (11266.7)	−27830.6* (15763.3)	−13734.4 (25690.9)
1994 dummy	−8428.3*** (1711.6)	−18484.5*** (3260.6)	−26752.3*** (4141.3)	−37091.6*** (5903.2)	−34560.1*** (6354.8)	−50435.7*** (7997.9)	−73939.3*** (11151.9)	−55527.3*** (10635.1)	−74838.3*** (14945.3)	−74267.8*** (17351.4)
2000 dummy	−4932.7*** (1520.6)	−3229.2 (2506.5)	−4738.3 (3252.5)	−10095.0* (5404.3)	914.9 (5229.7)	−7429.8 (6786.5)	−9609.8 (9612.7)	−2873.8 (9901.1)	11989.9 (18436.2)	9005.0 (26665.8)
Number of obs.	3422	3403	3413	3410	3415	3426	3415	3423	3433	3425
Adjusted R^2.	0.028	0.051	0.054	0.045	0.049	0.052	0.064	0.042	0.047	0.031

TABLE 3 (Continued)

Determinants of remittances as a share of household income, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	0.129 (0.126)	0.488** (0.193)	0.154 (0.136)	0.171 (0.155)	0.393*** (0.150)	0.215* (0.119)	0.300** (0.131)	0.154 (0.102)	0.265*** (0.0909)	0.114* (0.0681)
No. of children	−0.0368 (0.181)	−0.755*** (0.248)	−0.215 (0.205)	−0.452** (0.190)	−0.531*** (0.198)	−0.174 (0.178)	−0.511** (0.216)	0.130 (0.187)	−0.426*** (0.153)	−0.273** (0.135)
No. of elderly	1.795*** (0.423)	1.798*** (0.482)	1.790*** (0.473)	1.679*** (0.522)	1.316*** (0.508)	1.703*** (0.524)	2.717*** (0.620)	1.509*** (0.402)	0.782** (0.331)	0.670* (0.371)
No. of employed	−1.077*** (0.204)	−1.663*** (0.320)	−1.436*** (0.308)	−1.275*** (0.292)	−1.641*** (0.292)	−1.496*** (0.246)	−1.200*** (0.222)	−0.883*** (0.193)	−0.930*** (0.173)	−0.451*** (0.118)
Age of household head	−0.0708*** (0.0194)	−0.0972*** (0.0259)	−0.115*** (0.0256)	−0.106*** (0.0278)	−0.124*** (0.0297)	−0.0992*** (0.0275)	−0.180*** (0.0316)	−0.0935*** (0.0241)	−0.0964*** (0.0265)	−0.0624*** (0.0226)
Male household head	−1.753*** (0.419)	−1.479*** (0.539)	−2.178*** (0.636)	−1.286** (0.558)	−2.252*** (0.585)	−0.812* (0.478)	−1.046** (0.454)	−0.881** (0.418)	−1.631*** (0.498)	−1.389** (0.558)
Education of household head	−0.309*** (0.0980)	−0.390*** (0.114)	−0.539*** (0.104)	−0.577*** (0.103)	−0.642*** (0.0977)	−0.582*** (0.0952)	−0.734*** (0.0959)	−0.584*** (0.0900)	−0.408*** (0.0804)	−0.235*** (0.0661)
Urban household	−0.995*** (0.372)	−1.896*** (0.359)	−2.619*** (0.385)	−2.170*** (0.354)	−2.189*** (0.375)	−2.108*** (0.375)	−2.766*** (0.457)	−1.811*** (0.378)	−1.315*** (0.404)	−0.119 (0.344)
1994 dummy	−0.176 (0.352)	−0.203 (0.411)	−0.474 (0.403)	−0.804* (0.411)	−0.386 (0.381)	−0.721* (0.378)	−0.843** (0.411)	−0.655** (0.292)	−0.733** (0.307)	−0.416** (0.205)
2000 dummy	1.049** (0.511)	1.982*** (0.615)	3.278*** (0.644)	2.564*** (0.651)	4.040*** (0.644)	3.184*** (0.626)	3.577*** (0.635)	3.990*** (0.741)	2.363*** (0.534)	1.898*** (0.589)
Number of obs.	3422	3403	3413	3410	3415	3426	3415	3423	3433	3425
Adjusted R^2	0.032	0.042	0.056	0.050	0.069	0.062	0.100	0.080	0.058	0.034

Note: The regression examining the determinants of receiving remittances (a dummy variable) is a probit model; the regressions looking at the determinants of the amount received (in pesos and as a share of household income) are simple ordinary least squares regressions with robust standard errors. Dataset is a pooled cross-section of households in 1989, 1994 and 2000; 1989 is treated as the base year.

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.

Propensity score matching is thus used to construct counterfactual incomes for remittance-receiving households, providing an estimate of what their income would be once this behavioural response (including the migrant's counterfactual income) is taken into account, assuming that their income would be similar to that of non-remittance-receiving households with comparable characteristics. These specifications thus use the same individual and household characteristics as above to predict counterfactual incomes.[5]

The resulting Gini coefficient is lower than that based on income excluding remittances, but is still higher than that of actual income, suggesting that inequality would be higher in the absence of remittances, even when taking the behavioural response into account (in line with the parametric results of Acosta et al., 2008). This pattern holds up in both the 1990s and the 2000s and 2010s.

Remittances lower inequality in both urban and rural areas, but the effects in rural areas, with more remittance-receiving households and on average poorer households, are much more pronounced. For instance, in 2014, the Gini coefficient in urban areas was 0.431 based on actual income and 0.433 based on counterfactual incomes, whereas in rural areas, it was around 0.403 based on actual incomes and 0.413 based on counterfactual incomes. This is in line with the findings of Keskin (2009), who examines the impact of remittances on rural income inequality in Mexico and finds that remittances have a positive effect on rural equality and become more equalising over time.

To illustrate the economic significance of this result, the Gini coefficient fell by about 0.01 between 2002 and 2012, whereas the differences between the Gini coefficients based on actual income and income without remittances, and actual income and counterfactual income respectively, are about 0.006 and 0.004 in the later period, as shown in Figure 4. The behavioural response, captured as the difference between income excluding remittances and counterfactual income, appears to be large: it reduces the impact of remittances on inequality by more than two thirds, suggesting that labour supply at the household level is very elastic to remittance income (as discussed above, remittances accounted for about 20% of household income in 2014 for households in the median decile).

Consistent with the earlier findings of Canales (2008) and Comisión Económica para América Latina y El Caribe (CEPAL) (2005), remittances would typically not be large enough for significant social mobility, for instance, to allow households to change income deciles or climb out of poverty. Median remittances received in 2014 were about 140 USD, and much lower for poorer households, whereas the national poverty line corresponded to over 200 USD per month.

6.4 | What are the effects of the crises?

The effects of the peso crisis and global financial crisis are examined further based on Tables 3 and 4, which suggest that even controlling for a range of household characteristics, there are very clear crisis effects. Figure 5 depicts how the likelihood of receiving remittances and the amount of remittances received as a share of income changed across income deciles during the peso and global financial crises, respectively.

Both crises showed an increasingly pro-poor pattern of remittances. During the peso crisis, the likelihood of receiving remittances as well as amounts as a share of income fell at the top, whereas there was little change in the lower income deciles. During the global financial crisis, the likelihood of receiving remittances as well as remittance amounts as a share of income again fell at the top, but now even increased at the bottom. The decline of remittances to richer households during crises periods in the receiving country is consistent with falling investment motives. One possible explanation for the increase in remittances to poorer households during the global financial crisis could be that as fixed costs of migration fell over time, migration became a *relatively* more accessible option to poorer households, in line with the cumulative causation theory of migration (this would not necessarily be inconsistent with

[5]The following results rely on radius matching, where each treated household is matched only with control households whose propensity score falls within a predefined neighbourhood of the propensity score of the treated household. Results are however robust to alternative matching estimators.

TABLE 4 Determinants of remittances by decile; before, during and after the global financial crisis

Determinants of receiving remittances, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	0.0209 (0.0252)	0.0187 (0.0228)	0.0103 (0.0250)	0.0676*** (0.0240)	0.0349 (0.0234)	0.0547** (0.0228)	0.0472** (0.0234)	0.0872*** (0.0241)	0.0630** (0.0257)	0.0426 (0.0288)
No. of children	−0.0779** (0.0382)	−0.0528 (0.0374)	0.0333 (0.0375)	−0.0473 (0.0353)	0.0268 (0.0343)	0.0106 (0.0356)	0.0519 (0.0348)	−0.0428 (0.0379)	0.00727 (0.0402)	0.0635 (0.0477)
No. of elderly	0.0465 (0.0582)	0.0231 (0.0558)	−0.0862 (0.0619)	−0.0151 (0.0597)	0.0485 (0.0599)	0.112* (0.0600)	−0.0190 (0.0625)	0.0206 (0.0676)	0.0136 (0.0658)	0.132* (0.0709)
No. of employed	−0.162*** (0.0413)	−0.188*** (0.0406)	−0.214*** (0.0399)	−0.230*** (0.0394)	−0.198*** (0.0380)	−0.198*** (0.0376)	−0.160*** (0.0361)	−0.194*** (0.0355)	−0.0956*** (0.0356)	−0.0306 (0.0398)
Age of household head	0.0000496 (0.00228)	0.00647*** (0.00231)	0.0107*** (0.00273)	0.00972*** (0.00251)	0.00507** (0.00257)	0.000534 (0.00262)	0.00696** (0.00283)	−0.00184 (0.00297)	0.00305 (0.00337)	−0.00392 (0.00375)
Male household head	−0.372*** (0.0559)	−0.416*** (0.0547)	−0.489*** (0.0592)	−0.513*** (0.0572)	−0.477*** (0.0608)	−0.448*** (0.0598)	−0.402*** (0.0616)	−0.461*** (0.0641)	−0.292*** (0.0678)	−0.548*** (0.0809)
Education of household head	−0.0116 (0.0123)	−0.0349*** (0.0120)	−0.0406** (0.0168)	−0.0350*** (0.0112)	−0.0530*** (0.0107)	−0.0530*** (0.0117)	−0.0496*** (0.0129)	−0.0660*** (0.0133)	−0.0406*** (0.0111)	−0.0413*** (0.00872)
Urban household	−0.406*** (0.0703)	−0.664*** (0.0623)	−0.647*** (0.0615)	−0.562*** (0.0558)	−0.578*** (0.0571)	−0.509*** (0.0562)	−0.526*** (0.0587)	−0.501*** (0.0622)	−0.417*** (0.0675)	−0.692*** (0.0773)
2008 dummy	0.229*** (0.0677)	0.122* (0.0647)	0.0628 (0.0684)	0.0665 (0.0693)	−0.00308 (0.0676)	−0.0667 (0.0713)	−0.0848 (0.0711)	−0.242*** (0.0722)	−0.185** (0.0761)	−0.270*** (0.0922)
2014 dummy	0.188*** (0.0727)	0.0264 (0.0704)	−0.162** (0.0770)	−0.0507 (0.0760)	−0.282*** (0.0788)	−0.267*** (0.0784)	−0.232*** (0.0793)	−0.529*** (0.0839)	−0.359*** (0.0857)	−0.606*** (0.106)
Number of obs.	6563	6556	6563	6579	6569	6564	6582	6585	6524	6596

(Continues)

TABLE 4 (Continued)

Determinants of the amount of remittances received, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	6.846 (7.058)	15.86 (11.98)	28.39 (18.64)	66.35*** (19.52)	68.03*** (22.51)	60.73*** (22.92)	71.79*** (25.37)	125.9*** (37.97)	109.4** (43.76)	189.8*** (70.26)
No. of children	−15.39 (10.72)	−15.42 (19.40)	13.12 (26.25)	−32.07 (29.89)	−12.85 (33.30)	7.085 (35.27)	11.36 (36.21)	−111.0** (55.79)	−29.52 (47.37)	−50.30 (130.5)
No. of elderly	9.403 (18.19)	2.600 (32.68)	−41.69 (36.51)	−7.254 (51.68)	35.32 (62.76)	90.78 (65.97)	−95.81 (62.78)	−10.03 (80.37)	−98.97 (63.94)	46.40 (98.26)
No. of employed	−77.05*** (12.41)	−162.4*** (22.23)	−217.1*** (29.84)	−297.3*** (38.36)	−298.5*** (42.91)	−313.4*** (42.82)	−261.5*** (43.80)	−347.7*** (60.17)	−215.9*** (56.52)	−269.7*** (100.00)
Age of household head	−1.752** (0.805)	−0.577 (1.299)	1.780 (1.674)	1.347 (1.847)	0.264 (2.207)	−5.306* (2.865)	−0.537 (2.485)	−7.402* (4.043)	−0.0765 (3.361)	−15.16* (8.798)
Male household head	−175.3*** (25.15)	−332.0*** (43.31)	−516.7*** (59.13)	−627.5*** (73.39)	−663.4*** (86.15)	−695.2*** (94.02)	−632.9*** (94.11)	−715.5*** (121.2)	−498.3*** (117.4)	−713.8*** (205.2)
Education of household head	0.0598 (2.980)	−14.45*** (4.597)	−19.10*** (5.293)	−23.17*** (4.942)	−24.35*** (4.880)	−30.86*** (5.338)	−30.67*** (5.215)	−47.16*** (7.020)	−28.11*** (5.592)	−25.57*** (8.464)
Urban household	−122.2*** (20.86)	−308.2*** (29.59)	−389.9*** (39.97)	−433.3*** (48.68)	−495.8*** (60.56)	−505.1*** (68.65)	−542.8*** (81.17)	−674.6*** (111.5)	−273.2*** (86.29)	−1037.4*** (280.7)
2008 dummy	79.04*** (16.82)	108.8*** (29.68)	133.8*** (39.99)	81.08* (48.06)	107.4** (53.19)	37.17 (56.28)	48.36 (59.34)	−104.4 (79.99)	−149.1* (84.40)	−159.5 (139.9)
2014 dummy	62.80*** (18.64)	30.46 (31.03)	−37.89 (37.90)	−70.48 (49.33)	−154.7*** (52.31)	−127.5** (62.39)	−152.5** (60.73)	−406.9*** (86.43)	−160.0 (98.59)	−158.1 (175.3)
Number of obs.	6563	6556	6563	6579	6569	6564	6582	6585	6524	6596
Adjusted R^2	0.031	0.048	0.061	0.063	0.057	0.049	0.040	0.040	0.016	0.015

TABLE 4 (Continued)

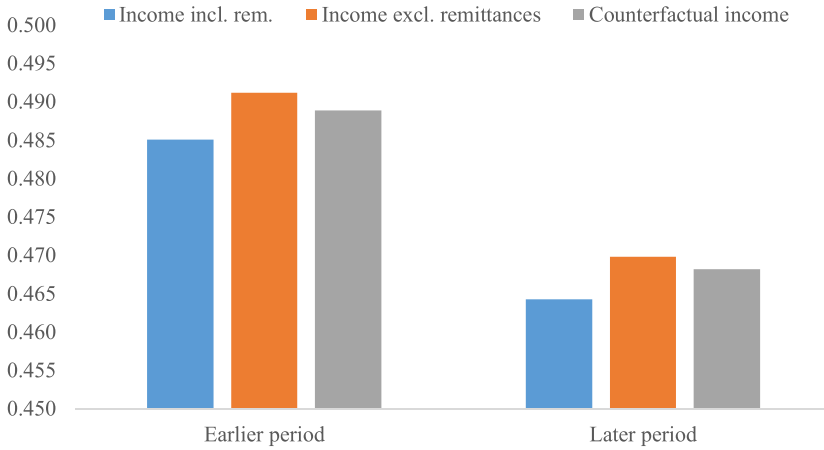
Determinants of remittances as a share of household income, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	0.111 (0.111)	0.182 (0.116)	0.185 (0.130)	0.391*** (0.118)	0.285*** (0.109)	0.236*** (0.0886)	0.205*** (0.0764)	0.252*** (0.0916)	0.183*** (0.0707)	0.124** (0.0536)
No. of children	−0.276* (0.165)	−0.235 (0.185)	0.0926 (0.185)	−0.220 (0.182)	−0.0187 (0.161)	0.00766 (0.133)	0.0809 (0.113)	−0.202 (0.140)	−0.0586 (0.0804)	0.0745 (0.0985)
No. of elderly	0.0653 (0.265)	−0.0891 (0.313)	−0.417 (0.267)	−0.126 (0.305)	0.118 (0.306)	0.295 (0.260)	−0.301 (0.193)	0.0622 (0.215)	−0.175 (0.114)	−0.0356 (0.0912)
No. of employed	−1.236*** (0.186)	−1.583*** (0.215)	−1.593*** (0.213)	−1.692*** (0.225)	−1.442*** (0.200)	−1.240*** (0.167)	−0.815*** (0.129)	−0.821*** (0.145)	−0.408*** (0.0980)	−0.211*** (0.0760)
Age of household head	−0.0213* (0.0119)	−0.00257 (0.0122)	0.0168 (0.0118)	0.0121 (0.0109)	0.00688 (0.0105)	−0.0179 (0.0110)	−0.000725 (0.00767)	−0.0149 (0.00951)	−0.000438 (0.00615)	−0.00775 (0.00621)
Male household head	−2.528*** (0.366)	−2.934*** (0.399)	−3.510*** (0.412)	−3.438*** (0.409)	−3.008*** (0.396)	−2.604*** (0.349)	−2.001*** (0.287)	−1.619*** (0.282)	−0.895*** (0.207)	−0.724*** (0.199)
Education of household head	−0.0298 (0.0463)	−0.162*** (0.0491)	−0.166*** (0.0449)	−0.162*** (0.0336)	−0.135*** (0.0266)	−0.134*** (0.0218)	−0.107*** (0.0183)	−0.134*** (0.0201)	−0.0629*** (0.0122)	−0.0342*** (0.0104)
Urban household	−1.944*** (0.290)	−2.907*** (0.277)	−2.772*** (0.280)	−2.552*** (0.278)	−2.456*** (0.286)	−1.967*** (0.261)	−1.756*** (0.252)	−1.794*** (0.282)	−0.515*** (0.157)	−0.941*** (0.228)
2008 dummy	0.617** (0.299)	0.155 (0.340)	0.177 (0.338)	−0.329 (0.346)	−0.280 (0.308)	−0.491* (0.267)	−0.361 (0.226)	−0.875*** (0.260)	−0.609*** (0.197)	−0.494** (0.196)
2014 dummy	0.0205 (0.295)	−0.809** (0.338)	−1.148*** (0.317)	−1.323*** (0.343)	−1.521*** (0.304)	−1.178*** (0.283)	−0.989*** (0.232)	−1.590*** (0.278)	−0.653*** (0.214)	−0.502** (0.210)
Number of obs.	6563	6556	6563	6579	6569	6564	6582	6585	6524	6596
Adjusted R^2	0.032	0.046	0.061	0.062	0.059	0.051	0.044	0.041	0.018	0.019

Note: The regression examining the determinants of receiving remittances (a dummy variable) is a probit model; the regressions looking at the determinants of the amount received (in pesos and as a share of household income) are simple ordinary least squares regressions with robust standard errors. Dataset is a pooled cross-section of households in 2002, 2008 and 2014; 2002 is treated as the base year.

*Significant at 10% level.

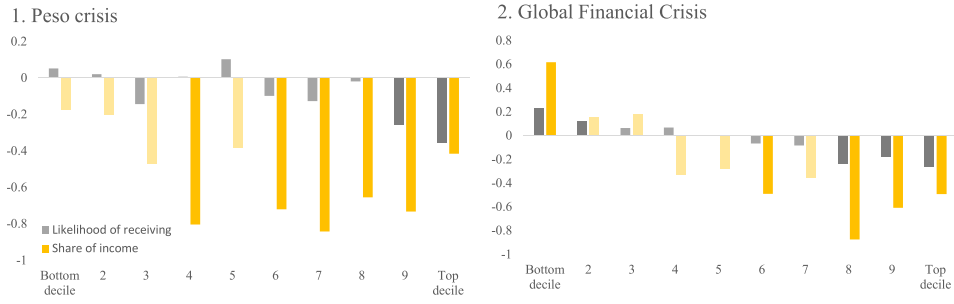
**Significant at 5% level.

***Significant at 1% level.



Source: INEGI and authors' calculations.
Note: Counterfactual income uses actual income for non-remittance-receiving households and an estimated counterfactual income for remittance-receiving households based on propensity score matching. 'Earlier period' includes the surveys in 1989, 1994 and 2000; 'later period' includes the surveys in 2002, 2008 and 2014.

FIGURE 4 Gini coefficients [Colour figure can be viewed at wileyonlinelibrary.com]



Source: INEGI and authors' calculations.
Note: The figure plots crisis year dummy coefficients (1994 in panel 1 and 2008 in panel 2) from Tables 3 (panel 1) and 4 (panel 2). Darker colors denote statistically significant coefficients at the 10 percent level.

FIGURE 5 Crisis effects [Colour figure can be viewed at wileyonlinelibrary.com]

slowing overall flows, as long as migration becomes *relatively* more accessible to poor households and is not restricted to mostly high-income households). Alternatively, this effect could be driven by migrants' better integration in the United States (with higher incomes, more stable jobs and a regularised status; see, for instance, Light, 2016), allowing them to better cushion the shock in the United States. This insurance effect is quite striking in a context where both the sending and receiving countries were hit by a common shock.

Regressions so far did not include variables that are likely endogenous to remittance receipts, such as income. The results are qualitatively similar when household income (excluding remittances) is included, with the effects of the crisis being positive for a larger share of the bottom of the distribution, and the effect of income itself being negative, as expected.

Although the results so far relied on simple probit and ordinary least squares regressions, results are very similar when accounting for non-random selection into receiving remittances using the Heckman two-step estimator (Table A1).

7 | CONCLUSIONS

The paper examined the evolution and determinants of remittances across the income distribution. Remittances were found to lower inequality at the macro level: the Gini coefficient based on an income distribution with counterfactual incomes for remittance-receiving households is higher than that based on the actual income distribution, suggesting that inequality would be higher in the absence of remittances, even taking behavioural responses into account.

Remittances could also help absorb shocks. During both the peso crisis and the global financial crisis, households at the top of the income distribution became both less likely to receive remittances and received smaller amounts. During the global financial crisis, households in the bottom part of the income distribution became even significantly *more* likely to receive remittances relative the precrisis and postcrisis years. This suggests that the pro-poor pattern of remittances became stronger over time. One possible explanation for this could be that migration is no longer prohibitively costly to those at the bottom of the income distribution as social networks and more widely available information lower the costs of migration. Migration opportunities could become more evenly spread across the income distribution even as overall flows decline. Alternatively, the effect could be driven by migrants' improved integration in the host country, reflected in status regularisation, higher incomes or more stable jobs. This may then have allowed them to cushion some of the shocks, especially at the bottom of the distribution, despite the fact that migrant incomes too were likely hit in the sending country.

Overall, these results thus tentatively suggest that as migration opportunities became more widely available, remittances cannot only reduce income inequality in the home country but could also help to some extent absorb shocks hitting the poorest.

In this light, restrictions to immigration, regularisation and integration policies in the United States could have significant negative impacts: lower migration flows translating into lower remittances could result in increases in poverty and inequality in Mexico. Although remittances may have acted as shock absorbers at the household level, allowing remittance-receiving households to cushion shocks to their income, in a scenario of permanently reduced migration and remittance flows spending on social safety nets and social assistance expenditures would need to be prioritised to limit adverse effects on poverty and inequality.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available at https://en.www.inegi.org.mx/programas/enigh/tradicional/2014/#Microdata.

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APPENDIX A.

TABLE A1 Determinants of remittances by decile, Heckman two-step estimator, global financial crisis

Determinants of the amount of remittances received, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	95.36*** (26.62)	132.6 (150.9)	59.12 (152.9)	107.0 (160.1)	403.3*** (99.80)	229.0*** (59.14)	395.4*** (137.7)	6.287 (155.6)	485.3 (429.6)	798.7 (495.7)
No. of children	−61.90 (39.46)	−124.5 (228.8)	38.23 (229.0)	−36.13 (259.0)	−674.9*** (160.4)	−9.001 (30.68)	−558.7** (220.8)	157.4 (301.3)	−145.6 (754.4)	−835.3* (504.9)
No. of elderly	587.5*** (114.7)	288.1 (388.5)	−323.8 (439.6)	303.8 (407.9)	619.7*** (223.6)	1346.8*** (234.9)	262.0 (247.6)	1183.9* (605.2)	−2098.6 (1382.3)	356.6 (755.8)
No. of employed	−762.3*** (93.65)	−1245.1*** (261.4)	−1209.2*** (259.9)	−1517.0*** (274.5)	−2347.0*** (225.0)	−1892.7*** (185.2)	−1571.8*** (312.6)	−1094.6*** (283.2)	−2268.2*** (666.7)	−2850.3** (1123.5)
Age of household head	−21.06*** (4.081)	−46.12*** (13.41)	−12.91 (18.76)	−43.29** (20.42)	−71.99*** (11.43)	−63.76*** (10.76)	−72.98*** (18.69)	−65.27** (27.77)	−41.18 (61.67)	−125.9*** (13.72)
Male household head	−1044.0*** (107.6)	−1389.4*** (426.5)	−1548.4*** (477.9)	−2313.3*** (512.2)	−2795.3*** (322.1)	−1600.9*** (191.5)	−1777.8*** (441.1)	−2059.4*** (741.5)	−4525.0*** (1543.3)	−3713.1** (1701.6)
Education of household head	−120.0*** (27.32)	−189.9** (90.12)	−2.185 (132.2)	−73.30 (159.6)	−1052.7*** (98.06)	−1037.9*** (105.4)	−928.1*** (150.8)	−1100.9*** (179.6)	−88.69 (284.2)	−1541.1*** (446.5)
Urban household	−861.7*** (109.2)	−2042.4 (.)	−916.9 (680.0)	−888.8 (727.1)	−5153.0*** (454.5)	−3919.2*** (381.7)	−2118.1*** (373.2)	−2421.7*** (642.3)	1117.4 (1520.2)	−5025.2*** (1611.2)
2008 dummy	−9.782 (126.1)	569.6* (320.2)	1744.4*** (405.6)	78.62 (538.0)	613.1** (266.4)	−419.8*** (81.97)	−213.1 (449.7)	−256.5 (641.9)	401.8 (1525.9)	−844.3*** (125.4)
2014 dummy	50.03 (118.3)	289.4 (368.9)	856.2* (460.4)	−513.7 (566.9)	428.8 (307.4)	−590.2*** (91.42)	−329.6 (446.0)	−29.87 (713.6)	4372.2** (1729.3)	−1620.7*** (543.0)
Pred. prob. (ln)	0.158*** (0.0197)	0.451*** (0.0343)	0.313*** (0.0228)	0.325*** (0.0238)	0.259*** (0.0196)	0.200*** (0.0195)	0.0770*** (0.0124)	0.0753*** (0.0127)	0.121*** (0.0165)	0.115*** (0.0250)
Number of obs.	6563	6556	6563	6579	6569	6564	6582	6585	6524	6596

TABLE A1 (Continued)

Determinants of the amount of remittances received, by decile										
	Bottom decile	2	3	4	5	6	7	8	9	Top decile
No. of household members	−0.864 (94.88)	46.43 (129.3)	53.96 (152.6)	120.9 (161.8)	371.2* (203.1)	115.0 (255.4)	665.2** (282.9)	297.5 (345.2)	596.4** (248.9)	3221.5** (1279.9)
No. of children	−144.7 (149.8)	98.73 (194.2)	27.51 (229.3)	−151.9 (268.5)	−88.22 (315.3)	350.2 (367.0)	−450.2 (429.6)	−455.9 (566.8)	−356.6 (440.0)	−3066.1 (1943.2)
No. of elderly	−1.238 (198.5)	−206.1 (272.8)	−187.4 (385.5)	462.5 (406.8)	−138.1 (504.4)	−96.72 (593.9)	−634.4 (698.8)	830.2 (985.9)	961.2 (789.7)	−327.6 (4684.6)
No. of employed	−526.6*** (126.6)	−830.0*** (189.9)	−1283.3*** (232.2)	−1745.0*** (290.6)	−1767.2*** (308.1)	−1631.7*** (342.7)	−2401.8*** (375.8)	−2777.9*** (479.0)	−2025.1*** (362.1)	−6511.8*** (1601.7)
Age of household head	−22.22** (10.98)	−28.00** (12.12)	−18.49 (15.47)	−53.74*** (20.44)	−14.12 (24.51)	−18.15 (26.37)	−65.15** (32.13)	−102.1** (45.33)	−158.1*** (26.22)	−339.7 (257.3)
Male household head	−559.7*** (192.7)	−738.5** (338.8)	−1717.1*** (398.8)	−2724.5*** (514.2)	−3287.1*** (551.3)	−3117.7*** (614.9)	−4086.2*** (692.9)	−3888.7*** (1004.7)	−4873.4*** (739.2)	−2643.2 (4550.3)
Education of household head	54.81 (62.40)	−87.66 (66.19)	−58.56 (61.69)	−215.8* (116.3)	−95.63 (123.4)	17.15 (121.9)	−186.6 (127.1)	−260.8* (148.8)	−319.8*** (88.73)	−288.1 (508.4)
Urban household	−278.0 (237.9)	−881.7** (377.5)	−1198.8*** (443.7)	−1578.2*** (594.4)	−1477.7*** (568.8)	−1341.2** (666.6)	−2660.8*** (720.6)	−2322.5** (1009.9)	−1827.0** (769.0)	−4746.6 (4368.8)
2008 dummy	380.5 (265.0)	711.0** (307.7)	1738.8*** (405.4)	60.49 (540.5)	1630.7*** (631.4)	1883.2** (761.4)	2958.2*** (869.7)	1145.4 (1230.3)	−1674.4* (889.6)	1744.2 (3519.8)
2014 dummy	356.5 (267.8)	455.4 (329.0)	857.6* (460.6)	−527.7 (568.7)	948.8 (733.7)	1357.5 (844.0)	1470.8 (934.7)	99.27 (1429.4)	−518.8 (1044.0)	9633.7 (.)
Pred. prob. (square)	33.15*** (4.200)	75.89*** (5.709)	43.96*** (3.600)	74.48*** (5.251)	75.98*** (7.584)	60.14*** (5.534)	53.60*** (6.667)	34.48*** (4.979)	26.93*** (4.367)	88.65*** (13.02)
Number of obs.	6563	6556	6563	6579	6569	6564	6582	6585	6524	6596

Note: The selection variable is a non-linear transformation
(the logarithm and the square, respectively) of the predicted probability of sending as a control in the amount equation, acting as a selection correction. Dataset is a pooled cross-section of households in 2002, 2008 and 2014; 2002 is treated as the base year.

*Significant at 10% level.

**Significant at 5% level.

***Significant at 1% level.