

5 Remittances and their Effects on Poverty and Inequality

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Introduction

The sheer magnitude of remittance flows to the three countries in Northern Central America (NCA) would suggest that they must play a significant role in reducing poverty. However, the links between migration, remittances, and poverty and inequality are complex, making it difficult to determine the effects *a priori*. Migration and remittances affect poverty through the loss of workers and their labor from the household, whether they worked in the home or were employed outside the home. The loss of their earnings is a direct cost to the household, while the loss of their time spent on household activities transfers the burden onto others in the household or increases the household's monetary costs, for example, if they need to pay for childcare. However, while the household loses the migrant's income and labor, it no longer must expend resources to meet that individual's needs, for example, for food or clothing. Sometimes the net effect can be positive, for example, if unemployed individuals migrate, or negative if productive workers leave. Given the positive selection into migration as discussed in Chapter 3, the outflow of workers from the NCA region reduces the skills and experience of the remaining pool of workers. Depending on the distribution of the migration and on subsequent remittance flows, this could result in an increase in poverty in these countries.

Remittances, of course, can compensate for the income losses associated with migration. To the extent that the remittances sent to a receiving household are greater than the migrant's original income minus his or her consumption, then the household in the country of origin will be better off. If these households are poor households, then the flow of remittances may lower the headcount rate of poverty or even the poverty gap. The effects of remittances can be seen

at the extensive margin (the overall share of receiving households among the population) and the intensive margin (how much each household receives). Both margins determine the extent to which remittances change households' income and poverty. The impact of remittances on poverty varies from country to country, and, even within any given country, it will vary over time.

In this chapter, we explore the evolution of the relationships between migration, remittances, and poverty and inequality in the NCA countries. We start by describing what is known so far about this relationship using data from each country's household survey – the EHPM (*Encuesta de Hogares de Propósitos Múltiples*) for El Salvador, the ENCOVI (*Encuesta Nacional de Condiciones de Vida*) for Guatemala, and the EHPM (*Encuesta Permanente de Hogares de Propósitos Múltiples*) for Honduras. To account for endogeneity concerns, we then generate two counterfactual scenarios for four different points in time spanning 20 years to estimate the impact of remittances on poverty.⁷⁵ The strong growth in remittances sent to the NCA region up until the global financial crisis of 2008 suggest that they played an important role in terms of reducing poverty. However, it is not clear how the subsequent drop in remittances after the global financial crisis affected poverty levels. On the one hand, if remittances to poorer households continued to be sent at the same rate while richer households bore the brunt of the reduction, then the effect of remittances on poverty might have stayed the same as before the crisis. If, on the other hand, the migrants from poorer households, those with the lowest skills, were particularly hard hit by the contraction of the developed economies, then the reduction in remittances may have had a serious negative impact on household welfare in the NCA countries. Also, from 2014 to 2019, the Latin America and the Caribbean (LAC) region experienced its lowest economic growth for 70 years.⁷⁶ However, it was also a period when there was a significant reduction in poverty in one of the NCA countries, El Salvador. We track how the role played by remittances in reducing poverty has evolved in El Salvador and in the other two NCA countries where poverty levels have changed little in 20 years.⁷⁷

Background

There is growing evidence of the important role played by remittances in reducing poverty and inequality. Previous research has shown a positive correlation between remittances and poverty reduction⁷⁸ as well as a small narrowing of inequality.⁷⁹ In the LAC context, most research has

75 Because Guatemala has not carried out a household survey since 2014, much of the analysis for that country ends in 2014. Wherever possible, we have used extrapolations and data from the 2018 Population and Housing Census to provide insights into what may have happened since 2014.

76 ECLAC (2020)

77 Remittances can also affect poverty through macroeconomic channels such as the exchange rate and the balance of payments. High levels of remittances can cause the local currency to appreciate, which can make exports less competitive in ways that are reminiscent of Dutch Disease or the Resource Boom model (Amuedo-Dorantes and Pozo, 2004). This in turn can translate into lower salaries and less foreign investment, and these negative effects on incomes and employment can increase poverty and, possibly, inequality. However, this chapter focuses on the household-level effects of remittances.

78 Adams and Page, (2005), Yang and Martinez (2006), Gupta et al (2007), Gubert et al (2010), UNCTAD (2011), Vacaflares (2018), and Ekanayake and Moslares (2020).

79 Barham and Boucher (1998).

agreed that remittances are an important driver of poverty reduction, with the magnitude of the reduction being proportional to the country's level of remittances and migration. For the NCA countries, migration and remittances are topics of critical importance as poverty continues to affect a large share of the population, remittance flows are substantial, and there were significant changes in migration and remittances patterns during the 2008 global financial crisis (see Chapter 2).⁸⁰

There is a body of research that has concentrated on quantifying the effect of remittances in poverty and inequality using micro and macroeconomic methods. Acosta et al (2008) analyzed the effect of remittances in several Latin American countries using a mix of macro data and household surveys from the early 2000s. They found that remittances generally have a positive effect in terms of reducing poverty but that this effect tends to be small. The authors found that remittances were associated with lower poverty levels in all three NCA countries (in 2000 in Guatemala and El Salvador and in 2002 in Honduras), which, along with Mexico, had the largest reductions in poverty among the 10 countries being studied. In fact, the impact on overall poverty was greatest in those countries where remittances as a share of GDP were highest. Even in countries where remittances were received mainly by households in the middle or upper tail of the income distribution, the authors found a link between poverty reduction and remittances when the remittances were large enough.

Using pooled data at the country level, Vacaflores (2018) showed that the findings of Acosta et al (2008) held true for 13 countries in Latin America between 2000 and 2013. The authors' results indicated that remittances had decreased extreme and total poverty. They also found that remittances had reduced inequality according to several measures including the Gini coefficient and the relative income of the lowest earners. Ekanayake and Moslares (2020) used a similar macroeconomic approach for a total of 21 Latin American countries between 1980 and 2018. They also controlled for several country-wide variables such as institutional quality. As with the previous studies, their results indicated that remittances had reduced extreme poverty defined as living under the \$1.90 international poverty line (IPL).

These important studies based on macroeconomic data shed light on the importance of remittances for reducing poverty in recent years. However, all recent literature using microeconomic data has either focused on other regions of the world or has only focused on individual countries. To partially fill this gap, we used the latest available microeconomic data to explore the relationship between migration, remittances, and poverty and equity in the NCA region. This research contributes to the literature in two ways. First, we have been able to look not just at how migration, remittances, and monetary poverty are linked at a given time but also at how this link changes over time and in the face of shocks in the host countries. By carrying out the study in three, somewhat similar, countries, we were able to show how

⁸⁰ The more recent changes brought about by the COVID-19 pandemic are discussed in Chapter 9 as the comparable household survey data used in this chapter do not cover that period.

heterogeneous the effects on poverty can be. Second, our research extended the Acosta et al (2008) methodology by looking at how the impact of remittances on poverty differs when household composition is taken into account.

We start this discussion by describing the evolution of the trends using surveys covering the past two decades in the three NCA countries. Second, we generate two counterfactual scenarios to estimate the impact of remittances on poverty and inequality and summarize how this relationship has evolved over time. Finally, we offer some concluding remarks based on these results and discuss possible areas for future research in the area.

Poverty and Inequality in Northern Central America: Lagging Behind the Rest of Latin America and the Caribbean

Poverty

The incidence of poverty in the NCA region is greater than in the rest of LAC. In 2019, of the 33 million people who lived in the three NCA countries, 13.4 million were classified as living in poverty, or more specifically, living below the upper-middle-income poverty line (UMIC-PL) of \$5.50 2011 PPP (see Box 5.1 for the details of the poverty measures used in this chapter). This represents about 40 percent of the NCA population, compared to about 22 percent for the whole LAC region. Based on the international poverty line (IPL, \$1.90 in 2011 PPP),⁸¹ about 2.7 million people in NCA were living in extreme poverty, or about 8 percent of its population. This compares to 4.4 percent in LAC.

The first years of the new century in LAC were characterized by high levels of economic growth (see Chapter 4) and substantial reductions in poverty (Figure 5.1, Panel A). Using the \$5.50 line, roughly 60 million people were lifted out of poverty in the first decade. By 2010, more people were part of the middle class than were poor, a complete reversal from 2000, when there were about three people living in poverty for every two in the middle class. Although, the poverty situation largely stagnated during the 2010s, there have been some gains in poverty reduction in the past years. However, poverty reductions were small in Northern Central America in comparison with reductions in LAC and were largely driven by the developments in El Salvador.

81 The IPL is the poverty threshold for the first Sustainable Development Goal ("End poverty in all its forms everywhere") and the first of the World Bank's twin goals ("Eradicating extreme poverty by 2030").

Box 5.1

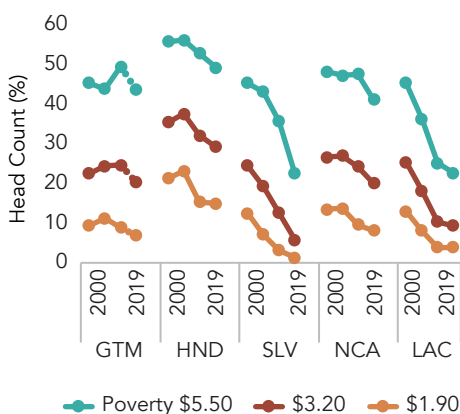
Poverty Definitions and International Comparisons

In this chapter, we have assessed poverty using an *aggregate income* approach. Income from diverse sources, including remittances, was aggregated at the household level and then divided to get a per capita income measure. To ensure the comparability of incomes and poverty rates across the three countries and to enable comparisons with Latin America in general, we used the harmonized data from SEDLAC, which is a joint project of the World Bank and CEDLAC at the University of La Plata to harmonize household survey data sets for Latin America to enable comparable poverty analyses. Once we had obtained per capita income, we compared its value to a poverty line. Individuals who had an income lower than the poverty line were classified as poor. The most well-known poverty line – the international poverty line (IPL) of US\$1.90 a day (in 2011 PPP), which is the updated version of the original “dollar-a-day” poverty line – which is used to define poverty for the Sustainable Development Goals and the first of the World Bank’s twin goals, the eradication of extreme poverty by 2030 (the second goal being to promote shared prosperity by increasing of the incomes of the population in the bottom 40 percent of the income distribution). (See Ravallion et al, 1991 for how the international poverty line is constructed.) However, most of the countries in Latin America and the Caribbean belong to the upper-middle-income group, and for many of them, the poverty headcount when using the IPL is less than 5 percent. For middle-income countries, for which the IPL might not reflect the extent of poverty, the World Bank introduced new poverty lines (see Jolliffe and Prydz, 2016 for the theoretical underpinnings of these new lines). The value of the lower-middle-income country poverty line (LMIC-PL) is US\$3.20 per person per day, while the upper middle-income country poverty line (UMIC-PL) is US\$5.50. Given that the three countries in Northern Central America are classified as lower-middle-income, the US\$3.20 line was the most appropriate to use for comparison. However, throughout this document, we have also made use of the \$1.90 and \$5.50 lines when necessary.

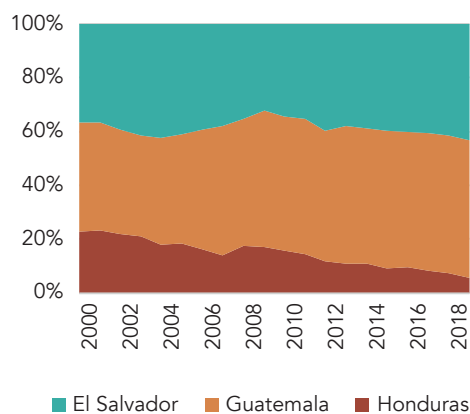
The *aggregate income* approach and the poverty lines used by the World Bank are not universal: Each of the countries studied in this chapter has its own national methodology to measure monetary poverty. Honduras and El Salvador use an aggregate of household income. On the other hand, Guatemala uses aggregate consumption, which is the sum of all of the goods and services that a household consumes over a period of time. Moreover, national poverty lines, which are defined according to country-wide patterns of consumption, are different for each country and are set for both rural and urban areas and sometimes are defined for extreme and total poverty levels. In Guatemala, the national extreme poverty line is set according to household composition and the implicit value in 2014 was closer to the LMIC-PL line. Under this line, the country had an extreme poverty rate of 23.4 percent. Honduras revamped its national poverty line in 2017, and it now lies between the IPL and the LMIC-PL, with Honduras having an extreme poverty rate of 19.4 percent in 2019. For El Salvador, the extreme poverty rate was similar to that of Honduras, but the poverty rate was smaller at 4.5 percent.

Figure 5.1 Changes in Poverty, 2000-2019

a) Poverty Rates in the Past Two Decades



b) Composition of the Population Living in Poverty (under \$3.20 2011 PPP) by Country



Source: SEDLAC (CEDLAS and World Bank).

Note: All poverty lines are in 2011 PPP terms. Guatemala 2019 numbers are interpolated since the last survey was done in 2014. NCA = Northern Central America, LAC = Latin America and The Caribbean, as defined by World Bank regions.

In fact, the panorama of poverty in the NCA region is very heterogenous, with Honduras and Guatemala exhibiting slow or stagnant poverty reduction, and El Salvador achieving strong gains in all poverty classifications. At the upper-middle-income country poverty line (UMIC-PL) of US\$5.50, close to half of the population in Honduras and Guatemala were classified as poor in 2019, compared to only 20 percent in LAC and 22 percent in El Salvador. At the LMIC-PL of US\$3.2, the gaps were even wider. Honduras still had the highest poverty levels in the NCA region, with an extreme poverty rate of 15 percent. In 2014, Guatemala's extreme poverty rate was 8.8 percent, almost the same level as in 2000. Guatemala has not fielded a survey since 2014, but its growth rates indicate a possible, albeit small, decrease in poverty between 2014 and 2019. In 2000, El Salvador accounted for about a quarter of the NCA population and a similar LMIC-PL poverty rate of 23 percent (Figure 5.1, panel b). By 2019, however, El Salvador accounted for 20 percent of the total NCA population but a mere 5.6 percent of its poor. Honduras' the population share has risen from 27 to 30 percent in the past two decades while its share of the NCA's poor population has risen from 36 to 43 percent. Guatemala, with 16.6 million people in 2019, has consistently accounted for not only half of the total NCA population but also half of all of its poor.

Inequality

Inequality in the NCA region also decreased between 2000 and 2019. The Gini coefficient declined from 0.54 to 0.46, a 15 percent decrease, compared with a 10 percent decrease for

LAC (Figure 5.2). The patterns in inequality reduction in the NCA region are very different from those of LAC. While inequality in LAC decreased mostly between 2000 and 2006, there was barely any change in the NCA countries during that period. However, the roles were reversed in the 2006 to 2014 period, when the NCA region reduced inequality at an average annual rate of -1.4 percent, compared to -0.5 for LAC. Between 2014 and 2019, there was a slowdown in terms of gains in inequality in both the NCA and the LAC regions.

Different rates of income growth across the income distribution underlay the different patterns of both poverty reduction and inequality. The growth incidence curves (GIC) in Figure 5.3 show how growth was pro-poor in El Salvador, with those in the lower end of the income distribution experiencing strong growth. The overall increase in incomes per capita was 4 percent. This is reflected in decreasing poverty rates at all levels. In contrast, in Honduras, despite a reduction in inequality and slightly pro-poor growth (1 percent for the bottom 40 percent of the population), overall growth was 0.6 percent, and the incomes of those in the lowest and highest deciles of income were mostly stationary. Guatemala's GIC refers to the 2006 to 2014 period and shows a decrease in the incomes of those in the upper 75 percent of the income distribution.

Thus, the country level story on inequality is similar to the poverty one. Most of the observed decrease in inequality was driven by the reduction in El Salvador. During the entire two-decade period (2000 to 2019), the country experienced a reduction in the Gini coefficient of almost a quarter. Honduras and Guatemala also experienced declines, though they were not as pronounced.

Figure 5.2 Evolution of Inequality, Gini Coefficients

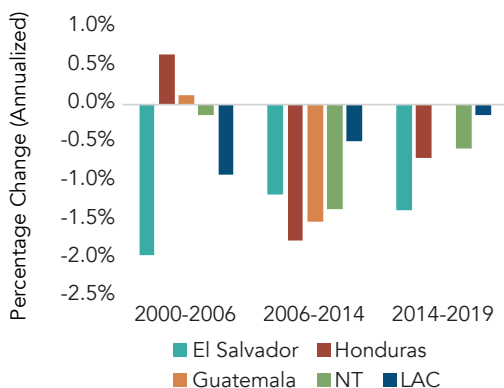
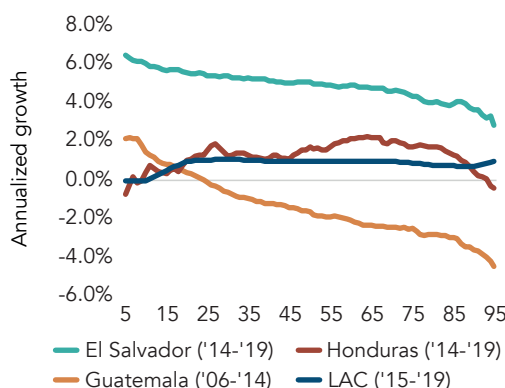


Figure 5.3 Growth Incidence Curves in Last Years of Available Data



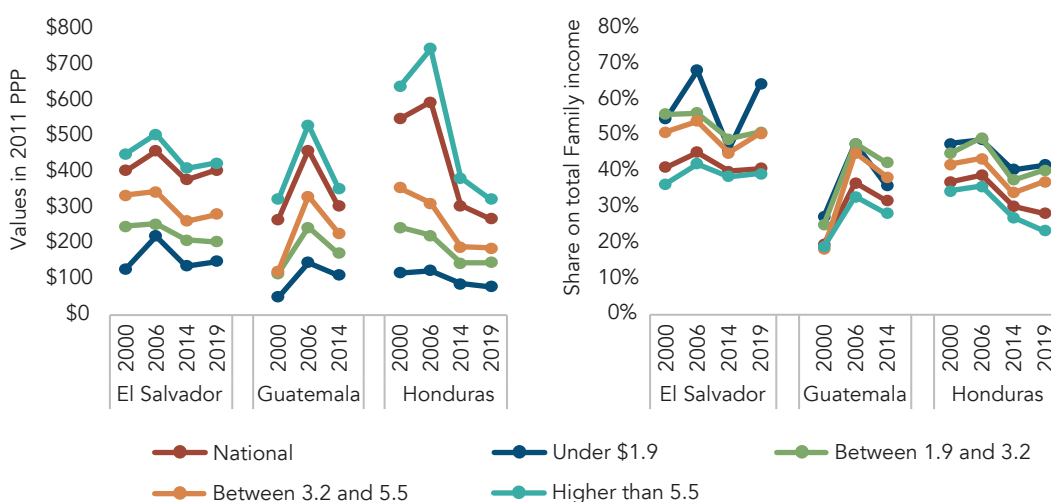
Source: Harmonized Household Surveys from SEDLAC (CEDLAS) and World Bank.

Note: These are anonymous growth incidence curves, i.e., drawn from repeated cross sections and not panel data. The data for El Salvador and Honduras cover 2014-2019, Guatemala covers 2006-2014, and LAC covers 2015-2019.

Remittances

Remittances represent between 14 and 22 percent of GDP in the three NCA countries, but they represent a smaller share of per capita incomes at the household level,⁸² ranging from 0.6 percent in Guatemala to 2.2 percent in El Salvador. These numbers are low in comparison to the contribution of remittances to GDP, but when we looked only at those households that received remittances, they represented 30 to 40 percent of household income on average (Figure 5.4). The average amount of remittances sent (in dollars, 2011 PPP) varied greatly between years and countries. Remittances in El Salvador, as a share of household income, were substantially higher than in Honduras and Guatemala (41 percent in 2019 for El Salvador compared to 29 percent in Honduras and 32 percent in Guatemala in 2014). In both Honduras and Guatemala, there was a reduction in the average remittance amounts received by households between the beginning of the century and the last year of data, even if there was an increase right before the financial crisis. In Honduras, the average yearly remittance fell from about \$307 in 2014 to \$270 in 2019. These reductions were reflected in the fall of remittances' share of household income in recent years, which was down to about 30 percent in the most recent survey years in each country.

Figure 5.4 Remittances in PPP Values and as Share of Total Household Income, by Poverty Status

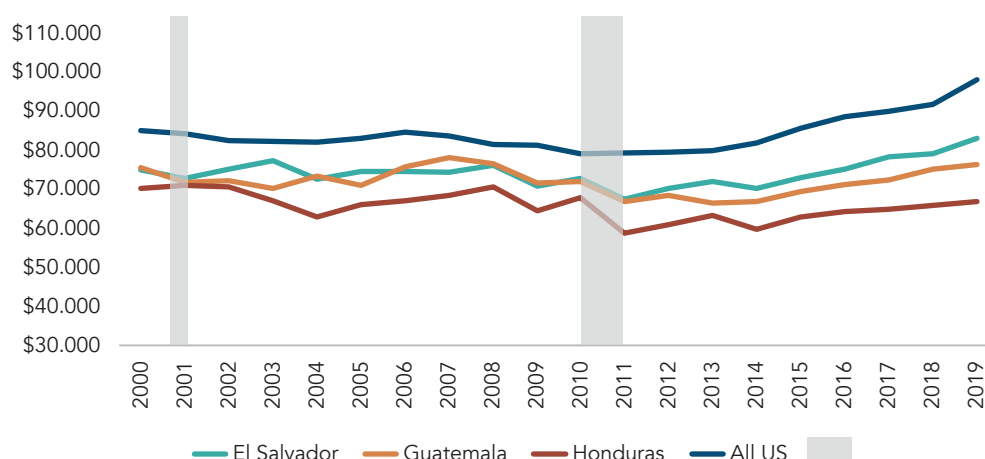


Source: Authors' calculations based on the EHPM for El Salvador, ENCOVI for Guatemala, and the EHPM for Honduras. The calculations were made for those households that received remittances

82 World Bank (2021).

These changes in reported remittances reflect changes in the incomes of NCA migrant households in the United States over the same period (Figure 5.5). The 2008 global financial crisis hit migrant households hard, causing average household income to decline substantially in 2009 and again in 2011. The income levels of El Salvadoran migrant households had recovered by 2016 (in real terms), while Guatemalan migrant households did not recover until 2018. In Honduras, the average income of migrant households remained well below 2000 levels in 2019.

Figure 5.5 Household Income of Migrants in the United States by Country of Origin



Source: Authors' calculations based on American Community Survey (ACS) data. All numbers are expressed in 2019 dollars. NBER data is from the NBER Business cycle dating.

The extent to which remittances affect poverty depends on which households receive them and on how much they receive. As expected, those households that have sent a migrant to another country are more likely to receive remittances than those that have not. The correlation is not perfect as not all migrants remit, and some non-migrant-sending households benefit from the generosity of family and friends who migrate from other households. Also, the characteristics of migrant-sending households affect the distribution of remittances. Previous research has indicated that the percentage of households reporting having a migrant member increases with income and wealth. This reflects the fact that migration is costly, thus making it harder for the poorest households to send a member to another country.⁸³ In 2019, 15 percent of households in El Salvador reported having sent a migrant abroad (Annex Table 5.1), but the differences between income quintiles were considerable, with only 10 percent of households in the lowest income quintile reporting having sent a migrant, while the share in the top quintile

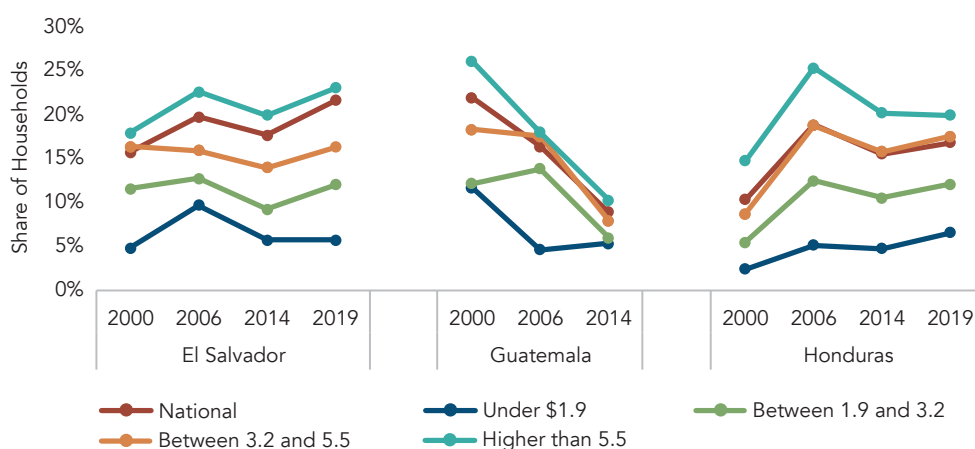
83 Stark et al (1986).

was closer to 20 percent. In Honduras and Guatemala, while the incidence of migration was lower than in El Salvador, the same pattern of poorer households being less likely to send migrants was evident.

As would be expected, the distribution of remittances is not homogeneous across all households but instead increases with household income. In most cases, the households that reported receiving remittances tended to be concentrated in the third, fourth, and fifth quintiles of the income distribution. In terms of poverty, twice as many non-poor households reported receiving remittances as those in extreme poverty (Figure 5.6). This followed the same pattern that has been seen in most countries in Latin America⁸⁴ and underlines what was found in Chapter 3 about positive selection into migration.

Figures 5.4 and 5.6 show the intensive and extensive margins of remittances in overall income respectively. Figure 5.6 shows the extensive margin or the share of households receiving remittances by poverty status. In 2019, Honduras and El Salvador had the highest proportion of households receiving remittances and had similar distributions between different poverty levels. Guatemala, on the other hand, had a smaller share of remittance-receiving households. In terms of poverty, about 5 to 7 percent of all poor households (using the IPL) received remittances in the three countries, a very small number compared to national averages ranging from 9 to 22 percent.

Figure 5.6 Share of Households Receiving Remittances by Poverty Status



Source: Authors' calculations based on the EHPM for El Salvador, ENCOVI for Guatemala, and the EHPM for Honduras. The calculations were made for those households that received remittances.

84 Acosta et al (2008) and Torres-Zorrilla (2008). This pattern does not always hold true across countries. In Sri Lanka, Peru, and Mexico, a higher share of remittance-receiving households was found in the lowest income quintiles (Prabal and Ratha, 2012 and Acosta et al, 2008).

The intensive margin of remittances tells us the other side of the story, which is the amount actually received by those households. In El Salvador, households considered to be poor according to the IPL received an average of \$150 (2011 PPP) per year in 2019, while, in Honduras, they received just \$80. Guatemala was in the middle with about \$112. The results are similar when using higher poverty lines with Salvadoran households receiving more than their Honduran and Guatemalan counterparts. Salvadoran households have historically received a higher percentage of their income in the form of remittances than the other two countries (Figure 5.4, Panel B).

Methodology

In assessing the relationship between remittances and poverty, we had to make several assumptions. Given the limitations of the existing data (for example, the available data are cross-sectional and incomplete), it was not possible to create a full, dynamic model of the poverty-remittance relationship. Therefore, we approached the problem in two ways. In our first scenario, we compared actual, observed poverty levels with the levels that would have existed if remittance income had not been available to households. This was based on the unlikely assumption that pre-remittance income is independent from remittance income, in other words, that households make no adjustments to their income when they receive remittances. This assumption is most likely not true, but the scenario provided us with an upper bound estimate of the difference in poverty rates associated with migration. In our second scenario for what pre-remittance income would have been in the absence of migration, we predicted the income of remittance-receiving households as it would have been had no one migrated from that household. To do this, we had to make several assumptions about the household's composition and about the number of migrants that it had sent. Implicit in this scenario was the assumption that the household decision to send a migrant is not random but is motivated by individual and household characteristics, some of which are observable and others of which are not.

The key indicators of welfare that we assessed were the standard monetary poverty and inequality measures. We calculated the changes in poverty measured as the head count ratio (or the percentage of the population with per capita household income below a given poverty line). Then we used the Gini coefficient to measure changes in inequality.

Household Income without Remittances

To estimate the effects of remittances on poverty in the NCA countries, we created counterfactual economies from which migration did not take place and compared them to the actual economies of the countries in Northern Central America. We took a simple approach to the migrant and remittance flows and assumed that all remittance-receiving households had sent a migrant. In the first counterfactual scenario, we subtracted remittance income from total household income. For clarity, we refer to the observed distribution of per capita household

income as the “actual income” and this simple counterfactual as “income minus remittances.” This is a simple, or naïve, counterfactual that only considers a first-order income effect, as if remittances suddenly vanish and the households make no adjustments in their labor supply, composition, or receipt of other non-labor income. It is also important to note that, in this exercise, we assumed a uniform reduction in remittance income, meaning that every receiving household experienced the same percentage reduction in remittances. Although this is unlikely, the exercise was still a helpful tool to explore the level of exposure of each country to remittance income.

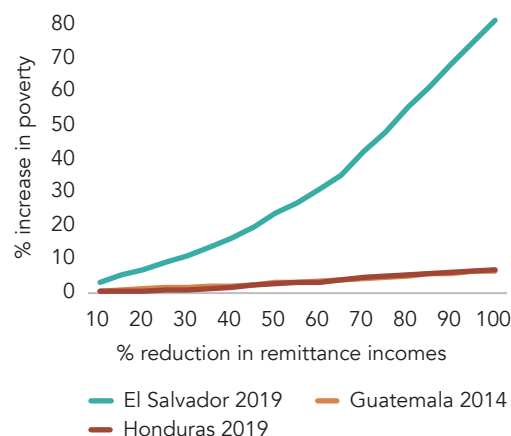
We started by identifying the effects of a gradual reduction in remittance income on total household income. In Figure 10A, the X-axis is the reduction (in percentage change) of the income from remittances, while the Y is the percentage change in the poverty ratio or headcount. This can be thought of as the elasticity of poverty with respect to a reduction in remittance income. It would be equivalent to:

$$E(R) = \frac{W(Y^A)}{W(Y)} - 1$$

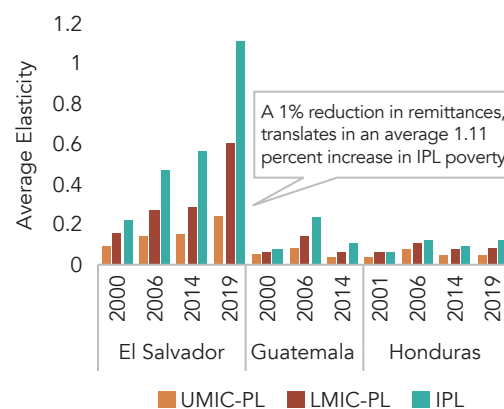
Where W represents the poverty rate associated with the income distribution in question, Y^A . This income distribution is simply total income minus the remittance reduction, that is $Y^A = Y - R * Y^r$. One extreme case is when where all remittances are removed from household income, while when $R = 0$, E is in the original case.

Figure 5.7 Elasticity of Poverty with Respect to Remittances

a) Elasticity of Poverty to Reductions in Remittances (LMIC-PL)



b) Elasticity of Poverty with Respect to Remittances



Source: Authors' calculations based on the EHPM for El Salvador, ENCOVI for Guatemala, and the EPHPM for Honduras.

Note: The figure shows the change in poverty of subtracting remittances from total household income.

The elasticity of poverty to remittance incomes varied depending on which poverty line, country, and year was analyzed, as shown in Figure 5.7, panels A and B. First, we found that the IPL was the poverty line with the highest elasticity. This is the line with the lowest value and thus the one that captures the effect on the poorest households, suggesting that remittances are more necessary to households at the lower end of the distribution. For example, in El Salvador, a reduction of remittances of 50 percent translated into an increase in poverty of about 24 percent in 2019. The other two countries had increases of a smaller magnitude, yet the effect was most significant when using the IPL.

How Households Adjust to the Lack of Remittances

In our second scenario for what pre-remittance income would have been in the absence of migration, we imputed the per capita household income of remittance-receiving households using information from the non-receiving families and then corrected for possible endogeneity. We called this scenario the “imputed income” counterfactual. Given that household characteristics vary, decisions to migrate and remit are not made randomly. Moreover, after migration and remittance decisions have been made, households adjust how they allocate their time between labor, education, home activities, and leisure. We incorporated this into the model of aggregate income as follows. Consider the expected income of a household:

$$\mathbb{E}(Y_h) = \mathbb{E}Y_h^{nr} + \mathbb{E}I_h^r Y_h^r$$

Where Y_h^{nr} and Y_h^r refer to non-remittance and remittance income, and I_h^r is 1 when a household receives remittances and 0 otherwise. For households that do not receive any remittances, the above equation becomes:

$$\mathbb{E}(Y_h | I_h^r = 0) = \mathbb{E}(Y_h^{nr} | I_h^r = 0) \neq \mathbb{E}(Y_h^{nr})$$

Where the last step indicates that total household income without remittances is not independent of the remittances indicator. Accounting for this endogeneity, we followed the methodology used by Acosta et al (2008) and estimated a model of household income as the following reduced form equation:

$$Y_h^{nr} = \beta X_h + \gamma H_h + \mu_h \quad (I)$$

Where Y_h^{nr} represents household total income without remittances, X_i is a vector of household characteristics, H_i is a set of characteristics of the household head, and μ_h represents random shocks and unobserved heterogeneity. As noted before, an estimation of Equation I using least squares and assuming a normal, zero-mean error term would lead to biased estimates. Instead, Equation I needs to address the latent correlation between being a remittance-receiving household and income. Therefore, we corrected the bias by using a Heckman selection model. Consider that households may be remittance-receiving if:

$$I^r = \begin{cases} 0, & \text{if } M^r > 0 \\ 1, & \text{otherwise} \end{cases}$$

Where:

$$M_h^r = \beta_1 X_h + \gamma_1 H_h + \omega Z_h + v_h \quad (\text{II})$$

We included additional variables Z in this selection equation that affect the selection into being a remittance-receiving household but do not affect the household's income function. Therefore, for the non-receiving households, we would have:

$$\begin{aligned} \mathbb{E}(Y_h^{nr} | I_h^r = 0) &= \mathbb{E}(\beta X_h + \gamma H_h + \mu_h | I_h^r = 0) \\ &= \beta X_h + \gamma H_h + \mathbb{E}(\mu_h | \beta_1 X_h + \gamma_1 H_h + \omega Z_h > -v_h) \end{aligned}$$

And assume that:

$$\mu_h, v_h \sim \mathcal{N} \left(0, \begin{bmatrix} \sigma_1 & \rho \\ \rho & 1 \end{bmatrix} \right)$$

Leading to:

$$\mathbb{E}(Y_h^{nr} | I_h^r = 0) = \beta X_h + \gamma H_h + \sigma_1 \rho \lambda (\beta_1 X_h + \gamma_1 H_h + \omega Z_h).$$

This result is equivalent to a “penalized” income production equation, as follows:

$$Y_h^{nr} = \beta_2 X_h + \gamma_2 H_h + \theta \hat{\lambda}_h + \epsilon_h \quad (\text{III})$$

Equation III gave us an unbiased estimator of the household income of non-remittance-receiving households. We used this to estimate what the household income of present-day remittance-receiving households would have been if no one had migrated or remitted. To account for the effects of converting migrants back to household members in the household of origin, we had to change the demographic composition of the household. In Rodriguez (1998) and Acosta et al (2008), the authors assumed that one adult male had migrated and would need to be “re-integrated” into the household to estimate household income in the absence of migration. We were able to expand on this by adding additional characteristics of the would-be migrants. We assumed that remittance-receiving households would share the number of migrants reported by all migrant-sending households.

We added both the labor force participation rate and the unemployment rate of the population into the equation. Following Acosta et al (2008), we assumed that the other characteristics that affect the household's potential to generate income (such as education, labor force

Table 5.1
Number of Imputed Migrants

Country	Survey year	Years applied	Number of receiving households	Male migrant stock	Female migrant stock	Male migrants per household	Female migrants per household
El Salvador	2000	2000	225 899	219 380	354 188	0.97	0.60
El Salvador	2006	2006	340 384	396 527	243 664	1.16	0.72
El Salvador	2014	2014	304 962	252 716	169 389	0.83	0.56
El Salvador	2019	2019	419 337	329 437	247 198	0.79	0.59
Guatemala	2014	2000-2014	297 517	186 496	55 706	0.62	0.18
Honduras	2008	2000-2006	280 113	273 656	137 003	0.98	0.49
Honduras	2014	2014-2019	299 901	222 185	149 603	0.74	0.50

Source: Authors' calculations based on household surveys from each country plus the 2018 Guatemala census.
Notes: For the imputed number of migrants, we used the total number of declared migrants (from one to six migrants per household) divided by the number of receiving households. For El Salvador 2000, we used the 2006 ratio of female and male migrants, since in that year there was no such divided question. Since the surveys for Honduras 2000, 2006, and 2019 did not include a question on the number of migrants, we used the closest survey with such information. The Guatemala survey did not ask the question in a comparable form in any of the years, so we used the 2018 census information.

participation, and unemployment rates) are the average of the other adults in the household (see Table 5.2 for the details). For the average age of the migrants, we used data from the US American Community Survey (ACS) for the past 10 years for migrants in the 18 to 65 age range. Moreover, we assumed that the re-integrated migrants would have an age structure similar to the one in most recent data. Table 5.1 summarizes the results of these "re-integrated" migrants.

Estimating the equation with this information and the mentioned assumption gave us an approximation of household income free of selection bias that we then used to impute total household income in those households that reported receiving remittances.

Findings

Overall, we found that remittance-receiving households and non-receiving households differed in terms of several key characteristics (Table 5.2). The receiving households tended to be older than non-receiving households as measured by the age of the head of household and by the average age of the household members, except for Honduras in 2019. As might be expected, due to the nature of migrants, receiving households tended to have a smaller share of household members of working age (26 to 65 years old) and a lower ratio of men to women. The households also differed significantly in the characteristics of their head of household, with the heads of household in remittance-receiving households being older, more likely to be female, less likely to work in a formal job, and having fewer years of education.

Table 5.2.

Comparison of Dependent Variables by Year (Households that do and do not receive remittances)

Remittance-receiving households compared to other households	El Salvador		Guatemala		Honduras	
	2000	2019	2000	2014	2000	2019
Household Variables						
Average age in household	>>>	>>>	>>>	>>>	>	<<
Total members	.	<<<	<<<	<<<	>>>	>>>
Urban dwelling	<<<	<<<	>>>	<<<	>>>	>>>
Household Composition						
Infant 0-5	<<<	<<<	<<<	<<<	<<<	>>>
Child 6-16	>>>	<<<	.	>>>	>>>	.
Young adult 17-25 ratio	.	<	.	.	.	>>>
Adult 26-65	<<<	<<<	<<<	<<<	<<<	<<<
Male/female ratio	<<<	<<<	<<<	<<<	<<<	<<<
Employed members share	<<<	<<<	.	<<<	<<<	<<<
Household Head Variables						
Age (of head)	>>>	>>>	>>>	>>>	>>>	>>>
Female head	>>>	>>>	>>>	>>>	>>>	>>>
Head works in formal job	<<<	<<<	<<<	<<<	<<<	<<<
Married	<<<	<<<	<<<	<<<	<<<	<<<
Years of education	<<<	<<<	<<<	<<<	.	<
Highest Level of Education in Household						
Less than primary	.	>>>	<<	<<	<<<	<<<
Primary to Incomplete Secondary	.	<<<	.	.	>>>	.
Completed secondary or Incomplete Tertiary	>>	<<<	>>	>>>	>>>	>>>
Tertiary or more	<<<	<<<	.	<<<	.	.

Source: Authors' calculations based on household surveys from each country plus the 2018 Guatemala census.

Notes: The symbols indicated the comparison between those households that received remittances versus those that did not. For example, a > means that a remittance-receiving household had a higher value than a non-receiving household. The number of symbols indicates the statistical significance of the difference, using a t-test comparison. Three symbols indicate $p < 0.01$, two $p < 0.05$ and two $p < 0.1$. A dot (.) indicates that the difference is not significant, $p > .1$.

Other characteristics of the households varied greatly between the three countries. For example, in El Salvador, remittance-receiving households were more likely to be rural than their non-remittance receiving counterparts. In contrast, in Honduras, remittance-receiving households were more likely to be urban.

Results of the Regressions

The estimates of the income and selection equations (equations I and II) were found by solving for the unknown parameters simultaneously using Maximum Likelihood estimation. The estimates for the three countries can be found in Annex Table 5.2. The first column of each year in the table indicates the regression of the “total household income” equation (in logarithms) with the corrections made for possible endogeneity, while the second column of each year shows the results of the selection model.

We started by observing what determines remittances.⁸⁵ As expected, dependency rates were a factor, as households with children and older adults representing a larger share of all household members being more likely to receive remittances. On the other hand, households with more adults of working age and with a higher male-female ratio tended to be less likely to receive remittances, as were those with a higher percentage of adults who worked. As will be discussed in Chapter 7, the receipt of remittances can cause some household members to decide not to participate in the labor force. The age of the household head was mostly not significant, but older households (higher average age of all members) was associated with receiving remittances. Being a married household head led to a lower probability of receiving remittances in most countries.

In general, the education variables – a higher average number of years of schooling and a higher level of schooling completed in the household – were significant and led to a higher probability of receiving remittances. This was as expected. Bollard et al (2011) have shown that more educated migrants remit more. However, in the NCA countries, in most cases, the effect was smaller for tertiary education than for secondary (or even negative).

The two additional variables added to the main surveys from external sources were the homicide rate in the department or municipality where the household was located and the regional migration rate, again from the area where the household was located.⁸⁶ The homicide rate tended to be significant, except for most years in El Salvador. It was associated with receiving remittances, which suggests an altruistic motive – remittances are sent to households

85 In the equation, the dependent variable is the condition of being a non-receiving household. Thus, negative coefficients imply a higher probability of being a remittance-receiving household.

86 The crime rate was constructed as the total number of homicides in an area over the total population. The migration rate was defined as the percentage of households that declare having at least one migrant member. We constructed the variables at the cantonal, municipal, departmental, and regional level using different sources. See Annex Table 5.3 for further information on the source and geographical scope of each of them.

living in areas with higher crime rates, where income disturbances are more likely.⁸⁷ These results contradict recent studies on the topic that have found a self-interested motive to be more likely. In studies in Colombia and Mexico, higher crime tended to reduce the amount of remittances and the number of remittance-receiving households.⁸⁸

The network effect of migration, captured by the regional migration rate, had a positive effect on being a remittance-receiving household for all countries. This was expected, as households in areas where migration is high have a higher chance of being themselves a household with a migrant and, thus, a household that receives remittances. Our underlying assumption here was that the migration rate variable affects the probability of receiving remittances but not the family's income (corresponding to Z in equation II).

The income equation coefficients were consistent with our expectations. Age tends to reflect experience, which had a positive effect on income generation. Age squared was negative and accounted for decreasing returns of experience. Having a household head employed in the formal sector, having a greater number of working adults relative to total household size, and more years of education all had the expected positive signs. Location dummies for regions and rural/urban areas tended to be significant, which isolated regional fixed effects.

As for the model specification, the coefficient on the correlation of the errors between the selection and income equations (ρ) was significant for 2014 and 2019 in Honduras, for Guatemala in 2014, and for El Salvador in 2006. The effect was large and significant for the first two countries, less so for El Salvador. In fact, for Honduras and Guatemala, the coefficient of the Inverse Mills ratio (λ) was negative, indicating that unobserved factors that make remittances more likely were associated with higher income. This represents a change as, in the earlier years (2000 and 2006), the results indicated that there was no structural selection of remittances. In other words, in those two years, after accounting for observable characteristics, the income distribution of the households that were receiving remittances was similar to that of the households that were not receiving remittances. For El Salvador, however, the lack of selection on unobservables was fairly consistent from 2000 to 2019.⁸⁹

Results of the Simulations

We compared the poverty rates produced under the two counterfactual scenarios to the poverty rate corresponding to households' actual incomes. The results are summarized in Figure 5.8 and the full details can be found in Annex Table 5.4.

⁸⁷ Borja (2012).

⁸⁸ Meseguer et al (2017) and Vargas-Silva (2009).

⁸⁹ In the cases where the coefficient on the correlation of errors is insignificant, the results of a Heckman model are similar to those of an Ordinary Least Squares regression.

The results of the first scenario, *income minus remittances*, show the upper bound effect of the role played by remittances in reducing poverty. If remittances suddenly disappeared from household income, El Salvador would see a staggering three-fold increase in extreme poverty (at the \$1.90 IPL rate) from 1.3 percent to 4.2 percent. This is the biggest change and far exceeds the effect that would be seen in Honduras in 2019 and Guatemala in 2014, though the change in extreme poverty in those two countries would be a noteworthy 15 percent. There were clear differences in the dynamics of poverty over the years between El Salvador, on the one hand, and Honduras and Guatemala, on the other. While the positive impact of remittances on poverty in Honduras and Guatemala has lessened, it has increased in El Salvador. This holds true regardless of what poverty line is used. The change for Honduras and Guatemala came after 2006, suggesting that the global financial crisis of 2008 may have played a role in shifting the distribution of remittances in the two countries.

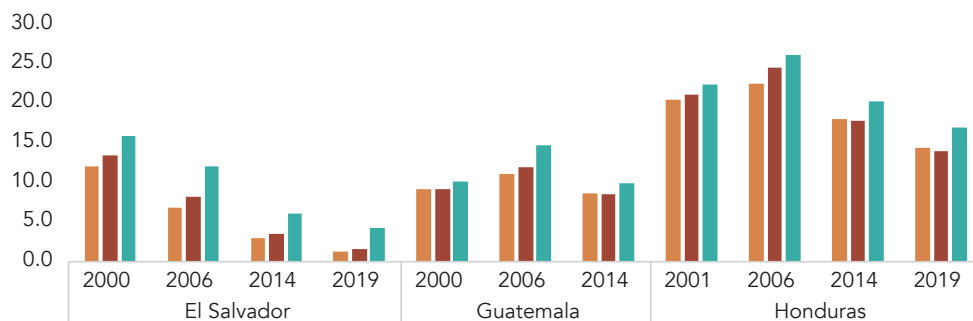
In the second scenario that explored what households' pre-remittance income would have been in the absence of migration, we found that the effects of remittances on poverty were heterogenous across countries and time periods. As with the first scenario, remittances had only a limited effect in terms of reducing poverty in Honduras and Guatemala, and in more recent years the effect was negative, that is, poverty under the imputed income scenario was lower than at the baseline levels. This is indicative of the declining share of remittances in household income in recent years and reflects the fact that households that receive remittances are different from those that did not

The contrast with El Salvador is sharp. When the \$3.20 poverty line is used, the poverty rate in Honduras and Guatemala would have remained the same by the last year of available data (2019 for Honduras and 2014 for Guatemala), while in El Salvador, it would have been 33 percent higher in the absence of migration and remittances. At the UMIC-PL poverty line of \$5.50, the change would also have been negligible in Honduras and Guatemala (3 to 4 percent increase but El Salvador would still have had a substantial increase at 26 percent. Again, this highlights the greater decline in the share of remittance income in total household income in Honduras and Guatemala than in El Salvador.

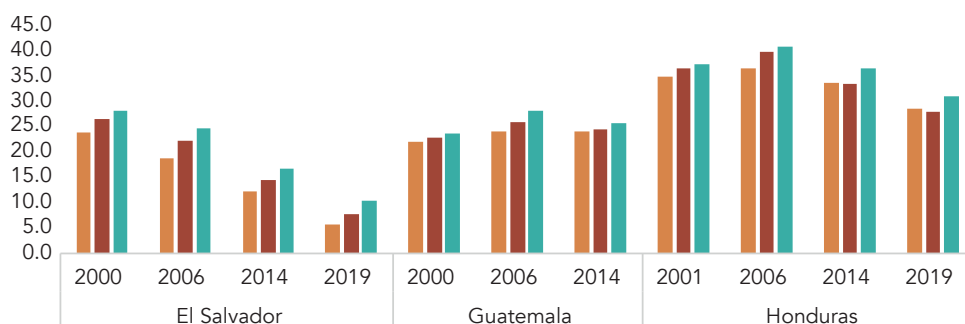
In the most recent years in Guatemala and Honduras, it is not at all clear that migration was a positive strategy for reducing poverty for those in the very poorest households. Guatemala's extreme poverty rate in 2104 would have been lower in the absence of migration. The same is true for Honduras in both 2014 and 2019. This may reflect some differences in the migration patterns of Honduras and Guatemala compared with those of El Salvador. The more recent large-scale migration of Guatemalans and Hondurans and their less established networks in the destination countries mean that it may still be inordinately costly for the very poor in those two countries to migrate. Many Guatemalans migrate to Mexico, which is feasible because of its proximity, but the southern states of Mexico that border on Guatemala are some of the poorest areas in the country, with wages that are lower than in other destination countries.

Figure 5.8 Alternative Scenarios Regarding Poverty and Remittances

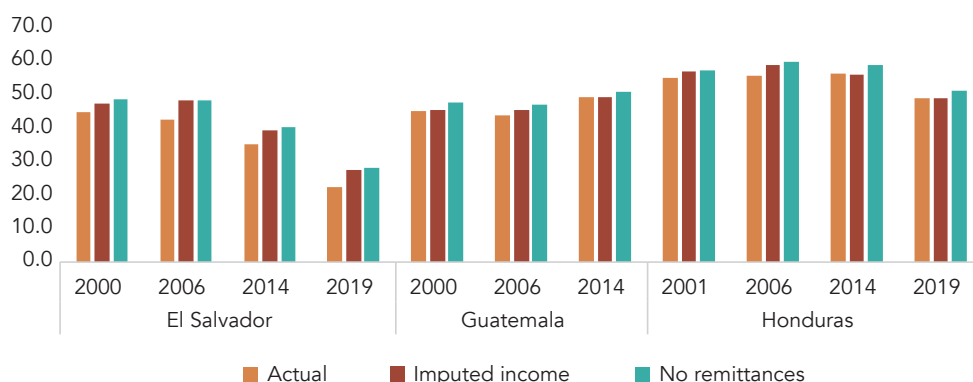
Poverty Rates based on Simulations (using IPL of US\$1.9, 2011 PPP)



Poverty Rates Based on Simulations (Using LMIC poverty line of US\$3.2)



Poverty Rates Based on Simulations (using UMIC poverty line of US\$5.5 in 2011 PPP)



Actual Imputed income No remittances

Source: Authors' calculations based on the EHPM for El Salvador, ENCOVI for Guatemala, and the EHPM for Honduras.

Notes: The three scenarios are: (i) observed poverty rates (actual total household income including remittances); (ii) poverty rates if remittances were subtracted from total household income; and (iii) imputed income where remittance earnings are subtracted and the earnings that the migrant would have earned if she or he had not migrated are added to the household income. Poverty rates were calculated based on per capita household income. For comparability, all income figures are in 2011 PPP terms.

This may suggest that factors other than economic ones, such as escaping crime and violence and/or a desire for family reunification, may be prompting migration from the Guatemala and Honduras.⁹⁰

As might be expected from our analysis, remittances had only a limited effect on inequality in the three countries. The changes in the Ginis were relatively small, with El Salvador experiencing only a 6 percent increase in inequality under the first scenarios (income minus remittances) and only a 1 percent increase in inequality under scenario two (imputed income scenario). These small changes are in line with most of the previous research.

Robustness Checks

We expanded our analysis with a series of robustness checks. In scenario two, in which we “re-integrated” migrants into their households, we estimated the characteristics of the migrants based on the gender, employment, and age characteristics of the migrant pool according to recent data on current migrants from both host and home countries. To assess the robustness of our findings, we first redid all of our calculations by simply adding one migrant per household following the model used by Acosta et al (2008). This changed our calculation in terms of poverty and inequality only slightly, so the results remained as before. Then we considered the average number of migrants per migrant-reporting household (as opposed to remittance-receiving household), which gave a higher number of migrants in each household but did not change our results.

Second, we took household demographics into account by looking not at per capita income but per adult equivalent income. The per capita income measure is based on the assumption that each individual requires the same amount of resources. In reality, there are economies of scale in households: a one-person household needs one refrigerator, while a five-person household does not need five refrigerators to have the same level of welfare. By the same token, different members of the household have different needs. Children, for example, eat less than adults, their clothing is less expensive, and they engage in less costly leisure activities. As a result, poverty analyses that use per capita income can overestimate the overall poverty rate. Given that households receiving remittances tend to have more children than non-receiving households, we decided to assess the impact of removing remittances or imputing remittance-free income using per adult equivalent income instead of per capita income. In the absence of any specific formula for establishing an empirical adult equivalence scale for the three NCA countries, we assigned each adult in the household a weight of 1 and each child under the age of 16 a weight of 0.5 before dividing total income by household size.⁹¹

90 See Chapter 2 for a discussion of these other push and pull factors affecting migration. There is evidence that family reunification is an increasingly salient motive for migration from the three countries, however, which does not explain the differences observed here between El Salvador and the other two countries.

91 The Organization of Economic Cooperation and Development (OECD) uses two equivalence scales. The first, the “modified OECD” scale assigns a weight of 1 to the first adult, 0.5 to additional adults, and 0.3 to

We found that remittances had a much larger impact on poverty once the lower demands of children had been taken into account (Annex Table 5.5). Overall poverty in the last year for which we had data for each country was lower, as could be expected as total household income was now being divided by fewer people. Because the poor tend to have more children, the difference between per capita and per adult equivalent can be expected to be greater for poor households than for the non-poor. The effect of remittances became more pronounced El Salvador, for example. Using the IPL, the poverty rate increased by 28 percent using adult equivalent income, while it had increased by only 21 percent when using per capita income. Using the UMIC-PL, the poverty rate increased by 36 percent based on adult equivalent income, while it had increased by only 23 percent using per capita income.

The impact of this change in calculation in Honduras and Guatemala was not as large, as their results on the basis of adult equivalent income and those on the basis of per capita income were essentially the same. Thus, the same conclusion holds, which is that remittances are not as necessary to poor households in Honduras and Guatemala as they are in El Salvador. Only for the IPL, in Guatemala, was there any change. On the basis of adult equivalent income, there would be an increase of 1 percent in poverty, while on the basis of per capita income, the change would be -2 percent. However, these changes were largely not significant.

The fact that remittances and migration affect household formation needs to be taken into account. In our analysis, we have assumed that the demographic composition of migrant-sending households is static, other than the departure of the migrant(s) themselves. However, the composition of the households that we observed may have changed from its composition when the decision to migrate was made. Imagine the simplest case where a nuclear family makes the decision to send the husband abroad. The migrant's wife and children might remain as a household unit or they might join with another household (that of the woman's parents for example). In this case, household formation is endogenous to migration: the households to which we are imputing income are not, in fact, the same households that would have existed in the absence of migration. As different types of households have different poverty rates, ignoring this endogeneity could lead to under- or over-estimation of the poverty impact.

Unfortunately, we cannot provide direct evidence of this, as the household composition prior to migration is unobserved. The data that we have suggest that this is a relevant issue. The household that results from the case cited above - in which a wife decides to move in with her parents - is, indeed, over-represented among migrant-sending households. These would be households in which there are children, but their parents are not the household head (case 1 in Table 5.3). As these multi-family households typically have much higher poverty rates,

each child (based on Haaganars et al, 1994 and as adopted by Eurostat). An alternative is the square root scale, which divides household income by the square root of household size (OECD, 2010) and which is used by the Luxembourg Income Study. In the absence of analytical work to establish the proper equivalences in Northern Central America, we used 0.5 simply to demonstrate the point that household composition matters in poverty calculations.

if migrants originally came from such households, then the differences in poverty that we have found remain applicable, but if they came from a household comprised of a nuclear family – the type of household with lower poverty rates – the overall poverty impact would be underestimated. The second type of household that is over-represented among remittance-receiving households are those categorized as “partner not present but own children in household”. If the migrant had stayed (not migrated), and if the migrant was the partner of the household head, the household would have been a nuclear family, which overall has a lower poverty rate than that of households where the partner is not present. Thus, the impact of remittances on poverty could be overstated. Without being able to account for the potential differences in household composition prior to migration, there is no way to untangle this effect.

Table 5.3

Typology of Remittance-Receiving Households (%)

	El Salvador			Guatemala		Honduras		
	2006	2014	2019	2006	2014	2006	2014	2019
National share of households receiving remittances	20	18	22	16	9	19	16	17
1. Children with relatives, head of household not their parents	38	38	37	33	21	32	27	33
2. Nuclear family (parents and own children)	20	17	22	21	12	20	15	15
3. Extended family (parents, own children, and other adults)	8	8	11	8	4	9	7	9
4. Traditional household without young children	18	16	24	14	8	15	15	12
5. Partner not present (own children in household)	33	31	33	34	20	39	28	27
6. Single, no children	30	27	28	25	8	19	24	24
7. Other types of households	27	22	26	23	11	24	21	22

Source: Authors' calculations based on the EHPM for El Salvador, ENCOVI for Guatemala, and the EHPM for Honduras.

Conclusions

The analysis in this chapter shows that the relationships between migration, remittances and poverty levels vary both across countries and across time. Overall, the evidence points to households' migration decisions leading to a reduction in poverty, especially when household demographics are taken into account. However, this effect was not as strong in more recent years in Honduras and Guatemala. In part, this reflects the observed reduction in both the absolute amounts of remittances sent to Honduras and Guatemala over time and, in part, the reduced share of these remittances in total household income. The 2008 global financial crisis seems to have had a notable effect as remittances fell sharply in all three countries between 2006 and 2014. Only in El Salvador was there a strong recovery after 2014, and only in El Salvador did remittances retain their value, actually increasing their impact in terms of reducing poverty.

There are also structural differences in Honduras and Guatemala relative to El Salvador in terms of migration and poverty. On the one hand, our regression results showed that, in recent years, income and remittance patterns in Honduras and Guatemala are indicative of selection into migration, which means that households receiving remittances in those two countries were more likely to be structurally richer than those who were not receiving remittances. For this reason, while remittances raised the income of the receiving households, they did not reduce the national poverty rate. On the other hand, El Salvador, unlike its neighbors, had substantial and pro-poor economic growth over the same period, with a subsequent reduction in poverty. Interestingly, despite this strong improvement in welfare, remittances not only continued to flow into El Salvador but also grew in volume. This appears to support the findings in Chapter 4 that altruism was a key motive for sending remittances to El Salvador. Alternatively, it may simply reflect unique features of migration from El Salvador, such as the larger size of the El Salvadoran diaspora compared with those of the other two countries and the longer time during which there have been significant amounts of migration from El Salvador. Honduras and Guatemala have more recent migration patterns. Additionally, ACS data show that the incomes of households of Salvadoran origin in the United States have been historically higher than those of Hondurans and Guatemalan migrant households there. Moreover, the incomes of Honduran migrant households in the United States declined by 5 percent (in real terms) over the two decades. In 2019, Salvadoran migrant households in the U.S. earned about 24 percent more than Honduran ones on average (see Figure 5.5).⁹²

For governments, the implications are two-fold. First, while remittances can protect individual households from poverty, external shocks can affect both the level and the distribution of remittances and thus their nationwide poverty effect. The 2008 global financial crisis seems to have had a lasting impact on remittances in the NCA countries. The more recent global shocks wrought by the COVID-19 pandemic have affected the dynamics of remittances, with

92 These differences probably also help to explain the different levels of remittances received in each country.

an initial reduction and a subsequent increase. We are yet to see if this increase is distributed equally, or if it is concentrated amongst higher income household. In order to adopt the right public social assistance policies, policymakers will need to have a better understanding of remittances flows. This is needed not only to ensure that social safety nets will remain adequate given fluctuations in remittances but also to ensure that public programs do not crowd out the remittances themselves, leading to net welfare losses.⁹³ Therefore, there is a clear need for better and more frequent data on the distribution of the flows of migration and remittances. Additional research is also needed to assess the general equilibrium effects of migration and remittances and how the counterfactual situation of no migration would affect local labor markets and potentially change equilibrium wages. Finally, comparing data collected over time may shed some light on the dynamics of remittances and the labor choices made by the members of remittance-receiving households in the countries of origin.

93 Nikolov and Bonci (2020) reviewed the literature and showed that public spending can crowd out remittances if potential crowding out is not taken into account in the program design. Ambrosious (2019) found that state governments in Mexico diverted public spending away from municipalities with higher remittances flows.

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Annex 5.1

Table 5.1

Percentage of Households Reporting Migrants and Remittances by Wealth in Northern Central America

		Quintile					National
		1	2	3	4	5	
El Salvador (2019)	Migrants	10.1%	13.2%	13.9%	16.2%	20.3%	15.3%
	Remittances	15.0%	19.0%	21.7%	23.7%	25.8%	21.6%
Honduras (2019)	Migrants	6.8%	10.5%	12.8%	15.2%	17.2%	13.0%
	Remittances	7.3%	13.9%	19.3%	21.4%	19.9%	16.8%
Guatemala (2018 Census)	Migrants	3.5%	5.9%	7.0%	7.8%	5.6%	6.0%
	Remittances	3.5%	6.6%	9.3%	12.4%	11.0%	8.5%

Source: Authors' calculations based on the EHPM for El Salvador (2019), Census data for Guatemala (2018), and the EHPM (2019) for Honduras.

Note: Quintiles are based on total household income for El Salvador and Honduras. Information on income was not available in the 2018 Guatemalan census, so we calculated the quintiles by creating a wealth index using principal component analysis with the following household goods and services: radio, stove, TV, cable, fridge, water tank, washing machine, PC, internet access, hot water, motorcycle, car, kitchen facilities, and in-house drinking water.

Table 5.2

Regression Results

Panel A: El Salvador								
	2000		2006		2014		2019	
Equation:	Income	Selection	Income	Selection	Income	Selection	Income	Selection
Household Head:								
Age	0.017***	-0.0029	0.015***	-0.0096	0.012***	-0.015***	0.011***	-0.015***
Married	0.12***	0.40***	0.13***	0.50***	0.086***	0.45***	0.11***	0.33***
Formal Job	0.33***	0.092**	0.22***	0.22***	0.24***	0.16***	0.28***	0.14***
Household Variables:								
Average Age	-0.0042**	-0.016***	-0.0015	-0.013***	-0.0014	-0.011***	-0.00055	-0.0052*
Urban	0.26***	-0.010	0.092***	0.030	0.050***	0.075**	0.039***	0.092***
Average Years of Education Adults	0.085***	-0.0075	0.068***	-0.0090	0.059***	-0.0014	0.057***	0.0092
Total Members	0.13***	-0.015	0.10***	-0.011	0.14***	0.0052	0.16***	0.0097

Table 5.2 Continued

Panel A: El Salvador								
	2000		2006		2014		2019	
Equation:	Income	Selection	Income	Selection	Income	Selection	Income	Selection
Household ratios:								
Infant 0-5	-0.30*	-0.85***	-0.18	-0.67**	-0.42***	-0.70***	-0.28***	0.055
Members aged 6-16	-0.16	-1.11***	0.043	-1.04***	-0.092	-1.02***	-0.085	-0.26
Members aged 17-25	0.020	-0.95***	0.024	-0.97***	-0.075	-0.91***	-0.038	-0.57***
Adult 25-65	0.013	-0.35***	0.040	-0.37***	-0.035	-0.26***	-0.037	-0.16*
Male/Female Ratio	-0.16***	0.21***	-0.12***	0.17***	-0.060***	0.19***	-0.095***	0.20***
Share of Employed Members	0.94***	0.97***	0.58***	1.14***	0.57***	0.81***	0.72***	0.92***
Highest Education:								
Primary to Incomplete Secondary	0.10***	-0.11**	0.015	-0.14***	0.029*	-0.11**	0.023	-0.13***
Completed Secondary or Incomplete Tertiary	0.23***	-0.17**	0.12***	-0.22***	0.16***	-0.16***	0.12***	-0.15***
Tertiary or More	0.57***	0.078	0.41***	-0.032	0.51***	-0.045	0.43***	-0.040
Other Variables:								
Homicide Rate	0.68**	0.76	0.50***	-0.22	-0.012	0.019	-0.12	1.55***
Migrant Rate		-3.62***		-1.26***		-2.48***		-2.56***
Model Statistics:								
Obs.	15886		16178		21126		21330	
Rho	0.031		0.14		0.024		0.095	
Sigma	0.72		0.60		0.53		0.49	
Lambda	0.022		0.081**		0.013		0.046	

Table 5.2 Continued

Panel B: Guatemala						
Equation:	2000		2006		2014	
	Income	Selection	Income	Selection	Income	Selection
Household Head:						
Age	0.015**	-0.0019	0.017***	-0.019**	0.015***	-0.010
Married	0.17***	0.32***	0.12***	-0.00089	0.081***	0.083
Formal Job	0.34***	0.091*	0.42***	0.43***	0.30***	0.37***
Household Variables:						
Average Age	-0.0033	-0.028***	-0.011***	-0.019***	-0.0069***	-0.0095*
Urban	0.19***	-0.23***	0.20***	0.21**	0.13***	0.23**
Average Years of Education Adults	0.093***	-0.0016	0.082***	-0.033***	0.072***	-0.023*
Total Members	0.12***	0.029**	0.11***	0.062***	0.11***	0.053***
Household ratios:						
Infant 0-5	-0.33	-1.58***	-0.53***	-1.91***	-0.49***	-0.92**
Members aged 6-16	0.037	-1.79***	-0.26*	-2.30***	-0.25*	-1.31***
Members aged 17-25	0.22	-1.22***	-0.018	-1.47***	-0.17*	-1.13***
Adult 25-65	0.21	-0.10	0.17**	-0.49***	0.049	-0.55***
Male/Female Ratio	0.056	0.60***	-0.066*	0.59***	-0.013	0.43***
Share of Employed Members	0.59***	0.39***	0.71***	0.61***	0.61***	0.72***
Highest Education:						
Primary to Incomplete Secondary	0.12***	-0.10	0.17***	-0.12**	0.059**	-0.100
Completed Secondary or Incomplete Tertiary	0.26***	-0.21*	0.37***	-0.24***	0.27***	-0.19*
Tertiary or More	0.38***	-0.21	0.62***	-0.040	0.56***	0.076
Other Variables:						
Homicide Rates	3.12***	-1.74	3.58***	-1.60**	2.92***	-5.46***
Migrant Rates		-9.47***		-9.11***		-3.19***
Model statistics						
Obs.	7235		13673		11503	
Rho	0.029		0.096		-0.41	
Sigma	0.73		0.66		0.60	
Lambda	0.021		0.064		-0.25***	

Table 5.2 Continued

Panel C: Honduras								
2000		2006		2014		2019		
Equation:	Income	Selection	Income	Selection	Income	Selection	Income	Selection
Household Head:								
Age	0.020***	0.0018	0.025***	-0.0047	0.0087***	0.0013	0.012**	-0.022**
Married	0.14***	0.20***	0.17***	0.16***	0.045***	0.15***	0.080**	0.016
Formal Job	0.33***	0.13*	0.26***	0.10***	0.28***	0.057*	0.28***	0.085
Household Variables:								
Average Age	-0.0016	-0.0050	-0.0094***	-0.013***	-0.0029*	-0.0056*	-0.017***	0.022***
Urban	0.27***	-0.14*	0.36***	-0.064*	0.23***	-0.20***	0.31***	-0.29***
Average Years of Education Adults	0.086***	-0.018	0.090***	-0.039***	0.075***	-0.018***	0.058***	0.0049
Total Members	0.12***	-0.0035	0.10***	0.0010	0.14***	-0.018**	0.13***	0.024
Household ratios:								
Infant 0-5	-0.40*	-0.37	-0.72***	-1.01***	-0.45***	-0.22	-0.63**	0.19
Members aged 6-16	-0.30	-0.65	-0.53***	-1.09***	-0.22*	-0.49**	-0.59***	0.35
Members aged 17-25	-0.00093	-0.48	-0.19*	-0.76***	0.064	-0.55***	-0.18	-0.077
Adult 25-65	-0.025	-0.26	-0.032	-0.23*	-0.0038	-0.0086	0.014	0.13
Male/Female Ratio	0.046	0.21*	-0.088**	0.35***	-0.012	0.23***	0.043	0.27**
Share of Employed Members	0.91***	0.90***	0.87***	0.69***	0.66***	0.45***	0.67***	0.39***
Highest Education:								
Primary to Incomplete Secondary	0.16***	-0.30***	0.18***	-0.23***	0.14***	-0.17***	0.20***	-0.11
Completed Secondary or Incomplete Tertiary	0.44***	-0.36**	0.40***	-0.24***	0.33***	-0.28***	0.49***	-0.26*
Tertiary or More	0.72***	-0.13	0.75***	0.29**	0.65***	-0.091	0.81***	-0.26

Table 5.2 Continued

Panel C: Honduras								
Equation:	2000		2006		2014		2019	
	Income	Selection	Income	Selection	Income	Selection	Income	Selection
Other Variables:								
Homicide Rates x1000	2.75***	-3.93*	8.58***	-4.23***	1.46***	-2.17***	3.36***	-2.39*
Migrant Rates		-16.4***		-10.5***		-4.30***		-5.75***
Model Statistics								
Obs.	6909		20393		22883		5390	
Rho	-0.0088		0.14		-0.82		-0.88	
Sigma	0.73		0.80		0.80		0.76	
Lambda	-0.0065		0.11		-0.66***		-0.67***	

Source: Authors' calculations based on household surveys from each country.

Notes: Each combination of country and year has two columns; one corresponds to the income equation and the other to the selection equations of a Heckman model. The income equation uses a logarithmic scale, which is then transformed back into levels using a smearing retransformation. The selection equation is a dummy of not receiving remittances. Rho indicates the correlation of the errors between the income and the selection equation. Sigma corresponds to the standard deviation of the errors in the income equation, while lambda is the Inverse Mills ratio, which is the multiplication of sigma and rho. Both equations are solved simultaneously using maximum likelihood. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5.3

Migration and Murder Rates Used in the Models

Survey		Homicide Rate		Migrant rate (census)	
Country	Year	Administrative Level	Year of data	Level of merging	Year of data
El Salvador	2000	Municipality	2001***	Municipality	1992
El Salvador	2006	Municipality	2009 ◊◊	Canton	2007
El Salvador	2014	Municipality	2013 ◊◊	Canton	2007
El Salvador	2019	Municipality	2013 ◊◊	Canton	2007
Guatemala	2000	Region	2002*	Region	2002
Guatemala	2006	Department	2009*	Department	2002
Guatemala	2014	Department	2014◊	Municipality	2018
Honduras	2000	Department	2005**	Department	2001
Honduras	2006	Department	2005**	Municipality	2013
Honduras	2014	Municipality	2014 ◊◊◊	Municipality	2013
Honduras	2019	Municipality	2017 ◊◊◊	Municipality	2013

Source: Homicide rates are from the * Observatorio de la Violencia – Dialogos, ** Observatorio de la Violencia – DEGIC, *** Corte Suprema - Instituto de Medicina Legal - Unidad de Estadísticas, ◊ Instituto Nacional de Estadística de Guatemala, ◊◊ Policia Nacional - El Salvador, ◊◊◊ Policia Nacional – Honduras. Migrant rates were calculated from census data, either using microdata from the NSO (Guatemala 2018 Census); IPUMS data (El Salvador 1992 and 2007, Guatemala 2002, and Honduras 2001 census); or the Redatam website of the NSO (Honduras 2013 census).

Note: The administrative level indicates the geographical level at which the rates were added to the main surveys. The lowest level of disaggregation is the canton, followed by the municipality, department and region. Technical specifications and lack of regional variables drive the choice of merging. In some cases merging is not perfect, so the national rates are instead.

Table 5.4

Poverty Results under the Different Simulations

	LMIC Poverty \$3.20			LMIC Poverty \$5.50			Gini		
	Income minus Remittances	Imputed Income	Income minus Remittances	Income minus Remittances	Imputed Income	Income minus Remittances	Income minus Remittances	Imputed Income	Income minus Remittances
Counterfactual	15.9	13.6	28.1	48.1	47.6	0.53	0.53	0.53	0.53
2000 Actual	12.2		24.0	44.6			0.51		
Change	30%	11%	17%	8%	7%	4%	4%	2%	2%
Counterfactual	12.0	8.2	24.8	48.1	48.2	0.48	0.48	0.46	0.46
2006 Actual	6.9		18.8	42.4			0.46		
Change	74%	18%	32%	13%	14%	6%	6%	1%	1%
Counterfactual	6.0	3.6	16.7	40.1	39.2	0.436	0.436	0.419	0.419
2014 Actual	3.0		12.2	34.9			0.416		
Change	104%	21%	37%	15%	12%	5%	5%	1%	1%
Counterfactual	4.2	1.5	10.3	28.1	27.6	0.41	0.41	0.39	0.39
2019 Actual	1.3		5.7	22.3			0.39		
Change	237%	21%	81%	26%	24%	6%	6%	1%	1%

El Salvador

Table 5.4 Continued

		LMIC Poverty \$3.20			LMIC Poverty \$3.20			UMIC Poverty \$5.50			Gini	
		Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Income minus Remittances	Imputed Income
2000	Counterfactual	10.2	9.1	23.6	22.6	47.3	45.2	0.55	0.55	0.55	0.55	0.55
	Actual	9.2		22.1		44.8				0.54		
	Change	10%	-2%	7%	2%	5%	1%	1%	1%	1%	1%	1%
2006	Counterfactual	14.7	12.4	28.1	26.1	46.8	45.5	0.56	0.56	0.56	0.56	0.56
	Actual	11.1		24.2		43.4		0.55				
	Change	33%	12%	16%	8%	8%	5%	3%	3%	3%	3%	3%
2014	Counterfactual	9.9	8.5	25.8	24.3	50.4	49.3	0.49	0.48	0.49	0.48	0.48
	Actual	8.7		24.2		48.8		0.48				
	Change	14%	-2%	6%	0%	3%	1%	1%	1%	1%	0%	0%
2000	Counterfactual	22.4	21.0	37.3	36.2	57.0	56.0	0.56	0.56	0.56	0.56	0.56
	Actual	20.6		35.0		54.6		0.55				
	Change	9%	2%	7%	3%	4%	3%	1%	1%	1%	1%	1%
2006	Counterfactual	26.1	24.5	41.0	39.8	59.4	58.3	0.58	0.58	0.58	0.58	0.58
	Actual	22.5		36.6		55.2		0.58				
	Change	16%	8%	12%	9%	8%	6%	2%	2%	2%	2%	2%
2014	Counterfactual	20.3	17.9	36.5	33.8	58.3	56.0	0.52	0.52	0.52	0.52	0.52
	Actual	18.2		33.9		56.1		0.51				
	Change	12%	-2%	8%	0%	4%	0%	1%	1%	1%	2%	2%
2019	Counterfactual	16.9	14.0	31.1	28.4	50.7	48.6	0.49	0.50	0.49	0.50	0.50
	Actual	14.6		28.7		48.7		0.48				
	Change	16%	-4%	8%	-1%	4%	0%	2%	2%	2%	4%	4%

Source: Authors calculation using household data.

Note: Each cell corresponds to a unique combination of country, year, poverty rate, and calculation. For example, the first cell (15.9) corresponds to the IPL poverty rate calculated under the first counterfactual ("Income minus remittances") for El Salvador in 2000. The row below (12.2) corresponds to the actual poverty rate, while the following row corresponds to the change between the two (12.2 to 15.9). Poverty numbers can be slightly different from those reported in PovCalNet due to differences between survey versions.

Guatemala

Honduras

Table 5.5

Results of the Simulations Using Adult Equivalents

		IPL Poverty - \$1.90		LMIC Poverty \$3.20		UMIC Poverty \$5.50		Gini	
		Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income
2000	Counterfactual	11.1	9.2	20.6	18.9	38.0	37.5	0.51	0.51
	Actual	8.0		16.3		33.6		0.49	
	Change	39%	15%	27%	16%	13%	11%	4%	3%
2006	Counterfactual	7.5	4.2	16.7	14.3	36.8	36.8	0.46	0.44
	Actual	3.1		10.8		30.1		0.43	
	Change	145%	37%	54%	32%	22%	22%	6%	3%
2014	Counterfactual	3.9	1.7	10.8	8.6	29.3	28.5	0.415	0.402
	Actual	1.3		6.8		24.0		0.394	
	Change	209%	33%	59%	26%	22%	19%	5%	2%
2019	Counterfactual	3.0	0.7	7.3	4.5	20.0	19.2	0.39	0.38
	Actual	0.6		3.1		0.37		0.39	
	Change	435%	28%	137%	46%	41%	36%	7%	3%

El Salvador

Table 5.5 Continued

		LMIC Poverty \$3.20			LMIC Poverty \$5.50			Gini	
		Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income	Income minus Remittances	Imputed Income
2000	Counterfactual	5.8	4.9	13.8	13.0	31.7	30.7	0.52	0.53
	Actual	5.1		12.6		29.6		0.52	
	Change	15%	-4%	9%	3%	7%	4%	1%	2%
	Counterfactual	8.0	6.2	18.7	16.5	35.4	34.1	0.53	0.53
	Actual	5.6		14.7		31.4		0.51	
2006	Change	43%	10%	28%	12%	13%	9%	3%	3%
	Counterfactual	5.3	4.3	15.5	14.1	37.8	36.6	0.46	0.45
	Actual	4.2		14.0		36.2		0.45	
	Change	26%	1%	11%	1%	4%	1%	1%	0%
	Counterfactual	14.5	13.3	28.1	26.6	46.2	45.0	0.54	0.54
2000	Actual	13.0		25.9		43.5		0.53	
	Change	12%	2%	8%	3%	6%	3%	1%	2%
	Counterfactual	19.3	17.6	32.2	31.1	49.6	48.8	0.56	0.56
	Actual	16.1		28.0		45.1		0.55	
	Change	20%	9%	15%	11%	10%	8%	1%	2%
2006	Counterfactual	13.8	11.7	27.5	24.8	48.6	46.3	0.50	0.50
	Actual	11.8		24.7		45.8		0.49	
	Change	17%	-1%	11%	0%	6%	1%	1%	3%
	Counterfactual	11.1	8.7	24.4	21.6	43.4	40.8	0.47	0.48
	Actual	8.9		21.8		40.8		0.46	
	Change	24%	-3%	12%	-1%	6%	0%	2%	5%

Source: Authors calculation using household data.

Note: The calculations here correspond to an adult equivalence that assigns a value of 1 to every adult and a value of 0.5 to any children under the age of 18.