T = Total or very limited bilateral entries only.

B = Bilateral (if not for all 226 countries at least for main partners).

B/B = Bilateral/Bilateral.

B/T = Bilateral/Total.

UN = UN total only.

N = Nationality.

B = Birth.

E = Ethnicity.

B/N = Birth and nationality.

O = Other but equivalent.

C = Census.

PR = Population register.

S = Source unclear or not stated but obtained from National Statistics Bureau, either directly or from published yearly handbooks.

U = Unknown; check with United Nations.

R = Register of foreigners.

O = Other, that is, survey/permit data.

Annex 2: Entropy Measure

The entropy measure used to compare the shares of the foreign born and nationality matrixes is based on the entropy measure (3) devised by Walmsley and McDougall (2004):

$$(3) \quad E_{r,s} = 0.5\left[S_{r,s}^{*A}(Log_e(S_{r,s}^{*A}/S_{r,s}^{*B}))\right] + 0.5\left[S_{r,s}^{*B}(Log_e(S_{r,s}^{*B}/S_{r,s}^{*A}))\right]$$

Where: $E_{r,s}$ = the entropy measure of the difference between $S_{r,s}^{*A}$ and $S_{r,s}^{*B}$

$S_{r,s}^{*A}$ = the adjusted share of migrants from country r in country s to use in foreign born matrix.

$S_{r,s}^{*B}$ = the adjusted share of migrants from country r in country s to use in nationality matrix.

The adjustment to the shares being:

$$S_{r,s}^{*A} = (S_{r,s}^{A}(1 - TINY)) + (S_{r,s}^{B}(TINY))$$

$$S_{r,s}^{*B} = (S_{r,s}^{B}(1 - TINY)) + (S_{r,s}^{A}(TINY))$$

Where: $S_{r,s}^{A}$ = The proportion of migrants from country r to the total in country s in the foreign born matrix.

$S_{r,s}^{B}$ = The proportion of migrants from country r to the total in country s in the nationality matrix.

$TINY$ = Small number

2

THE IMPACT OF REMITTANCES ON POVERTY AND HUMAN CAPITAL: EVIDENCE FROM LATIN AMERICAN HOUSEHOLD SURVEYS

Pablo Acosta, Pablo Fajnzylber, and J. Humberto Lopez

Workers' remittances to developing countries have dramatically increased over the past few years. According to the World Bank's *Global Economic Prospects 2006*, remittances to middle- and low-income countries amounted to about $30 billion in 1990. Fifteen years later, they are estimated to have reached almost $170 billion, implying annual growth rates that are well above 10 percent. Remittances now account for about 30 percent of total financial flows to the developing world and provide significant foreign exchange earnings. They are more than twice as large as official development assistance flows, and they are equivalent to 2.5 percent of the gross national income of the developing world. Some evidence indicates that remittances flows have positive macroeconomic effects in recipient countries. Large remittances flows improve a country's creditworthiness for external borrowing and, hence, enhance the country's access to international capital markets. Moreover, some financial institutions in developing countries have been able to tap into international capital markets under relatively favorable conditions through securitization of future flows.

Given the nature, magnitude, and evolution of remittances flows, development practitioners now view remittances as having a potentially important role to play in supporting the development efforts of recipient countries. Remittances can support these efforts through two main channels. First, remittances could flow to the neediest groups of the population and, therefore, directly contribute to poverty reduction. Even if these flows are fully consumed, a concern of many development practitioners, they could have significant positive welfare effects. Second, with imperfect insurance and financial markets, remittances could contribute to increased investment in human and physical capital. For example, they could remove some of the financial constraints to investment faced by households and small-scale entrepreneurs. Similarly, remittances can provide insurance and, therefore, allow households and entrepreneurs to pursue riskier asset accumulation strategies. In this regard, remittances could help raise the country's long-run growth potential through higher rates of capital accumulation.

In practice, however, other effects may counterbalance these potential positive impacts. For example, if important costs are associated with the act of migrating, migrants may not come from the lowest quintiles of the income distribution and, therefore, remittances may not flow to the poorest people. As discussed below in the Latin American context, the assertion that remittances are directed mainly to the poor is difficult to defend when both the location of recipient households in the income distribution and the magnitude of the corresponding flows are taken into account. In those cases, remittances would not be expected to have a large effect on poverty headcounts. Moreover, comparing observed poverty rates with poverty rates calculated on the basis of nonremittances income could exaggerate the estimated development impact of these flows. Indeed, before leaving their home countries, migrants are likely to have made a contribution to their households' income, and this contribution should be taken into account when counterfactual poverty rates are calculated in a scenario of neither migration nor remittances. Adams (2006), for example, argues that failure to correct for the reduction in income associated with the absence of migrants from their households can dramatically change the estimated poverty impact of remittances. With data from Guatemala, Adams (2004) illustrates how the incorporation or lack of incorporation of this correction can lead to either positive or negative effects of remittances on poverty.

Remittances can also negatively affect domestic competitiveness, lowering the expected returns on capital. For example, remittances can exert pressure on the exchange rate and lead to a real appreciation, which, all other factors being equal, would lower the profitability of the tradable sector (in a Latin American context, see Amuedo-Dorantes and Pozo [2004] for evidence in this regard). Similarly, remittances may raise reservation wages and negatively affect labor supply (Rodriguez and Tiongson 2001). In both cases, remittances would affect the investment incentives of households and entrepreneurs and would lower the rate of capital accumulation.

In other words, given the potential counterbalancing effects associated with a surge in remittances, researchers may find it difficult to determine not only the magnitude but also the direction of the potential development impacts of remittances. Thus, empirical evidence is needed to ascertain the signs and orders of the magnitude of the different economic consequences of remittances flows. However, empirical evidence on the various development impacts of remittances remains limited. Many studies[1] have analyzed the poverty impact of remittances[2] by exploiting cross-national databases (see, for example, Adams and Page [2005] and Acosta et al. [forthcoming]) or by exploring the issue in specific country settings (see, for example, Adams [2004, 2006] on Guatemala and Ghana, Lopez-Cordova [2005] and Taylor et al. [2005] on Mexico, and Yang and Martinez [2006] on the Philippines) and have concluded that higher remittances inflows tend to be associated with lower poverty.

But many issues must be considered. First, cross-country studies tend to offer global results, but they do not fully exploit differences in country characteristics that may affect the development impact of remittances. In particular, the results can be misleading in specific country contexts if migration patterns differ significantly across countries and regions and if the analysis does not take those patterns into account. Moreover, cross-country studies usually take as counterfactual the hypothesis of no remittances without altering migration patterns rather than the more appealing counterfactual of no migration—that is, they underestimate the costs of migration and, hence, may overestimate the benefits of remittances. For example, some of the estimates obtained using cross-country analyses suggest that a 10 percent increase in per capita remittances may lead to a 3.5 percent decrease in poverty. Clearly, this estimate does not appear realistic, especially when its implications are considered: with this elasticity and the growth rates in per capita remittances observed during the past 15 years (more than 10 percent), the remittances effect alone should by now have nearly halved the poverty level that existed in 1990.

Country-specific studies allow for rich analyses but may offer a narrow view of the problem at hand if their existing stock is very limited. Moreover, the comparison of results may be problematic if the analyses of the various studies rely on diverse methodologies and assumptions. In that case, observed cross-country differences due to variation in country characteristics are difficult to distinguish from methodological differences across studies.

This chapter contributes to the debate by presenting an analysis of the development impact of remittances in 11 Latin American countries: Bolivia, the Dominican

Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Paraguay, and Peru. These are the countries for which the respective nationally representative household surveys contain information on the remittances received by households. In this regard, the present study contributes to the existing literature along several dimensions.

First, its results offer a comprehensive view of the poverty impact of workers' remittances in the Latin American region. The analysis focuses on the most commonly used poverty measure—headcount poverty—and explores how the results change with the use of different poverty lines and the movement from internationally to nationally defined poverty lines. In this regard, the analysis extends and completes that in Acosta et al. (forthcoming). Due to data limitations, the present study does not analyze all the countries in the region that according to Balance of payments (BOP) statistics receive nontrivial amounts of remittances flows, but its working sample covers more than two-thirds of the main remittances-receiving countries in Latin America, which, together with East Asia and the Pacific, is at the top of the ranking of remittances-receiving regions in the world.

Second, unlike other studies on the topic, which tend to focus either on the impact of remittances on poverty or on the impact of remittances on measures of household welfare that go beyond the pure income dimension (such as education or health levels), this analysis examines both issues. In the case of the impact of remittances on education, data limitations prevent inclusion of Bolivia in the analysis; Jamaica is included in its place. In the case of health, the sample is limited to two countries: Guatemala and Nicaragua.

Third, the present analysis is based on one methodology for all the countries; therefore, differences in outcomes emerge from differences in the pattern and volume of remittances, rather than from methodological biases. Thus, the results can be used to assess potential heterogeneity in responses to a surge in remittances. To the authors' knowledge, this exercise is the first of its type. In this respect, the chapter combines the virtues of cross-country analysis and country-specific analysis. It reflects country specificity in the sense that each country is analyzed in isolation, taking into account all the possible country characteristics. It reflects a cross-country perspective because of the relatively large number of countries analyzed with one methodology, thereby permitting examination of country heterogeneity.

Fourth, at a technical level, the chapter presents several exercises that are based on the same assumptions. In some cases, the counterfactual scenario is migration without remittances; in others, the counterfactual scenario has no migration, and the analysis corrects for the potential income that migrants might have had if they had not left their country. To this end, the study estimates an econometric model relating nonremittances income to a set of household and household head characteristics. In addition, in the preferred simulation, the study takes into account the fact that households with migrants may not be randomly selected from the population and allows for the possibility of selection bias. Moreover, following Schiff (2006), the chapter presents the results of estimating the impact of remittances on the poverty rates prevailing only among the households receiving those flows. Finally, when estimating the effects of remittances on human capital formation, the study controls for the counterfactual income of recipient households estimated for the purpose of assessing the impact of remittances on poverty.

The study suggests that remittances tend to have an overall positive impact on recipient economies. Remittances appear to reduce poverty levels, increase educational attainment, and contribute to improvements in health indicators. Policy makers, understandably, are increasingly interested in seeing an increase in the amount of remittances flowing to their countries.

Yet, in general, the estimated impacts tend to be modest and to reveal significant country heterogeneity. In about half of the countries analyzed, remittances have no significant impact on poverty. One reason is that, in some of the countries, a large share of the remittances-receiving population belongs to the top quintiles of the income distribution, which naturally reduces the potential poverty-reducing effects of remittances flows. Another reason is that, correcting for the reduction in income that would be associated with the absence of migrants from their households has a significant impact. In fact, estimates that do not correct for this factor suggest significantly larger declines in poverty rates in all countries. In addition, the study suggests that children from households reporting remittances are more likely to stay in school and that, controlling for premigration income, children from remittances-receiving households tend to exhibit better health outcomes than those from nonrecipient households with similar demographic and socioeconomic characteristics (although in this case the evidence is based on data from only two countries). These impacts, however, tend to be restricted to households with relatively low levels of schooling and income.

This chapter reviews the data and econometric methodology used in the present study and presents the empirical results regarding the impact of remittances on headcount poverty. Moving beyond the income dimension of poverty, it explores how remittances affect human capital accumulation.

Data and Methodology

The following sections present the data and the methodology used in this chapter. Included are a discussion of the various household surveys on which the study is based and a presentation of how the study has dealt with econometrical issues.

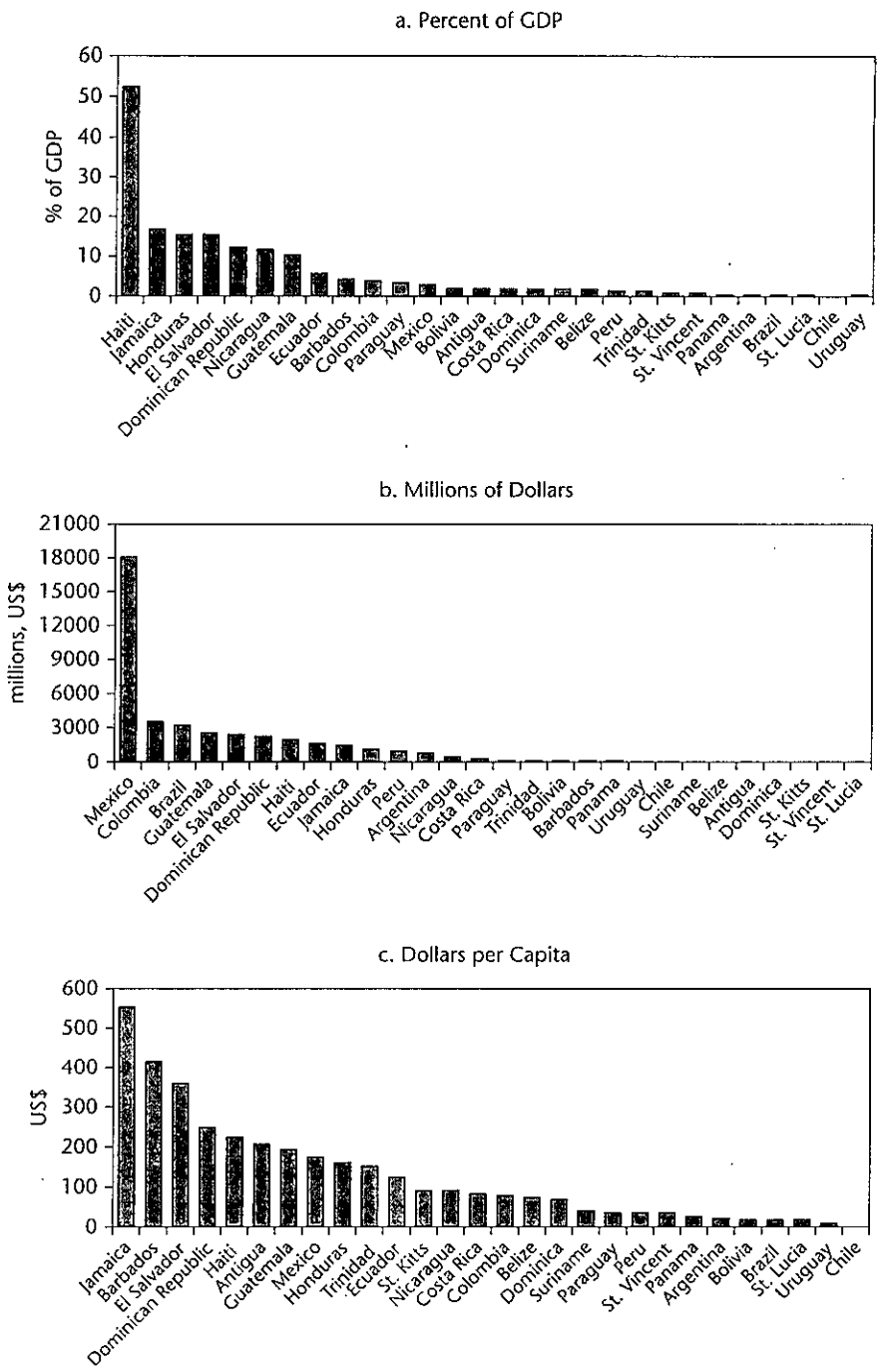
Data

The dramatic increase in remittances observed at the global level over the past few years has been mirrored in Latin America. In fact, officially recorded remittances flows to the region have increased more than twentyfold since 1980, when remittances amounted to about $1.9 billion, to nearly $50 billion in 2005. This trend has placed Latin America (together with East Asia and the Pacific) at the top of the ranking of regions by total amount of remittances and, more clearly, by per capita remittances received. Moreover, according to the World Bank (2006), remittances to the region could reach about $75 billion in 2007. Although this estimate is likely to be on the high side, it nevertheless highlights the fact that a collapse in remittances appears unlikely in the near future. In other words, the assumption that remittances are here to stay, at least in the short run, is realistic.

Within Latin America, remittances are particularly important in some countries. For example, they represent more than 50 percent of gross domestic product (GDP) in Haiti, the highest remittances ratio in the world, and 15–20 percent of GDP in Jamaica, Honduras, and El Salvador (see figure 2.1a). Similarly, in Guatemala, Nicaragua, and the Dominican Republic, remittances are 10–12 percent of GDP. The importance of those flows can also be illustrated by comparison with other private capital flows. Thus, in Guatemala, Honduras, El Salvador, and the Dominican Republic, remittances are equivalent, respectively, to 14, 4, 3, and 2 times foreign direct investment (FDI) flows. Even in Colombia and Ecuador, where in relative terms remittances are lower, remittances represent, respectively, 197 percent and 112 percent of FDI.

On a U.S. dollar basis, the Latin American country with the highest absolute remittances flows is Mexico, which received almost $22 billion in 2005 (about $18 billion in 2004, as reported in figure 2.1b). This flow would represent 45 percent of total flows to Latin America in that year ($48.3 billion) and would make Mexico the world's largest remittances recipient in 2005. Other countries with substantial flows are Colombia and Brazil with flows, respectively, of $3.8 billion and $3.5 billion in 2005, and Guatemala, El Salvador, the Dominican Republic, and Haiti with $2.5 billion on average. Also worthy of note are Ecuador, Honduras, Jamaica, and Peru, where remittances averaged about $1.5 billion in 2005. Finally, on a per capita basis, the country with the highest level of remittances would be Jamaica with approximately $550 per capita, followed by Barbados with about $400 per capita and El Salvador with flows of approximately $350 per capita (see figure 2.1c). The average for the 28 countries considered in figure 2.1 would be $128 per capita per year, but that amount increases to $270 among the 10 countries with the highest per capita remittances—a group that also includes the Dominican Republic, Haiti, Antigua and Barbuda, Guatemala, Mexico, Honduras, and Trinidad and Tobago.

Figure 2.1. Remittances to Latin America in 2004



Source: Balance of payments (macroeconomic) data.

Table 2.1. Household Surveys Used

Country	Year	Survey
Bolivia	2002	Encuesta de Hogares, MECOVI
El Salvador	2000	Encuesta de Hogares de Propositos Multiples, MECOVI
Haiti	2001	Les Conditions de Vie en Haiti, IHSI/Fafo/PNUD
Mexico	2002	Encuesta Nacional de Ingresos y Gastos de los Hogares, INEGI
Paraguay	2003	Encuesta Permanente de Hogares, Direcion General de Estadistica
Dominican Rep.	2004	Encuesta Nacional sobre Condiciones de Vida (ENCOVI)

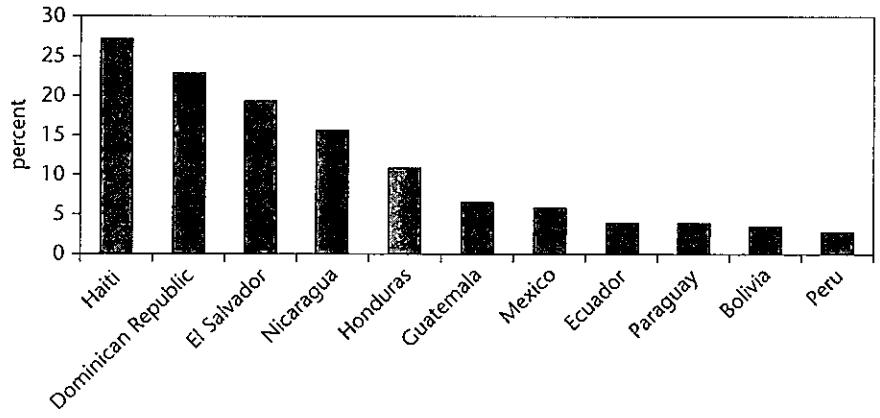
Source: Authors.

Data just described reveal the importance of remittances in the different Latin American countries. However, if interest centers on the characteristics of those receiving remittances, the BOP data described above are inadequate, and the researcher must resort to other sources. In this regard, the natural candidates are nationally representative household surveys. A problem with this alternative is that not all the Latin American countries have surveys containing relevant information on remittances. In fact, such data are available for only 11 countries. Table 2.1 reports the countries for which the household survey allows an analysis of the poverty impact of remittances. Overall, remittances to these countries in 2004 would have amounted to $33.5 billion, or about 70 percent of total remittances to the region.

One question that may arise at this stage regards the degree of consistency between the BOP-based data and the survey-based data. Significant and nonsystematic discrepancies between the two data sources would raise questions regarding the reliability of the remittances data and, therefore, of the results. Although differences between BOP and household survey estimates of remittances flows are significant, those differences are at least systematic—that is, the ordering of countries on the basis of remittances flows relative to GDP is very similar, regardless of the data source. Indeed, Acosta et al. (2006) find that the relationship between the two sources of data across countries is stable; BOP-based estimates surpass household survey data estimates by about 73 percent (an R^2 of 0.8 obtained for the corresponding regression line linking the two series). That is, household survey-based estimates of remittances flows (as a percent of household income) are about 40 percent lower than BOP-based estimates (as a percent of GDP). Although, in principle, these differences may reflect the reasons for discrepancies between household survey-based and national accounts-based income estimates,[3] it may be that household surveys are not fully representative of the population of remittances recipients and, hence, that these surveys may underestimate the relevance of remittances flows. This important caveat should be kept in mind when analyzing the results presented here, because the poverty-reducing effects of remittances could be underestimated (although in a similar way across countries). The first question that the present study attempts to answer on the basis of household survey data has to do with the characteristics of those receiving remittances in the sample of Latin American countries under consideration.

Figure 2.2 reports the share of households receiving remittances in each of the 11 countries in the sample, suggesting that this share varies significantly. For example, in Haiti more than 25 percent of households reported having received remittances in 2001. At the other extreme, only 3 percent of the Peruvian households would benefit from these flows. Remittances reach 10–25 percent of the households in the Dominican Republic, El Salvador, Nicaragua, and Honduras; 5–10 percent in Mexico and Guatemala; and 3–5 percent in Bolivia, Ecuador, and Paraguay. Thus, other factors being equal, a given amount of remittances would be expected to have quite different effects on the welfare of the population of countries such as Haiti and Peru.

Figure 2.2. Share of Households Receiving Remittances



Source: Household surveys.

Cross-country differences in the welfare effects of remittances become even more likely, because not all the households receiving remittances are poor, and the share of remittances recipients living in poverty varies considerably from country to country. These differences are apparent in figure 2.3, which plots the percentage of households receiving remittances by quintile of the (nonremittances) income distribution. Remittances recipients in some, but not all, countries are predominantly poor (61 percent of Mexican and 42 percent of Paraguayan households receiving remittances fall in the first income quintile).

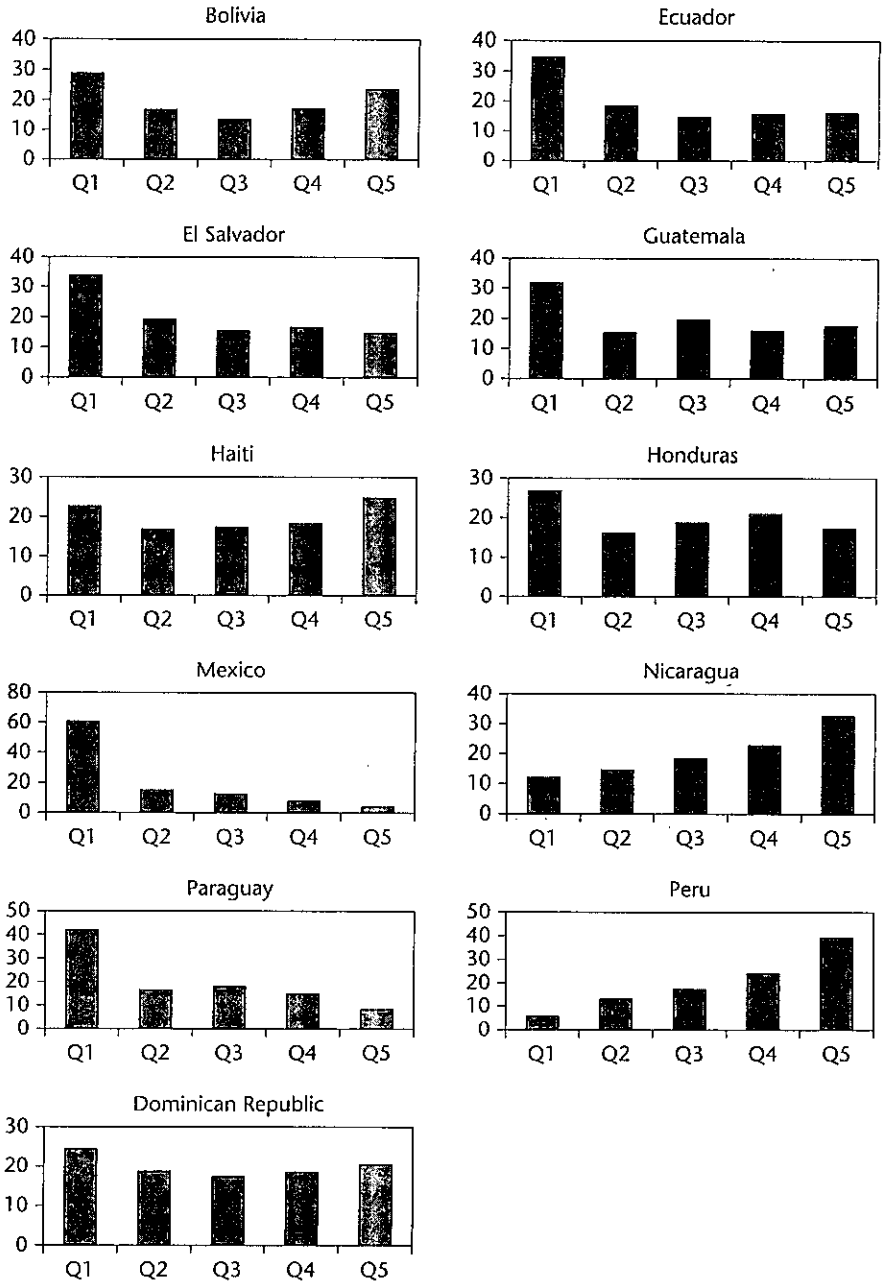
In Peru and Nicaragua, for example, the distribution of remittances recipients across households is completely different. In Peru less than 6 percent of the households that receive remittances belong to the lowest quintile, whereas 40 percent belong to the top quintile. Similarly, in Nicaragua only 12 percent of the recipients are in the first quintile, whereas 33 percent belong to the fifth quintile. Thus, in these two countries, remittances appear to be flowing to the richest families. Note that the interaction of these figures with the share of total households receiving remittances in the country would imply that less than 0.2 percent of the Peruvian population is made up of relatively poor households—that is, households in the first quintile of the income distribution—that receive remittances, and less than 2 percent of Nicaraguan households are remittances recipients belonging to the lowest quintile. Thus, in these two countries, the poverty-reducing potential of remittances, even if assumed to be sufficient to raise each household above the poverty line, will be limited. Even in Mexico, where the majority of the households receiving remittances belong to the lowest quintile, households receiving remittances and belonging to the lowest quintile represent only 3 percent of the national population. This finding suggests the orders of magnitude revealed in the exercises below.

Three countries (Ecuador, El Salvador, and Guatemala) have recipients who tend to be in lower quintiles (although in a less dramatic way than recipients in Mexico and Paraguay). In four countries (Bolivia, Honduras, the Dominican Republic, and Haiti), remittances appear to be homogeneously distributed across the distribution of income, or exhibit a U-shaped distribution (that is, remittances flow more to the lowest and the highest quintiles than to middle quintiles). In two countries—El Salvador and Haiti—more than 5 percent of households are remittances recipients and belong to the lowest quintile.

Econometric Methodology

The data described above provide a firm basis for assessing the impact of remittances on poverty. First, these data allow mechanical comparisons of poverty rates calculated with remittances either excluded or included in total reported household

Figure 2.3. Households Receiving Remittances by Quintile of the Distribution of Nonremittances Income



Source: Authors' calculations using the last available household survey.

Note: The figure reports the percentage of households receiving remittances that fall in each of the five quintiles of the income distribution.

income. These basic comparisons, however, suffer from one important shortcoming, namely, that remittances are unlikely to be an exogenous transfer but rather a substitute for the home earnings that migrants would have had if they had not left their countries to work abroad. In fact, the nonremittances income reported by households with migrants cannot be considered a good representation of the situation of the family before migration. If the migrant had positive earnings before leaving the household, the household's total nonremittances income is likely to be lower after migration. Thus, estimating the effect of migration and remittances on poverty would require consideration of the counterfactual per capita income that the household would have had if the migrant had stayed at home; otherwise, the true impact of migration and remittances on poverty reduction would be overstated.

To address this issue, Acosta et al. (forthcoming) calculate per capita household income for migrant households in the counterfactual scenario of no remittances and no migration. Clearly, this approach requires information about the income of the household before the migrant left, and this information is in general not available directly from household surveys. As an alternative, Acosta et al. (forthcoming) infer the counterfactual per capita income levels for those households with remittances on the basis of a reduced-form specification for the determinants of income among households without remittances. More formally, this approach involves estimating a model like

$$\log Y_i = \alpha + \beta X_i + \gamma H_i + \mu_i, \tag{1}$$

where Y_i represents per capita nonremittances income, X_i is a vector of household characteristics (demographic and location covariates), H_i is a set of characteristics of the household head, and μ_i represents random shocks and possible unobserved heterogeneity in income generation. Equation (1) can be estimated using the subsample of households that receive no remittances. The estimated coefficients then allow prediction of the counterfactual nonmigration income for remittances-receiving households. Given the absence of information on migrant characteristics for all but two countries (Haiti and Nicaragua) considered here, some basic assumptions about the number and the demographics of migrants are necessary. Following Rodriguez (1998) and Acosta et al. (forthcoming), this study assumes that, on average, a single adult male family member sends remittances. The study also assumes that this member's education is equal to the average years of education of other adults in the household.

Ordinary least squares (OLS) estimates of equation (1) will be inconsistent if μ_i is not independently identically distributed. In other words, if migrants are not randomly selected from the pool of households, estimates of equation (1) based on the sample of households without migrants could suffer from selection bias. To control for this possibility, a variable that represents the household's "propensity to neither migrate nor receive remittances" (M_i^*) is added to equation (1). This new term is calculated in the context of the two-step estimation framework proposed by Heckman (1979). The study adopts the following model specification:

$$M_i^* = \alpha_1 + \beta_1 X_i + \gamma_1 H_i + \omega Z_i + \nu_i \tag{2}$$

(no remittances selection rule)

$$\log Y_i = \alpha_2 + \beta_2 X_i + \gamma_2 H_i + \theta \lambda_i + \varepsilon_i \tag{3}$$

(earnings equation for nonrecipient households).

In practice, only the sign of the variable M_i^*, which represents the selection rule for whether or not the household receives remittances (which in turn is equivalent to a negative or positive value for M_i^*), is observable. Identification of this model requires an exclusion restriction: a set of variables Z_i that are related to the migration and remittances choice but that do not directly affect earnings for households with nonmigrants. The term λ_i is the selection inverse Mill's ratio, defined as

$$\lambda_i = \frac{\phi(\alpha_1 + \beta_1 X_i + \gamma_1 H_i + \omega Z_i)}{1 - \Phi(\alpha_1 + \beta_1 X_i + \gamma_1 H_i + \omega Z_i)},$$

with

$$\theta \lambda_i = E(\nu_i / \mu_i > -\beta_1 X_i - \gamma_1 H_i - \omega Z_i),$$

where μ_i is the error component in the earning equations, and $\theta = \text{cov}(\nu_i, \mu_i)/\sqrt{\text{var}(\mu_i)}$. Controlling for λ_i allows the remaining unexplained component ε_i to have the usual desirable independently identically distributed properties. If λ_i is a significant predictor of earnings, selection into the nonmigration status is indeed correlated with factors that affect household earnings, and OLS estimates of equation (1) would be inconsistent.

The exclusion restrictions on the nonremittances selection equation are an index of household assets, the percentage of households that receive remittances in the respective county of residence (a proxy for the presence of migrant networks), and their interaction. When county-level indicators cannot be calculated (as for Guatemala and Haiti), the variable that represents the percentage of households with migrants is measured at the department/province level. In this case, only the interaction of that variable with the household assets index is included. Finally, when information on household assets is missing (as for Bolivia, Ecuador,

and Honduras), the network variable is interacted with the number of adult males, which ensures variability at the household level.[4]

With the above-noted assumption concerning migrant characteristics, these coefficients are used to impute the counterfactual nonremittances per capita household income for recipient households. With this variable, the levels of poverty and inequality that would have prevailed had migration and remittances not occurred can be calculated. It must be noted, however, that, as Rodriguez (1998) mentions, the variance of the counterfactual income predicted on the basis of observable household characteristics is artificially small, because it ignores unobserved determinants of income.

A potential solution proposed by Barham and Boucher (1998) is to add to the predicted household income a random error component drawn from a distribution with the same properties (mean, variance) as the actual estimated errors. This approach yields 1,000 estimates of the imputed counterfactual nonremittances income for households with migrants, and the same number of estimates for the poverty and inequality levels that would have prevailed in the above-noted counterfactual scenario. Thus this chapter can report not only point estimates for those variables, but also 95 percent confidence intervals based on the 25th and 975th estimates of the variables sorted in ascending order.

Results

This section begins with a review of the estimates corresponding to the two-step model described in equations (2) and (3), which are reported in tables 2.2 and 2.3. Unlike the studies in Barham and Boucher (1998) and Adams (2006), this study finds λ_i to be positive and significant at the 1 percent level in all cases except that of Ecuador, an indication that recipients of remittances are not randomly selected from the complete pool of households. Moreover, this result suggests that households with a lower propensity to migrate are also more likely to have higher per capita income levels, which is consistent with the standard migration argument that potential migrants compare the returns at home and in their potential destination when deciding whether to work abroad.

The remaining coefficients have the expected signs. In the selection equation, larger households (particularly those with a higher number of adult males) are more likely to receive remittances (or migrate). On the other hand, the number of children and adult females is negatively related to the likelihood of migration and remittances receipts. Higher educational levels are negatively related to remittances, except in Haiti and Honduras (where education has the opposite sign). The presence of migrant networks, proxied by the percentage of households with remittances in the area of residence, and a household wealth index

Table 2.2. Two-Step Estimates of Nonrecipient Households' Income

Variables	Mexico	Guatemala	El Salvador	Paraguay	Honduras	Dom. Rep.	Bolivia	Ecuador	Haiti	Peru	Nicaragua
Household size	−0.102***	−0.113***	−0.214***	−0.087***	−0.125***	−0.166***	−0.088**	−0.134***	−0.296***	−0.141***	−0.205***
	(0.015)	(0.039)	(0.021)	(0.026)	(0.020)	(0.035)	(0.042)	(0.017)	(0.043)	(0.013)	(0.045)
Number of children 0–5 years old	−0.146***	−0.055	0.024	−0.175***	−0.089***	−0.070*	−0.129**	−0.102***	0.032	−0.076***	0.007
	(0.017)	(0.042)	[illegible]	(0.029)	(0.021)	(0.038)	(0.046)	(0.019)	(0.048)	(0.015)	(0.049)
Number of boys 6–15 years old	−0.100***	−0.031	0.033	−0.121***	−0.045**	−0.043	−0.121**	−0.068***	0.161***	−0.049***	0.062
	(0.017)	(0.042)	(0.023)	(0.028)	(0.021)	(0.038)	(0.046)	(0.019)	(0.047)	(0.014)	(0.048)
Number of girls 6–15 years old	−0.108	−0.042	[illegible]	[illegible]	−0.033	0.050	−0.098**	−0.066***	0.128***	−0.046***	0.028
	(0.017)	(0.042)	(0.023)	(0.028)	(0.021)	(0.038)	(0.046)	(0.019)	(0.047)	(0.014)	(0.048)
Number of males 16–65 years old	0.041***	0.006	0.048**	0.061**	0.135***	0.103***	−0.034	0.183***	−0.161***	0.073***	0.147***
	(0.016)	(0.043)	(0.022)	(0.026)	(0.020)	(0.037)	(0.043)	(0.018)	(0.047)	(0.013)	(0.048)
Number of females 16–65 years old	[illegible]	[illegible]	[illegible]	[illegible]	0.087	[illegible]	0.009	0.065***	0.192***	0.082***	0.181***
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(0.043)	(0.018)	(0.045)	(0.013)	(0.047)
Rural area		−0.377***	−0.419***	−0.203***	−0.395***	−0.022	−0.687***	−0.332***	0.134***		−0.292***
		(0.031)	(0.018)	(0.020)	(0.015)	(0.023)	(0.030)	(0.015)	(0.049)		(0.037)
Avg. Adult Education ([illegible] 65 years old)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.056***	0.045***	0.016***	0.068***	0.065***
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(0.005)	(0.003)	[illegible]	[illegible]	(0.007)
Age (household head)	0.032***	0.043***	0.023***	0.000	0.011***	0.042***	0.018***	0.011***	0.019***	0.011***	0.017***
	(0.002)	(0.006)	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)	(0.003)	(0.006)	(0.002)	(0.006)
Age squared × 100 (household head)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	−0.008	−0.007***	−0.024***	−0.002	−0.015**
	[illegible]	[illegible]	[illegible]	(0.004)	[illegible]	[illegible]	[illegible]	(0.003)	(0.006)	[illegible]	(0.006)
Years of education (household head)	0.042***	0.038***	0.030***	0.051***	0.036***	0.014***	0.047***	0.045***	0.029***	0.027***	0.020***
	(0.002)	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.002)	(0.007)	(0.002)	(0.006)

(Table continues on the following page.)

Table 2.2. (Continued)

Variables	Mexico	Guatemala	El Salvador	Paraguay	Honduras	Dom. Rep.	Bolivia	Ecuador	Haiti	Peru	Nicaragua
Lambda	0.379***	2.245***	0.915***	0.457***	0.300***	0.600***	0.382**	0.128	1.575***	1.333***	0.718***
	(0.045)	(0.184)	(0.049)	(0.132)	(0.060)	(0.068)	(0.152)	(0.090)	(0.140)	(0.076)	(0.114)
[illegible]											
Observations	15130	6529	12201	9031	19052	7507	5289	17446	5267	17897	3445
[illegible]											

Source: Authors.

Note: The table reports results from auxiliary regressions using Heckman's two-step procedure. The dependent variable is the log of per capita household income.

*Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Table 2.3. Two-Step Estimates of Nonrecipient Households' Income: First-Step Results of Auxiliary Regressions

Variables	Mexico	Guatemala	El Salvador	Paraguay	Honduras	Dom. Rep.	Bolivia	Ecuador	Haiti	Peru	Nicaragua
Household size (HH)	−0.145***	−0.002	−0.280***	−0.254***	−0.248***	−0.194***	−0.423***	−0.065	−0.235***	−0.106	−0.095
	(0.053)	(0.072)	(0.031)	(0.062)	(0.035)	(0.051)	(0.095)	(0.049)	(0.047)	(0.066)	(0.076)
Number of children 0–5 years old	0.105*	[illegible]	0.288***	0.264***	[illegible]	[illegible]	[illegible]	[illegible]	0.235***	[illegible]	0.137*
	(0.060)	[illegible]	(0.036)	(0.074)	[illegible]	[illegible]	[illegible]	[illegible]	(0.053)	[illegible]	(0.085)
Number of boys 6–15 years old	0.150**	−0.027	0.258***	0.228***	0.216***	0.181***	0.484***	0.019	0.247***	0.057	0.089
	(0.060)	(0.078)	(0.036)	(0.071)	(0.038)	(0.057)	(0.108)	(0.055)	(0.052)	(0.078)	(0.082)
Number of girls 6–15 years old	0.159***	−0.052	0.235***	0.236***	0.184***	0.190***	0.434***	−0.020	0.235***	0.066	0.109
	(0.060)	[illegible]	(0.036)	(0.070)	[illegible]	[illegible]	[illegible]	[illegible]	(0.052)	[illegible]	(0.083)
Number of males 16–65 years old	−0.379***	−0.412***	−0.306***	−0.123*	−0.080*	−0.509***	−0.059	−0.194***	−0.330***	−0.265***	−0.369***
	(0.055)	(0.074)	(0.033)	(0.064)	(0.042)	(0.053)	(0.105)	(0.054)	(0.048)	(0.068)	(0.080)
Number of females 16–65 years old	0.130**	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.176**
	(0.060)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(0.052)	[illegible]	(0.078)
Rural Area		−0.114*	−0.164***	0.174***	0.168***	0.061	0.307***	0.178***	−0.184***		0.097
		(0.066)	(0.034)	(0.066)	(0.031)	(0.040)	(0.097)	(0.045)	(0.055)		(0.076)
Age squared of adults (16–65 years old)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Age (household head)	0.035***	0.080***	0.059***	0.031***	0.039***	0.077***	0.048***	0.034***	0.030***	0.045***	0.017
	(0.009)	(0.010)	(0.005)	(0.010)	(0.005)	(0.007)	(0.014)	(0.007)	(0.006)	(0.012)	(0.012)
Age squared (household head)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(Table continues on the following page.)

Table 2.3. (Continued)

Variables	Mexico	Guatemala	El Salvador	Paraguay	Honduras	Dom. Rep.	Bolivia	Ecuador	Haiti	Peru	Nicaragua
Years of Education (household head)	0.040*** (0.007)	0.036*** (0.011)	0.015*** (0.005)	0.013 (0.010)	−0.003 (0.005)	−0.031*** (0.006)	−0.046*** (0.011)	−0.013* (0.007)	−0.008 (0.007)	−0.019** (0.008)	−0.028*** (0.010)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
% Remittances - Recipient households in County or Province	−3.790*** (0.151)		−3.568*** (0.199)	−6.072*** (0.540)	−3.071*** (0.331)	−2.960*** (0.220)	−3.455*** (1.258)	−5.898*** (1.006)		−8.845*** (0.659)	−3.663*** (0.351)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
% Remittances Recipient Households * Number 16–65 males					−0.915*** (0.163)		−2.668*** (0.732)	−4.395*** (0.615)			
Department/ province indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16134	7009	15285	9400	21412	9565	5492	18188	7043	18226	4041
Pseudo R-squared	0.355	0.1091	0.2465	0.2111	0.1935	0.2782	0.2837	0.1085	0.2363	0.3031	0.2661

Source: Authors.

Note: The dependent variable is the indicator of households not receiving remittances.

*Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

also appear to be positively and significantly correlated with the likelihood of receipt of remittances. In the earnings equation, as expected, education and demographic characteristics are strongly significant predictors of income in nonrecipient households; they explain between 33 and 55 percent of income variability, depending on the case.

The results of the study's poverty simulations are reported in tables 2.4–2.7. As noted above, the analysis is based on headcount poverty indexes, and it employs four poverty lines. Tables 2.4 and 2.5 reflect internationally comparable poverty lines of $1 and $2 per person per day, measured at PPP (purchasing power parity) values, which correspond respectively to "extreme" and "moderate" poverty rates. Tables 2.6 and 2.7 reflect analysis based on nationally defined "extreme" and "moderate" poverty lines. Readers interested in country comparisons should probably be more concerned with the results of tables 2.4 and 2.5, whereas readers interested in a specific country should focus on tables 2.6 and 2.7.

Before proceeding, it must be noted that Schiff (2006) has proposed to complement the analysis of the effect of remittances on national poverty rates with estimates of remittances' impact on the poverty rate prevailing among the subset of households that receive remittances. The point is that although the impact of remittances on national poverty levels may be limited, the impact on the poverty status of the households with migrants could be much larger; therefore, this restricted analysis can highlight interesting facts for the corresponding subgroup of the population. Thus, the tables below also report poverty effects using Schiff's approach.

Each table has two panels. Panel A reports (1) the national headcount poverty rate according to the relevant poverty line and (2) the poverty rate prevailing among households receiving remittances. Panel B reports (1) the difference between the national poverty rate calculated using nonremittance household income and the observed poverty rate; (2) the same calculation as in (1) for the specific sample of remittances recipient households; (3) the difference between the national poverty rate calculated using counterfactual household income scenario—with no migration and no remittances—corrected for selectivity and changes in household size; (4) the same calculation as in (3) for the specific sample of remittance recipient households.[5]

The first element to note in this analysis is that nationally defined poverty lines tend to yield higher poverty rates than those based on the PPP-adjusted $1 and $2 lines. This finding reflects the fact that countries tend to use more inclusive definitions of poverty (in the sense that more people qualify). These differences between nationally and internationally defined poverty lines are such that *extreme* poverty rates calculated on the basis of local poverty lines tend to be higher than the corresponding internationally defined *moderate* poverty rates (that is, $2 per day).

Table 2.4. Impact of Remittances on Headcount Poverty ($1 PPP)

Panel A: Observed poverty rates		
Country	All households (1)	Recipient HHs (2)
Bolivia	17.8	8.6
Ecuador	11.2	3.0
Guatemala	21.6	10.3
Honduras	16.2	2.8
Nicaragua	8.3	4.7
Peru	4.2	0.0

Panel B: Estimated poverty effects of remittances with and without adjustment for lost income				
Country	Without adjustment (all HHs) (1)	Without adjustment (recipient HHs) (2)	With adjustment (all HHs) (3)	With adjustment (recipient HHs) (4)
Bolivia	−0.6	−18.5	−0.2 (−0.4; −0.1)	−6.7 (−11.6; −1.8)
Ecuador	−1.3	−20.0	−0.3 (−0.4; −0.2)	−4.4 (−5.8; −3.0)
Guatemala	−2.2	−23.5	−1.0 (−1.3; −0.7)	−10.7 (−14.0; −7.4)
Honduras	−2.5	−23.2	−0.6 (−0.7; −0.5)	−5.5 (−6.5; −4.5)
Nicaragua	−0.5	−2.9	0.0 (−0.1; 0.1)	0.1 (−0.7; 0.9)
Peru	0.0	−0.7	0.0 (0.0; 0.0)	−0.4 (−0.7; 0.0)

Source: Authors.

Notes: PPP = purchasing power parity. HH = households.

Table 2.5. Impact of Remittances on Headcount Poverty ($2 PPP)

Panel A: Observed poverty rates		
Country	All households (1)	Recipient HHs (2)
Bolivia	34.7	22.2
Ecuador	27.2	10.9
Guatemala	39.1	21.3
Honduras	31.7	10.1
Nicaragua	22.6	13.4
Peru	15.5	0.8

Panel B: Estimated poverty effects of remittances with and without adjustment for lost income				
Country	Without adjustment (all HHs) (1)	Without adjustment (recipient HHs) (2)	With adjustment (all HHs) (3)	With adjustment (recipient HHs) (4)
Bolivia	−0.6	−17.1	−0.4 (−0.6; −0.1)	−10.6 (−17.0; −4.2)
Ecuador	−1.7	−25.7	−0.8 (−0.9; −0.6)	−12.0 (−14.5; −9.6)
Guatemala	−2.2	−23.4	−1.6 (−2.0; −1.3)	−17.0 (−20.9; −13.2)
Honduras	−3.0	−27.9	−1.5 (−1.7; −1.4)	−13.8 (−15.3; −12.3)
Nicaragua	−0.9	−5.7	−0.3 (−0.5; −0.1)	−2.0 (−3.4; −0.6)
Peru	−0.1	−5.2	0.0 (−0.1; 0.0)	−0.6 (−1.7; 0.5)

Source: Authors.

Table 2.6. Impact of Remittances on Headcount Poverty (Nationally Defined Extreme Poverty Line)

Panel A: Observed poverty rates		
Country	All households (1)	Recipient HHs (2)
Bolivia	37.5	26.4
Ecuador	25.8	10.4
Guatemala	32.1	18.8
Honduras	36.0	13.5
Nicaragua	34.3	18.3
Peru	22.9	1.8

Panel B: Estimated poverty effects of remittances with and without adjustment for lost income				
Country	Without adjustment (all HHs) (1)	Without adjustment (recipient HHs) (2)	With adjustment (all HHs) (3)	With adjustment (recipient HHs) (4)
Bolivia	−0.6	−17.5	−0.3 (−0.5; −0.1)	−9.2 (−15.8; −2.6)
Ecuador	−1.7	−25.8	−0.7 (−0.9; −0.6)	−11.1 (−13.4; −8.8)
Guatemala	−2.0	−21.3	−1.3 (−1.6; −0.9)	−13.3 (−17.1; −9.5)
Honduras	−3.1	−28.3	−1.7 (−1.8; −1.5)	−15.1 (−16.6; −13.6)
Nicaragua	−0.8	−5.2	−0.2 (−0.5; 0.0)	−1.6 (−3.2; 0.0)
Peru	−0.2	−6.7	0.0 (−0.1; 0.0)	−1.1 (−2.6; −0.5)

Source: Authors.

Note: HH = households.

Table 2.7. Impact of Remittances on Headcount Poverty (Nationally Defined Moderate Poverty Line)

Panel A: Observed poverty rates		
Country	All households (1)	Recipient HHs (2)
Bolivia	61.3	44.9
Dominican Republic	50.0	37.7
Ecuador	52.6	32.0
El Salvador	38.7	32.8
Guatemala	58.8	44.6
Haiti	94.5	88.1
Honduras	57.0	34.2
Mexico	23.0	15.7
Nicaragua	58.9	37.2
Paraguay	37.0	15.2
Peru	43.7	9.2

Panel B: Estimated poverty effects of remittances with and without adjustment for lost income				
Country	Without adjustment (all HHs) (1)	Without adjustment (recipient HHs) (2)	With adjustment (all HHs) (3)	With adjustment (recipient HHs) (4)
Bolivia	−0.5	−15.2	−0.4 (−0.7; −0.2)	−7.2 (−11.7; −2.8)
Dominican Republic	−4.0	−17.4	−0.8 (−1.2; −0.3)	−3.8 (−5.3; −1.3)
Ecuador	−1.8	−27.8	−1.0 (−1.2; −0.8)	−15.4 (−18.5; −12.3)
El Salvador	−4.3	−22.3	−1.3 (−1.6; −1.0)	−6.7 (−8.3; −5.0)
Guatemala	−1.8	−18.3	−0.9 (−1.3; −0.5)	−9.2 (−13.1; −5.3)
Haiti	−2.0	−7.3	−0.4 (−0.8; 0.1)	−1.4 (−3.1; 0.3)
Honduras	−3.0	−27.2	−2.1 (−2.3; −1.9)	−19.1 (−20.7; −17.5)
Mexico	−2.0	−13.7	0.1 (−0.1; 0.3)	−1.5 (−2.5; −0.5)
Nicaragua	−0.8	−5.4	−0.7 (−1.0; −0.4)	−4.3 (−6.2; −2.4)
Paraguay	−0.7	−4.7	−0.2 (−0.4; 0.1)	−1.3 (−3.0; 0.4)
Peru	−0.4	−13.5	−0.1 (−0.2; 0.0)	−3.0 (−5.9; −0.1)

Source: Authors.

Unsurprisingly, use of one or another set of poverty lines produces results that from a numerical point of view can vary significantly for each country.

Also noteworthy is the fact that poverty rates observed among households with migrants tend to be lower than poverty rates found in the general population. In Peru and Nicaragua, for instance, national poverty levels based on the $2 poverty line had been estimated at nearly 16 and 27 percent, respectively, but they are close to 1 and 13 percent, respectively, among recipients of remittances. Other countries where households with migrants are considerably less likely to be poor than the average household in the country include Bolivia, Ecuador, Guatemala, Haiti, and Honduras. The exception to this rule is Mexico, where regardless of the poverty line being considered, poverty rates are higher among households receiving remittances than in the general population.

As for the impact of remittances on poverty, column (1) in panel B of tables 2.4–2.7 reports the absolute change in poverty rates, measured in percentage points, when remittances are added to the other components of household income, without taking into consideration possible reductions in household income following the migration of family members. This column allows comparison of observed poverty rates with rates prevailing in a counterfactual scenario in which migration occurred but no money was remitted to family members left behind. With this approach, the results suggest that remittances cause reductions in moderate and extreme poverty headcounts (using national and international poverty lines). These reductions range from 2 to 7 percentage points in the Dominican Republic, Guatemala, Honduras, Haiti, El Salvador, and Mexico. This finding does not come as a surprise in the last two countries, where households with migrants tend to come from the lowest quintiles of the income distribution.

In contrast to the above results, the estimated reductions in poverty due to remittances receipts become much lower when observed poverty rates are compared with poverty rates prevailing in a less simplistic scenario in which neither remittances nor migration are present. Thus, the results in column (3) of panel B in the tables suggest that, given the demographic characteristics of recipient households, the income of households in the event of no migration would have been higher than observed nonremittances income. As a result, the poverty-reducing effects of remittances become much smaller. For El Salvador, Guatemala, and Honduras, reductions in poverty headcounts are estimated at between 1 and 2 percentage points, and in Haiti the reductions are between 3 and 4 percentage points in three of four cases. The effects are even smaller for other countries. Moreover, in the case of Mexico, remittances either have no significant poverty-reducing effect or are tied to a small increase of 0.1 percentage points in poverty rates.[6]

Establishing a common pattern to describe the countries where the largest poverty reductions are obtained is no trivial task. The position of migrants' households in the income distribution appears to play a role, as is illustrated by the fact that neither Peru nor Nicaragua—where remittances tend to flow to households in the highest income quintiles—are in the group of countries where the highest reductions in poverty rates are obtained. However, the countries where the largest shares of recipients are found to be in the bottom quintiles—Mexico and Paraguay—do not belong to that group either. One possible explanation is that, in these two countries, the share of remittances-receiving households is relatively low—5.8 and 3.8 percent of the population, respectively—and so is the dollar amount of remittances received by households, as measured by the share of those flows in GDP—1.6 and 3.5 percent, respectively. Moreover, remittances per household as a proportion of the country's per capita income are among the lowest in Mexico: 47 percent, compared with 140 percent on average among the five above-mentioned countries where the highest reductions in poverty are obtained.

As the last column of tables 2.4–2.7 illustrates, the poverty-reducing effects of remittances on the prevalence of poverty are larger in the subset of the population made up of recipient households. In Bolivia, Ecuador, Guatemala, Haiti, and Honduras, moderate poverty rates in that specific subgroup of the population are found to fall by between 10 and 17 percentage points, when using international poverty lines. Thus, even if the impact of remittances on national poverty rates is found to be relatively modest in most countries, remittances appear to have an important poverty-reducing effect on the pool of poor households with migrants.

Remittances and Human Capital

The previous section explored the effects of remittances on household income and poverty. Remittances can also affect the long-term welfare of recipients by influencing human capital formation. Exploring the latter phenomenon is important for at least two reasons. First, analysis of the effects of remittances on recipient households' health and educational outcomes could complement analysis of the monetary dimensions of poverty. Second, through effects on human capital, remittances could have lagged effects on household income and, consequently, on monetarily defined poverty indexes. For example, if children in recipient households accumulate more (or better) human capital than otherwise similar children, remittances could also be expected to positively affect long-run economic growth and, hence, long-run poverty levels. This section explores these issues.

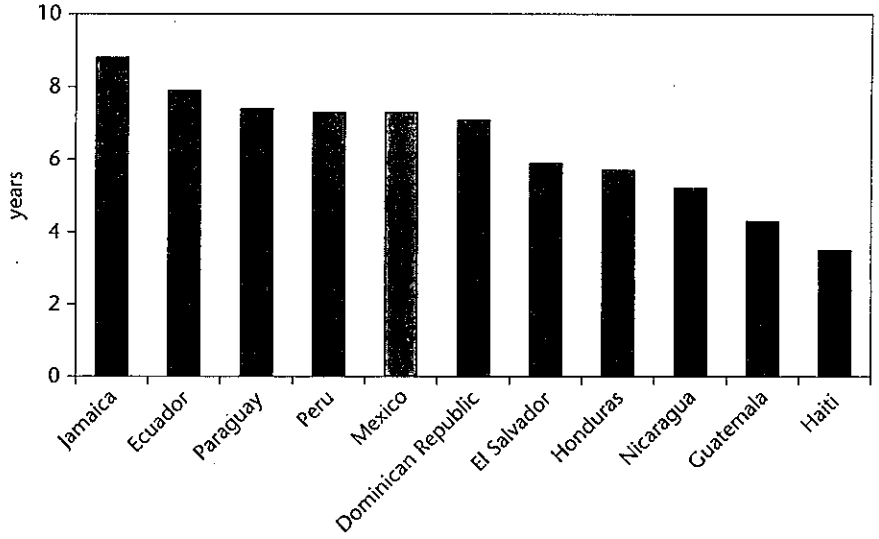
Educational Attainment

The net impact of migration and remittances on human capital accumulation is a priori unclear. On the one hand, migrant remittances can help overcome borrowing constraints that limit poor households' physical and human capital investments. On the other hand, migration of household members that precedes the receipt of remittances can have disruptive effects on family life, with potentially negative consequences for children's educational attainment. Moreover, to the extent that in destination countries most migrants tend to work in occupations requiring limited schooling, the returns from investments in education may be lower for those envisaging international migration than for those not envisioning migration, and these lower returns could tend to reduce the schooling of children in migrants' households. Similarly, migration can put pressure on wages in the home country, raising the opportunity cost of not working for older children. In any case, the direction of the relationship between remittances and child education depends on the idiosyncratic characteristics of each country.

Evidence on the impact of remittances on education in Latin America and the Caribbean is restricted to Mexico and El Salvador. Hanson and Woodruff (2003) find that remittances are associated with higher educational attainment in rural Mexico, in particular among 10- to 15-year-old girls whose mothers have low educational levels. Lopez-Cordova (2005) shows that higher remittance flows are associated with lower illiteracy rates in Mexican municipalities, but the evidence on the impact on school attendance is mixed: the effect is positive for 5 year olds, becomes insignificant among 6 to 14 year olds, and is negative for 15 to 17 year olds. Again with reference to Mexico, McKenzie and Rapoport (2006) show that children age 16 to 18 from households with migrants exhibit lower educational attainment levels; they also show that this negative effect is larger for children whose mothers have higher levels of schooling. In the case of El Salvador, Cox-Edwards and Ureta (2003) show that children from remittances-receiving households are less likely to drop out of school, a finding that they attribute to the relaxation of budget constraints affecting poor recipient households. Acosta (2006) shows that this result is stronger for girls and younger boys than for other children in this country.

Can previous literature findings apply to other countries in the region with significant remittances flows and available micro data (the Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, and Peru)?[7] Disparities in secondary enrollment rates in Latin America and the Caribbean range from about 80 percent in countries such as Chile and Argentina to less than 50 percent in countries like Mexico, El Salvador, the Dominican Republic, Nicaragua, Honduras, Guatemala, and Haiti (figure 2.4), which are also among the region's top receivers of international remittances.

Figure 2.4. Average Years of Education for Adults Age 22 to 65

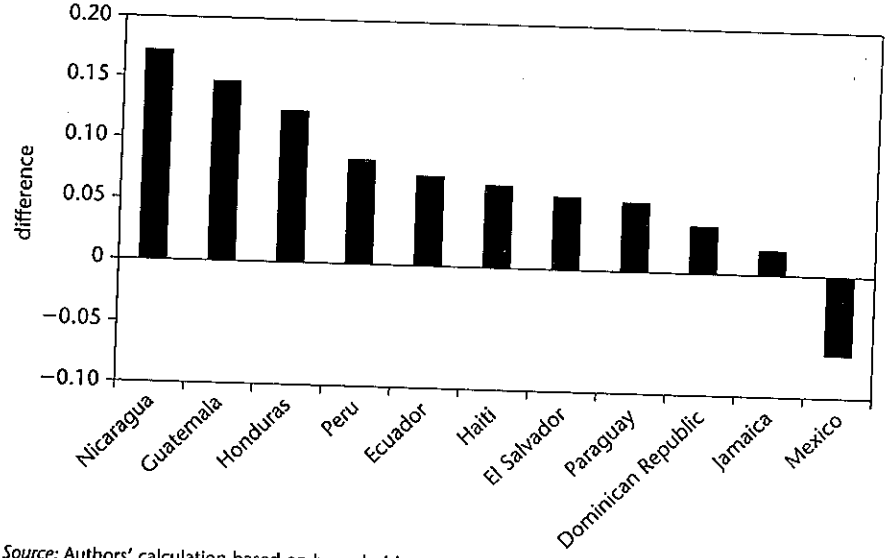


Source: Authors' calculations based on household surveys.

The claim that remittances could potentially have an important effect on education, by overcoming borrowing constraints and allowing increased investment in children's education, is illustrated by the comparison of enrollment rates among children age 12 to 17 across recipient and nonrecipient households (figure 2.5). With the one exception of Mexico, children from households reporting remittances are more likely to stay in school. The largest differences are obtained for Nicaragua, Guatemala, and Honduras, where enrollment rates are between 12 and 17 percent higher for recipient households than for nonrecipient households.

Of course, some of these differences could be attributed to the fact that households receiving remittances can be systematically different from their nonrecipient counterparts. Thus, it is necessary to control for observable demographic differences to test the robustness of the estimated effects of remittances on human capital. In addition, to assess the effect of remittances *and migration,* the human capital of recipients ideally should be compared to that of households that had similar levels of income before migration. In this respect, the study can use the above-noted estimates of the income of recipient households in that counterfactual scenario to compare the educational attainment of the children in those households with that of children of other households with similar social and economic conditions—alongside observed demographics—before migration. In particular, following a

Figure 2.5. Differences in School Enrollment Rates for 12–17 Year Olds by Remittances Recipient Status



Source: Authors' calculation based on household surveys.

specification close to that in Hanson and Woodruff (2003), equation (4) is estimated for children age 10 to 15 years old. Different estimations vary by gender and area of residence (urban and rural).

$$E_i = \alpha + \beta X_i + \gamma M_i + \lambda C_i + \delta R_i + \varepsilon_i, \qquad (4)$$

where E_i represents the number of school grades completed by child i, and X_i is a vector of child and household characteristics (age of the child, a dummy for the child being the oldest child in the household, indicators for the number of children of different ages in the household, the presence of a zero- to five-year-old child, and family home ownership), including quintile indicators for the counterfactual income that migrant households would have had in the absence of migration. These quintiles are constructed by ranking households according to per capita income levels, after inputting counterfactual incomes for households reporting positive remittances according to the procedure described in previous chapter sections.[8] Equation (4) also includes a set, M_i, of characteristics of the child's mother (indicators for mother's education, marital status, and head-of-household status and a quartic in mother's age). C_i represents community characteristics (the proportion of households with sanitary services in the county of residence, the proportion of household heads working in agricultural activities in the county of residence, and state/province indicators). R_i is a dummy variable for households that receive remittances (the sample also includes nonrecipients), and ε_i is a random error. Table 2.8 presents regression estimates for the δ coefficient on the main variable of interest, R_i.

Table 2.8. Access to Remittances and Children's Education: OLS

Age group	10–15 years old			
Dependent variable	Accumulated schooling			
	Rural		Urban	
Country	Boys	Girls	Boys	Girls
Mexico	−0.149 (0.129)	0.113 (0.095)	−0.023 (0.177)	−0.235 (0.192)
El Salvador				
Guatemala	0.448** (0.177)	0.313* (0.164)	0.291 (0.230)	0.454** (0.177)
Honduras				
Ecuador	0.187 (0.149)	0.112 (0.151)	0.289** (0.125)	0.314** (0.134)
Peru				
Haiti			0.098 (0.107)	0.244** (0.098)
Paraguay				
Nicaragua[1]	0.437*** (0.153)	0.375*** (0.133)		
Jamaica				
Dominican Republic[1]	0.077 (0.107)	0.118 (0.094)		

Source: Authors' calculations based on household surveys.

Note: The set of controls includes the age of the child; a dummy for the child being the oldest in the household; indicators for mother's education, marital status, and head-of-household status, and a quartic in mother's age; indicators for the number of children of different ages in the household and the presence of a child zero to five years old; family home ownership; counterfactual income quintiles; the proportion of households with sanitary services in the county of residence; the proportion of household heads working in agricultural activities in the county of residence; and state/province indicators.

1. Rural and urban areas together.

***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.

The results suggest that "access to remittances" is positively and significantly associated with higher educational attainment in 6 of 11 countries, the exceptions being Mexico, Paraguay, Peru, Jamaica, and the Dominican Republic. The estimated positive impact of remittances varies by gender and across rural and urban areas—for example, in Ecuador an impact is found only for urban areas. Because the actual amount remitted is likely to have a differential impact, depending on the magnitude of the transfer, the analysis is replicated to examine the impact of the per capita value of remittances received by the household. Given this alternative measure for remittances, the results suggest that higher flows increase schooling in the Dominican Republic and among boys in urban Mexico.

A potential methodological concern associated with the above results is that unobserved household characteristics that affect households' propensity to have migrants and receive remittances could drive decisions to keep children in school. The present study attempted to use instruments to address this simultaneity bias but failed to find ones that are sufficiently correlated with the migration status of households and yet do not otherwise affect the educational attainment of children. Some variables—such as the fraction of households that receive remittances in the county and that fraction's interaction with household characteristics—have passed standard specification tests for instrumental variables, but because the size of the sample of children age 10 to 15 is relatively small, coefficients and standard errors increased considerably in comparison with ordinary least squares. This finding led the study to focus on the latter and to rely on the assumption that controlling for parental schooling reduces the effect of unobservable household characteristics linked to human capital investments and migration—for example, how much households value human capital.

As noted above, previous evidence on Mexico has suggested that the positive effects of remittances on schooling vary with the educational attainment of parents (Hanson and Woodruff 2003; McKenzie and Rapoport 2006); these effects are generally larger when parents' educational attainment is low. Differential effects of this sort could be due to the fact that among poorer households—with lower levels of adult schooling—remittances could have a more sizable effect in terms of relaxing budget constraints that keep children out of school. But remittances could have a smaller impact on education when the schooling of parents is low if less educated parents prefer noneducational expenditures to educational expenditures. To find out which effect dominates, the study re-estimates equation (4) by adding an interaction term between remittances (R_i) and a variable that indicates whether the mother has four or more years of education. Table 2.9 reports the corresponding results.

The findings confirm those of previous papers on Mexico, suggesting that the positive effect of remittances on education tends to be larger when parents'

Table 2.9. Remittances and Children's Education by Mother's Education

Age group		10–15 years old			
Dependent variable		Accumulated schooling			
		Rural		Urban	
Country	Variable	Boys	Girls	Boys	Girls
Mexico	Receive remittances	−0.082	0.329**	−0.041	−0.573
		(0.192)	(0.141)	(0.329)	(0.553)
	Receive remittances*	−0.144	−0.417**	0.024	0.461
	Mother educ. 4 years or more	(0.240)	(0.186)	(0.378)	(0.577)
El Salvador	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	Receive remittances*	−0.116	0.229	−0.203	0.297
	Mother educ. 4 years or more	(0.212)	(0.176)	(0.197)	(0.206)
Guatemala	Receive remittances	0.482**	0.223	0.412	1.109***
		(0.200)	(0.186)	(0.337)	(0.231)
	Receive remittances*	−0.179	0.450	−0.323	−1.336***
	Mother educ. 4 years or more	(0.389)	(0.318)	(0.408)	(0.315)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ecuador	Receive remittances	0.278	−0.106	0.502	0.805*
		(0.233)	(0.237)	(0.331)	(0.463)
	Receive remittances*	−0.138	0.386	−0.239	−0.547
	Mother educ. 4 years or more	(0.277)	(0.287)	(0.344)	(0.475)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

(Table continues on the following page.)

Table 2.9. (Continued)

Age group		10–15 years old			
Dependent variable		Accumulated schooling			
		Rural		Urban	
Country	Variable	Boys	Girls	Boys	Girls
Haiti	Receive remittances			0.043	0.273**
				(0.120)	(0.111)
	Receive remittances* Mother educ. 4 years or more			0.229	−0.111
				(0.237)	(0.220)
Nicaragua[1]	Receive remittances	0.577**	0.554**		
		(0.260)	(0.221)		
	Receive remittances* Mother educ. 4 years or more	−0.208	−0.296		
		(0.310)	(0.258)		
Dom. Rep.[1]	Receive remittances	−0.148	0.301		
		(0.242)	(0.208)		
	Receive remittances* Mother educ. 4 years or more	0.282	−0.242		
		(0.263)	(0.230)		

Source: Authors' calculations based on household surveys.

Note: Regressions include the same set of controls as in table 2.8.

1. Rural and urban areas together.

***Significant at 1% level. **Significant at 5% level. *Significant at 10% level.

schooling is low. For instance, among rural girls in Mexico, Paraguay, and Peru,[9] the present study's previous results suggested no effect of remittances on educational attainment, but now the study identifies a positive and significant effect for children whose mothers have at most three years of educational attainment; for the remaining children, the study estimates the effect to be close to zero, although slightly negative in Mexico and Paraguay. Similarly, in Guatemala and Honduras, some of the previously estimated positive effects of remittances are now found to be larger in magnitude for children with uneducated mothers and considerably smaller for those whose mothers have at least four years of schooling.

Overall, with the addition of Paraguay and Peru to the list of countries where remittances affect educational attainment, only two countries (Jamaica and the Dominican Republic) are left in which the effects of remittances on educational attainment always insignificant. As for the differences by gender and urban status, the study's estimation results allow no easy generalizations and suggest that the various potential effects of migration and remittances—relaxation of budget constraints, social disruption, and changes in the returns of schooling—carry different relative weights, depending on the country and socioeconomic group involved. In any case, it appears that remittances tend to relax budget constraints that otherwise would have forced children to leave school and reduce their educational attainment, but this effect is sometimes restricted to children with less educated mothers.

Health Outcomes

Few papers have addressed the impact of migration and remittances on child health, and the exceptions are mostly focused on infant mortality. For instance, Brockerhoff (1990) and Ssengonzi, De Jong, and Stokes (2002) investigate the effects of female migration on child survival chances in Senegal and Uganda, respectively. They find that rural-to-urban migration significantly increases child survival chances. Kanaiaupuni and Donato (1999) analyze the effects of village migration and remittances on infant survival outcomes in Mexico and conclude that remittances reduce infant mortality. However, the authors reach the opposite conclusion for the effect of migration: communities experiencing intense migration have higher rates of infant mortality than communities with less intense migration. Finally, using data on Mexican municipalities, Lopez-Cordova (2005) concludes that larger proportions of remittances and migrant households at the community level are associated with lower infant mortality rates.

In the case of Mexico, Hildebrandt and McKenzie (2005) provide evidence on migration's impact on other child health outcomes. Their results show that migrant households have lower rates of infant mortality and higher birth weights

than nonmigrant households. Moreover, they find evidence that migration also raises maternal health knowledge and the likelihood that children are delivered by a doctor. On the other hand, children from migrant households appear to be less likely to receive preventive health care (breastfeeding, visits to doctors, and vaccinations).

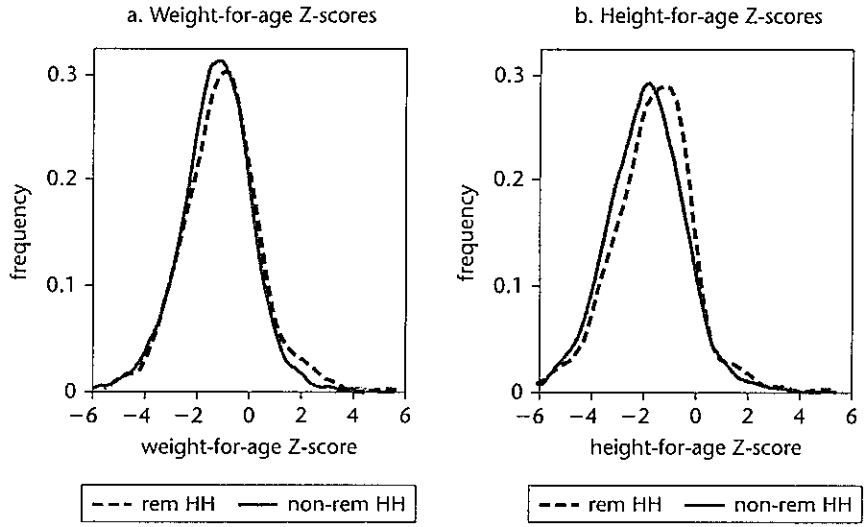
No previous study has investigated the impact of remittances and migration on young children's anthropometric indicators (weight for age and height for age), which are considered to be important measures of the health dimension of human capital accumulation and which are extensively cited in the literature of health economics. For instance, Hoddinott and Kinsey (2001) show that external shocks drastically affect child growth in developing countries. In medicine, the consensus is that weight and height are good indicators of health status and that each has different consequences in the short and long run. For instance, lower weight is usually associated with malnutrition and higher mortality risk, and lower stature in childhood is strongly correlated with lower body size in adulthood, which has negative consequences for earnings and productivity (Thomas and Strauss 1997), and with increased risk of cardiovascular and lung diseases.

This section assesses the effect of international migrant remittances on anthropometric health indicators that are typically used in the health literature and that are known to be linked with child growth. In addition, it estimates the impact of remittances on other health measures, such as those addressed in Hildebrandt and McKenzie (2005), including the probability that the delivery of children born in the year preceding the survey was assisted by a doctor and the probability that children age two to five received the complete set of required vaccinations. The anthropometric measures on which the present study focuses are the weight-for-age and height-for-age Z-scores (WAZ and HAZ) for children age one to five. These standardized measures of performance in weight and height consist of a comparison of each child of a given age to a reference group. The reference tables for WAZ and HAZ are taken from the U.S. Centers for Disease Control (CDC) growth charts for the United States (Kuczmarski et al. 2000).[10] The following formula is used for calculating the Z-scores:

$$Z = \frac{\left[\left(\frac{X}{M}\right)^{L} - 1\right]}{LS}, \tag{5}$$

where X is the measure of interest (weight, height) for the child, M is the median of the corresponding variable, S is the generalized coefficient of variation, and L is the power in the Box-Cox transformation taken from the CDC reference tables for a given age group. To avoid extreme values and outliers due to misreporting, the

Figure 2.6. Anthropometric Measures for Children Age one to five, by Remittances Recipient Status: Guatemala



Source: Authors' calculations based on household surveys.

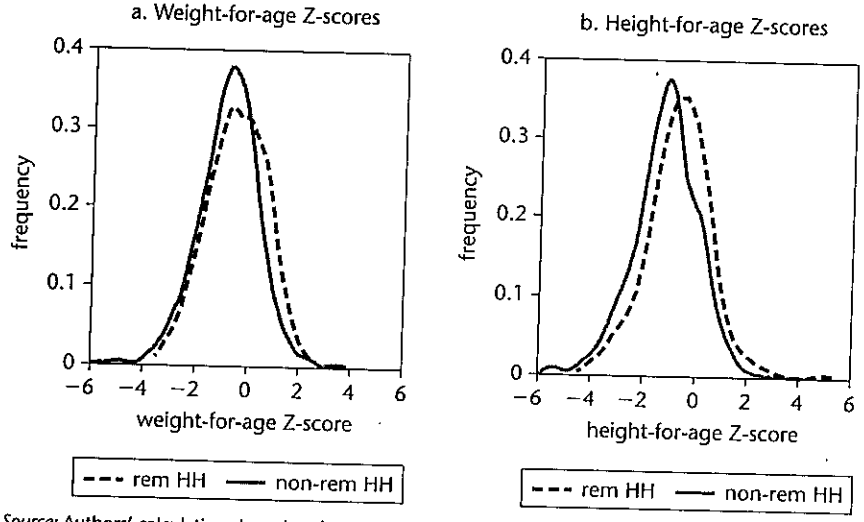
Notes: rem = ? non-rem = ? HH = households.

study follows Hoddinott and Kinsey's (2001) recommendation to drop children with Z-scores greater than 6 or lower than −6. The original reference tables account for children of 1.5, 2.5, 3.5 months, and so on; to match the present study's data, the reference months are rounded up (that is, 1.5 months in the reference table are equal to 2 months).[11]

Figures 2.6 and 2.7 show the distribution of weight-for-age and height-for-age anthropometric Z-scores for Guatemala and Nicaragua, the only two Latin American countries for which the available household surveys provide the information needed to calculate the health indicators (weight and height of young children) employed in this section. The study used kernel densities to estimate plot densities of the above-described anthropometric indicators for children age one to five years old from remittance recipient and nonrecipient households. The figures show that children from recipient households have both higher WAZ and HAZ. Kolmogorov-Smirnov tests reject the equality of distributions for recipient and nonrecipient households and suggest that remittances are in fact associated with higher anthropometric scores for children.

To test whether these results are driven by the differential characteristics of households with and without migrants, the study estimates a regression model similar to the one used for educational attainment—equation (4)—changing only

Figure 2.7. Anthropometric Measures for Children Age one to five, by Remittances Recipient Status: Nicaragua



Source: Authors' calculations based on household surveys.

the dependent variable, from years of schooling to the four health indicators measured above. In addition to this basic specification, the study estimates a modified version of equation (4) in which the indicator for remittances recipients is interacted with a dummy variable for the second quintile of the income distribution—using the counterfactual income before migration—and a dummy for households located in the third, fourth, and fifth quintiles.[12]

Table 2.10 reports the corresponding results, including the coefficients on free-standing dummy variables for the second, third, fourth, and fifth income quintiles. As confirmed by the study's estimates, both weight-for-age and height-for-age indexes tend to increase monotonically and significantly with household income, as does the likelihood of doctor-assisted deliveries in the case of Nicaragua. Moreover, controlling for premigration income, children from households receiving remittances tend to exhibit better health outcomes than children from nonrecipient households with similar demographic and socioeconomic characteristics. The relatively small sample sizes make most of the estimated interactives between remittances and income quintiles insignificant from a statistical point of view, but in most cases the results clearly indicate that the impact of remittances on children's health is concentrated in low-income households in the first quintile of the income distribution.

Table 2.10. Remittances and Health Outcomes

Country	Guatemala				Nicaragua			
Dependent variable	Weight-for-age Z-score	Height-for-age Z-score	Received all vaccines	Child delivered by doctor	Weight-for-age Z-score	Height-for-age Z-score	Received all vaccines	Child delivered by doctor
Remittances	0.211**	0.213	0.065**	0.255***	0.306	0.289	0.119	0.297**
	(0.089)	(0.228)	(0.021)	(0.160)	(0.394)	(0.347)	(0.225)	(0.090)
Remittances Q2	−0.324	−0.084	−0.082	−0.034***	−0.370	−0.079	−0.054	−0.463
	(0.283)	(0.264)	(0.079)	(0.007)	(0.457)	(0.421)	(0.275)	(0.25)
Remittances Q3-Q4-Q5*	−0.423	0.004	−0.041	−0.036***	−0.252	−0.148	0.071	−0.623***
	(0.272)	(0.253)	(0.071)	(0.006)	(0.418)	(0.385)	(0.252)	(0.114)
Q2								
Q3	0.233***	0.385**	0.016	0.054***	0.077	0.327***	−0.011	0.085
	(0.060)	(0.067)	(0.013)	(0.025)	(0.099)	(0.109)	(0.054)	(0.070)
Q4								
Q5	0.594***	0.686**	0.026	0.013	0.352**	0.594***	−0.102	0.263**
	(0.091)	(0.098)	(0.018)	(0.025)	(0.138)	(0.136)	(0.078)	(0.082)

Source: Authors' calculations based on household surveys.

Note: Regressions include the controls reflected in table 2.5.

***Significant at the 1% level. **Significant at the 5% level. *Significant at the 10% level.

Conclusion

This chapter explores the development impact of remittances in 11 Latin American countries and yields four major findings. First, in general, remittances appear to lower poverty levels in recipient countries. This result is robust to the use of counterfactual scenarios that input the potential contribution that the migrant may have made at home. Second, the estimated impact of remittances on poverty nevertheless tends to be modest in all the experiments performed. Clearly, when the counterfactual scenario is one of no migration, the result is even more modest than when the counterfactual is one of no remittances. Third, country heterogeneity in the results is significant. Factors that may lead to a particular outcome in a given country include the percentage of households receiving remittances, the share of those with remittances belonging to the lowest quintiles of the income distribution, and the dollar amount of remittances with respect to GDP. Fourth, although remittances appear to increase the educational attainment of children in some specific groups—defined by country, gender, and urban status—the impact is often restricted to children with low levels of parental schooling. Thus, once again, the positive development impact of remittances must be qualified. In the case of health outcomes, the results are restricted to two countries—Nicaragua and Guatemala—in both of which remittances appear to improve children's health, particularly in low-income households.

Notes

1. For comprehensive reviews, see IMF (2005), World Bank (2006), and IDB (2005), all of which examine the economic and development implications of remittances and migration.

2. The literature has also focused on the impact of remittances on other economic variables and measures of development. See, for example, Yang (2006) for the impact of remittances on intertemporal consumption smoothing, Ruiz-Arranz and Giuliano (2005) on growth, Amuedo-Dorantes and Pozo (2004) on risk management, Cox-Edwards and Ureta (2003) and Hanson and Woodruff (2003) on education, Rodriguez and Tiongson (2001) on labor supply, Woodruff and Zenteno (2007) on entrepreneurship, and Amuedo-Dorantes and Pozo (2004) and Rajan and Subramanian (2005) on external competitiveness.

3. For example, Deaton (2005) estimates that, on average, survey income is less than 60 percent of GDP and discusses the reasons for discrepancies between survey- and national accounts-based estimates.

4. The percentage of households receiving remittances in the same county (or province) is a proxy for migration networks at the county (province) levels. Previous literature has used migration networks as instruments for migration and remittances to assess their impact on development outcomes (Hanson and Woodruff 2003; Lopez-Cordova 2005; Acosta 2006; Acosta et al. 2006; Woodruff and Zenteno 2007). In the countries under analysis, the correlation between the fraction of recipient households in each county or province and the per capita income of nonrecipient households in the same area is not significantly different from 0 in 9 of 11 cases (where it varies from −0.038 to 0.043) and is still very low in the other two cases (0.14 in Haiti and 0.16 in Peru).

5. The results presented in the last two columns of panel B in tables 2.4–2.7 are preferred estimates. However, estimated poverty effects of remittances calculated without correcting for selectivity or changes in household size are available from the authors on request. Those results may be relevant for readers interested in assessing the separate impact on those results based on counterfactual income estimates of correcting first for selectivity and second for changes in household size.

6. The (very small) poverty-increasing remittances effects obtained for Mexico suggest that remittances do not compensate for the fall in income associated with migration. This result is to some extent counterintuitive and could be due to the presence of unobserved characteristics that reduce households' income-generation capacity and increase their willingness to migrate—for example, persistent unemployment and failing crops. If this negative selection into migration driven by unobservable household characteristics prevails over positive selection effects, households' counterfactual income before migration could be overestimated. An alternative explanation could be linked to the possible underreporting of remittances income.

7. Bolivia is excluded due to limited observations of children from remittances-receiving households. Jamaica, which was not included in the previous section due to the lack of nonremittances income data in the corresponding survey, is included in the analysis of educational attainment.

8. Because nonremittances income information is lacking in the survey, the regressions for Jamaica control for quintiles in counterfactual expenditure per capita rather than for income per capita.

9. In the case of Peru, the sample includes both urban and rural children to achieve sufficient variation.

10. Reference tables can be found at www.cdc.gov/nchs/about/major/nhanes/growthcharts/datafiles.htm.

11. For WAZ, the original tables used are the "Weight-for-age charts, birth to 36 months" for children from 0 to 36 months. For older children, values were extrapolated using the "Weight-for-age charts, 2 to 20 years." Similarly, for HAZ the reference tables used are "Length-for-age charts, birth to 36 months" for children from 0 to 36 months and "Stature-for-age charts, 2 to 20 years" for older children.

12. The third, fourth, and fifth quintiles are grouped due to the relatively small sample size for some of the estimations.

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DOES WORK MIGRATION SPUR INVESTMENT IN ORIGIN COMMUNITIES? ENTREPRENEURSHIP, SCHOOLING, AND CHILD HEALTH IN RURAL PAKISTAN

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Recent debates on "feasible globalization" have focused on the importance of opening international labor markets to low-skilled guest workers from developing countries. Some researchers argue that income gains from such a liberalization of labor markets would be large and could contribute significantly to a reduction in inequalities of wealth and opportunity, both within and across countries. Key to this view is the expectation that migrant remittances will fuel private investments in both physical and human capital in origin communities.

This chapter examines whether the investment choices of migrant households are indeed different from those of comparable nonmigrant households. The data come from rural Pakistan, where temporary work migration is substantial; more than one in four rural households report at least one migrant. Several aspects of work migration in rural Pakistan make it a particularly useful context for examining outcomes in a sending community. First, work migration is undertaken almost entirely by relatively young men who typically remain closely attached to their origin households and communities, returning frequently and sending substantial and regular remittances to their homes.[1] Second, migrants come largely