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The impact of remittances on human development outcomes in Ecuador

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Abstract

This paper analyzes the impact of remittances on education, health and consumption outcomes in Ecuador. We use local dispersion in bank density as source of exogenous variation. Although we find positive impacts on consumption, and on education and health expenditures, we find no significant effects on education and health outcomes. Regarding education, we find that children receiving remittances have a higher probability of attending private schools. In relation to health, people receiving remittances buy more medicines and are likely have better medical treatment in case of illness.

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1. Introduction

Ecuador has recorded migration flows for several decades. However, the financial crisis in 1999 triggered an important wave of migration, especially to Spain, resulting in a sharp increase in the flow of remittances to Ecuador at the beginning of this decade. According to official data by the Central Bank of Ecuador, remittances are the second largest source of foreign income in Ecuador after oil exports.

At the international level, most studies find some positive effects of remittances on human development variables as well as on short-term poverty. According to the World Bank (2006), remittances tend to reduce poverty, have a weak impact on inequality, and lead to higher household expenditures on health and education. More precisely, Adams and Page (2005) estimate the impact of migration and remittances on inequality and poverty for 71 countries and find that a 10% increase in remittances reduces the proportion of individuals living below the poverty line by 3.5%.[2]

In the same vein, Acosta *et al.* (2007b) find that remittances reduce poverty in Latin America. Every 1% increase in remittances as a proportion of GDP leads to a 0.37% poverty reduction in this region. However, the impact on poverty varies from country to country and depends on initial levels of income inequality. On the basis of balance-of-payments data and national household surveys, Acosta *et al.* (2007a) evaluate the impact of remittances on poverty, education, and health in eleven Latin American countries[3] and conclude that a moderate but positive impact on poverty reduction does

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[2] The impact found on poverty reduction is stronger than that of a previous analysis which concluded that, on average, a 10% increase in the share of international remittances in a country's GDP could lead to a 1.6% decline in the share of people living in poverty (Adams and Page, 2003).
[3] Bolivia, Dominican Republic, Guatemala, Haiti, Honduras, Ecuador, El Salvador, Mexico, Nicaragua, Paraguay, and Peru.

exist. The authors also observe strong regional heterogeneity regarding this impact.[4]

Fajnzylber and López (2007) come to the same conclusion: remittances have a positive but weak impact on poverty reduction, equality, growth, and investment. Acosta *et al.* (2008) find a positive impact on education expenditures and enrollment rates, as well as on health spending, and on anthropometric indicators in the lowest quintiles in El Salvador, Guatemala, Peru, Nicaragua, and the Dominican Republic. However, results for Mexico prove insignificant, while a positive impact on savings is seen among the lowest income groups throughout the region as a whole. On the other hand, López-Córdova (2006) finds positive results for Mexico, where infant mortality and child illiteracy (ages 6 to 14) decline as a consequence of remittances. Inter-American Dialogue (2007) finds signs of an impact on poverty by flows from the United States to Latin America –including improved diets and housing conditions– partly due to a concentration of remittances in low-income rural households. Gosh (2006) points out that the majority of migrants are non-poor. Therefore, Gosh sees an indirect link (if any) with poverty reduction in migrants' home countries, as a consequence of the spillover effect of flows received by non-poor migrants' relatives. The same report does acknowledge the existence of poor households among recipients, as well as the capacity of collective remittances to improve infrastructure in hometown communities. However, poor people are a minority of remittance recipients.

Other papers find a positive influence of remittances on education outcomes in some countries. See for instance Cox, Edwards, and Ureta (2003), or Acosta (2007), for analyses of El Salvador, or Yang (2004) for analysis of the Philippines.

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[4] Heterogeneity of results is frequently mentioned in remittance and migration literature (see also Fajnzylber and López, 2007). This feature shows the deficiencies inherent in cross-country approaches, reinforcing the need for case-by-case country studies.

In the case of Ecuador the current literature does not arrive to clear conclusions. Acosta *et al.* (2007a) find a weak impact of remittances on poverty reduction at the national level, but a significant impact for households that receive remittances. The same study observes a positive impact on education, and specifically on years of accumulated schooling, although this is limited to urban areas. The study also acknowledges a weaker impact by remittances on development in Ecuador, as compared to other countries analyzed therein. Calero *et al.* (2008) find similar results. In Ecuador, remittances have a positive effect on both school enrollment and child labor, especially among girls in rural areas. In addition, Pacheco (2007) finds no significant effects by remittances on students' cognitive achievement among children from rural areas. Guerrero (2007) finds no significant effects by remittances on health spending. According to Acosta *et al.* (2006), remittances might have helped 5% of Ecuador's population out of poverty between 2001 and 2002.

This paper evaluates the impact of remittances on human development variables in Ecuador with special emphasis on education and health outcomes. Resource constraints and imperfect capital markets play a notable role in households' decisions concerning investment in children's human capital in Ecuador. By reducing financial constraints, remittances can promote human capital investment.

The paper is organised as follows. The next section presents the data used for this analysis. Section 3 shows the country background and some stylised facts of remittances in Ecuador. Section 4 introduces the identification strategy. Section 5 presents and discusses our empirical findings. The final section concludes.

2. Data

Data come from the Living Standard Measurement Survey of 2006 (*Encuesta de Condiciones de Vida*, 2006) collected by the National Office of Statistics of Ecuador (INEC). The Ecuadorian survey has the same structure as other LSMS. It includes a complete list of all household members, and a consumption module that allows us to differentiate items such as food, education, health, housing, etc. In addition, the survey has information on education, health, and nutrition such as access to school, school attendance, child malnutrition, access to health services, childhood diseases, and so on. The survey also includes information at the household level: housing conditions, expenditures on housing, and some additional infrastructural variables, as well as some assets of the household. However the information provided about remittances is rather limited. It only contains information about the amount received, the country of origin, and some aggregated categories of the use of remittances.

The sample has a stratified multiphase design where the first level is given by the strata; within each stratum housings were selected, and in each housing one household was interviewed. The sample sise is 55,666 individuals corresponding to 13,581 households. From this total, 2,782 persons declared to have received remittances during the last twelve months.

To fill the lack of information about remittances, we selected a sub-sample (with national representation) of 937 cases and re-interviewed their households to obtain additional information on the characteristics of the migrant; the links between the remittance sender and the recipient; the amount, frequency, and transfer mechanisms; detailed information on the end-uses of remittances, and the access of recipients to financial services. The households were selected from cities absorbing the highest

proportions of remittances, and include 8 out of 22 provinces[5]. The information collected on the transfer mechanisms is relevant to our identification strategy.

3. Country background and features of remittances

Ecuador is a lower-middle income country, characterised by high levels of poverty and inequality.[6] During 1999 the country experienced one of the biggest financial crises in its history, and as a consequence GDP decreased by 9% in per-capita terms, and the unemployment rate rose to around 17%. As a result, the number of migrants increased considerably as well as the amount of remittances received by the country. Today remittances represent the second source of foreign resources amounting around 6% of the GDP[7].

According to the INEC data collected in 2006, remittances are distributed among quintiles as shown in Table 1.[8] The two richest quintiles (4 and 5) obtain more than 77% of total remittances in 2006. These results are consistent with analyses of the patterns of Ecuadorian migration – migrants are not from the poorest groups (López and Villamar, 2004)–, and with a previous study on the income distribution of remittances in the Andean country (Acosta *et al.* 2006).

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[5] The selected provinces are the bigger provinces in Ecuador and include Pichincha, Guayas, Azuay, Esmeraldas, Cañar, El Oro, Loja, and Tungurahua.

[6] In 2004, per capita GDP in constant 2000 prices was US$ 1,435. Based on the 2001 population census, and using the criteria of unmet basic needs, poverty was estimated to be at around 61 percent while based on the 1999, Living Standards Measurement Survey, the consumption Gini coefficient was 0.47.

[7] This is the proportion of remittances according to the Central Bank of Ecuador. Alternative official sources such as the National Office of Statistics of Ecuador (INEC) show a much lower figure.

[8] The aim of this section is simply to present figures on the distribution of remittances among actual income groups. In this regard we are not interested, in this paper, in the real impact of remittances on income distribution. For this reason, no counterfactuals (*à la* Acosta *et al.* (2008b)) are provided.

Table 2 shows the main uses of remittances by income quintiles. Remittances are mainly used to buy food (44% of the total), and this is more prominent among the poorer households. The second heading, education, accounts for 18% of total remittances. After debt reimbursement (which ranks third), health is the fourth most important use of remittances, accounting for almost 8%. The remaining eight options – clothes, housing, others, savings, vehicles, special occasions, electrical appliances, and investing in a business– collectively absorb only 22% of the flow.

Spending on health and education may contribute to development, in the medium and long term, through human capital formation and poverty reduction. These two headings account for 26% of total remittances by end-uses. The proportion dedicated to education increases in quintiles 2 and 3 (at 19.61% and 18.99%, respectively) relative to quintile 1 (at 11.48%). This result is consistent with the results obtained in the section containing the impact evaluation.

The proportion of health spending relative to the total volume of remittances spent increases with income: quintile 1 spends 1.92% of total remittances on health, while quintile 5 spends almost 11%.

4. Identification strategy

Remittances received by households are potentially endogenous. Unobserved heterogeneity associated with the amount of remittances received can be related to human capital decisions. There may even be reverse causality if households consider migration and remittances as an explicit means of funding human capital accumulation

of their children. In this regard, using OLS would generate biased and inconsistent estimates.

To evaluate the impact of remittances we take advantage of the fact that migrants receive remittances through formal banks and money-transfer companies. Using the data annexed to the Living Standard Measurement Survey (LSMS), we found that individuals receiving remittances preferentially use the institutions reported in Table 3, which differentiates banks and money-transfer companies. The formal banks most often used to receive transfers are: Banco Bolivariano, Servipagos, Banco del Pichincha, Banco de Guayaquil, Banco del Austro, and Produbanco. These account for 90% of total remittances received through the formal banking system. At the same time, Delgado Travel, Western Union, and Money Gram account for 87% of total of remittances received through money-transfer companies. In this regard, the probability of receiving remittances will be higher among those living in a parish where any of these financial intermediaries are located. We assume that the presence of these institutions is not related to the outcome variables used in the following models. One potential problem with our instrument is that the availability of banks and/or money-transfer companies could be correlated with the local economic environment. To address this concern we include parish level variables, as well as cantonal fixed effects.

We will estimate several forms of the following equation, where Y_i is the outcome variable:

$$Y_i = \delta R_i + X_i \beta + u_i \qquad (1)$$

We will evaluate the effect of remittances on several aspects of human development, such as school enrollment for children aged 6 to 15; child malnutrition; prevalence of respiratory diseases and diarrhea among children aged under 5; and access to health

services among those who were sick during the two weeks prior to data collection. In addition, we will evaluate the impact on certain areas of consumption: log of per capita consumption; log of consumption of food; log of education expenditures; log of health expenditures, and so on. X_i is a vector of individual, household, and community (parish) level characteristics. R_i is the treatment variable and refers to the monthly amount of remittances received by the household. Our parameter of interest is δ.

We use three different specifications. The first specification only includes the amount of remittances received by the household (the treatment variable). Specification two includes, in addition, individual and household variables: sex and age at the individual level; and age, sex, schooling level, and dummy variables for self-defined ethnicity for the head of household. Finally, the third specification includes parochial-level variables (average years of schooling, per capita income) as well as cantonal dummies (around 240); this last specification being the most complete and the main specification used in our analysis.

To address potential biases caused by the endogeneity of the treatment variable (R_i), we apply an instrumental-variables approach where the amount of remittances received is instrumented by an indicator that takes value of 1 if the parish has any of the banks or money-transfer enterprises reported in Table 3, and zero otherwise. This means that we will estimate a first-stage equation in which the endogenous variable R in equation (1) is instrumented by the presence (or lack) of transmission institutions at parish level (Z). Therefore, the identifying assumption is that $E(Z_i \cdot u_i \mid X_i) = 0$.

In addition to equation (1) we also present results from reduced-form estimations. This equation has a specification similar to equation (1), except that R is replaced by Z.

Such instrumental-variables estimates apply only to those whose likelihood of receiving remittances was affected by the instrument (that is, by the presence or absence of banks or money-transfer institutions). These are called "compliers", following Angrist *et al.* (1996), and cannot be easily identified from the data without additional assumptions (Angrist *et al.*, 2004), though they may have characteristics that make their outcome variables particularly sensitive to transfers.

5. Results

The first thing that must be established is the first-stage effect of the availability of money-transfer institutions on the amount of remittances. Using the same three specifications mentioned above we find that the presence of money-transfer institutions has a significant and positive association with the amount of remittances. The coefficient remains positive and significant through all three specifications. Having a money-transfer institution in the parish increases the amount of remittances by around US$8 per month (see Table 4). In all cases the F test for the instrument is significant.

Table 5 reports OLS, reduced form and 2SLS estimates for our preferred specification.[9] We do not find any significant effect of remittances on school enrolment, prevalence of child malnutrition, prevalence of respiratory diseases, prevalence of diarrhea, access to health services and food consumption. However, we do find significant and positive effects on log of consumption, and log of education and health expenditures. In the case of consumption, two-stage results show that increasing the amount of remittances by US$10 each month increases the general per capita

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[9] As already mentioned the most complete specification is specification 3, which includes variables at parish level as well as cantonal fixed effects. Appendix 1, 2 and 3 present OLS, reduced form and 2SLS estimates respectively for all specifications.

consumption by around 9%. Regarding education, increasing the amount of remittances by US$10 increases education spending by 18%. Regarding health, increasing the amount of remittances by US$10 increases health spending by 25%.

c*) What do they do with the money?*

Although we find significant and positive effects on education and health expenditures, we have not found significant effects on long term variables of human development. The main question that arises is how this increase in expenditure is used. In the case of education we explore the possibility of transferring children from public to private schools. In fact, we find that remittances increase the probability of attending private schools. Table 6 shows that increasing the amount of remittances by US$10 increases the probability of attending private schools by 6%. Migrating from public to private school could have a positive effect on students' cognitive achievement. However, comparison of test score results for private and public schools reveals no strong differences. Table 7 shows the results of cognitive tests for the third, seventh and tenth grades in both language and mathematics. In general, Ecuador has a serious problem related to students' cognitive achievements. Out of 20 possible points, a mark of at least 13 was required to pass on to the next level. On average, a majority of students fail each school grade. Although differences do exist between private and public schools, the performance of private schools, while better than that of public schools, is still insufficient to pass the grade.

In the case of health, however, we find no significant effects of remittances on the probability of having private health insurance, nor on the probability of using private

health centers when sick (Table 6). However, we do find significant and positive differences in buying medicines (Table 6). In Ecuador, during 2006, those who became ill and received some treatment in public health centers had to buy medicines at their own expense. Because some medicines are quite expensive, some people did not complete their treatment. Therefore, the positive impact on medicines could be associated with the possibility of receiving complete medical treatment.

d) Is it a matter of time?

Perhaps the failure to find significant impacts of remittances on human development outcome variables is due to the time it takes for a change in consumption or other expenditure to materialise as human development improvements. Using the data appended to the LSMS we get an idea of the length of time during which people have been receiving remittances. Table 8 shows the results by quintiles of income. On average, people in Ecuador have been receiving remittances for about six years. Approximately 85% of people who receive remittances in Ecuador have been receiving them for more than three years, and only 15% for less than three years. While this could be sufficient time to yield some positive effects on human capital variables, we cannot yet observe significant differences in human capital outcome variables.

Conclusions

This paper evaluates the impact of remittances on human development variables using an instrumental variables approach. Although we do not find significant impact on

long-term human development outcome variables, we find that remittances have an impact on consumption and, more precisely, on education and health expenditures. In addition, we find significant effects of remittances on the transfer of children from public to private schools, although performance indicators of private schools register only slightly better than those of the public system. Finally, we find that people receiving remittances purchase more medicines and are more likely to undergo complete medical treatment when sick than those not receiving remittances.

We do not find evidence that these positive effects on short-term consumption generate positive effects on expanding people's long-term capabilities. How to create the proper condition to facilitate that the increase on short-term consumption creates conditions to expand the capabilities of people is an important challenge in policy terms.

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Table 1: Remittances by income distribution, Ecuador

	quintile 1	quintile 2	quintile 3	quintile 4	quintile 5
Remittances ($)	4,254,277	7,796,783	36,048,886	90,946,070	72,449,148
Remittances (% of total)	2.01	3.69	17.04	43.00	34.26

Source: INEC (*Encuesta de Condiciones de Vida)*

Table 2: Remittance uses by income distribution (2007, US$ and %)

	quintile 1	quintile 2	quintile 3	quintile 4	quintile 5	total
Housing and land (building, purchasing, or enlargement)	194,751	161,709	3,385,626	1,005,026	3,796,118	8,543,230
	(5.44) (a)	(2.45)	(8.78)	(1.68)	(5.89)	(4.93)
Electrical appliances and other home appliances	73,032	0	0	0	589,583	662,614
	(2.04)	(0)	(0)	(0)	(0.91)	(0.38)
Vehicle purchase	0	0	1,299,088	56,594	4,297,287	5,652,969
	(0)	(0)	(3.37)	(0.09)	(6.67)	(3.26)
Investment in a business	0	0	0	44,832	455,459	500,291
	(0)	(0)	(0)	(0.07)	(0.71)	(0.29)
Savings	90,264	166,400	1,733,833	1,192,711	3,089,772	6,272,981
	(2.52)	(2.52)	(4.50)	(1.99)	(4.79)	(3.62)
Food	2,174,026	4,128,947	17,641,136	29,093,679	22,367,541	75,405,329
	(60.67)	(62.44)	(45.74)	(48.53)	(34.71)	(43.55)
Clothes purchase	300,457	283,193	1,374,312	3,699,054	3,124,229	8,781,245
	(8.39)	(4.28)	(3.56)	(6.17)	(4.85)	(5.07)
Education	411,242	1,296,693	7,325,830	9,474,765	12,900,449	31,408,979
	(11.48)	(19.61)	(18.99)	(15.80)	(20.02)	(18.14)
Health	68,827	205,202	2,104,179	3,754,832	7,076,215	13,209,254
	(1.92)	(3.10)	(5.46)	(6.26)	(10.98)	(7.63)
Debt reimbursement (other than previous destinations)	76,903	0	1,883,711	8,764,530	3,663,276	14,388,420
	(2.15)	(0)	(4.88)	(14.62)	(5.68)	(8.31)
Special occasions (weddings, birthdays…)	29,802	26,092	408,146	151,914	228,454	844,408
	(0.83)	(0.39)	(1.06)	(0.25)	(0.35)	(0.49)

Other	163,773	344,524	1,413,580	2,715,547	2,855,242	7,492,666
	(4.57)	(5.21)	(3.67)	(4.53)	(4.43)	(4.33)
Total	3,583,077	6,612,760	38,569,441	59,953,484	64,443,625	173,162,386

(a) parentheses indicate %.

Source: Data collected by Real Instituto Elcano and FLACSO, INEC (*Encuesta de Condiciones de Vida*).

Table 3. Transfer mechanisms

Banks	valid percent	cumulative percent
Banco Bolivariano	39.9	39.9
Servipagos	26.9	66.8
Banco de Pichincha	7.1	73.9
Banco de Guayaquil	5.8	79.7
Banco Austro	5.7	85.4
Banco Produbanco	4.4	89.8
Transfer companies		
Delgado Travel	54.1	54.1
Western Union	26.3	80.5
Money Gram	6.9	87.3

Table 4. First-stage estimates

dep var: remittances	specification 1	specification 2	specification 3
Instrument	10.9235*	6.0283**	8.9622**
	(2.6465)	(2.4607)	(3.6976)
F-value for instrument	17.04*	6**	5.87**

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.

Table 5. Impact of remittances on human development variables

Dependent variable	OLS	Reduced form	2SLS
School enrolment	0.00005*	0.0203	0.0015
	(0.00001)	(0.0130)	(0.0011)
Prevalence of child malnutrition	0.00001	0.1176**	0.0183
	(0.0001)	(0.0603)	(0.0156)
Prevalence of respiratory diseases	-0.0002*	-0.0591***	-0.0097
	(0.00006)	(0.0333)	(0.0087)
Prevalence diarrhea	-0.00003	0.0600*	0.0099
	(0.00007)	(0.020)	(0.0075)
Access to health services	6.37E-06	0.0232*	0.0057
	(0.00001)	(0.0067)	(0.0073)
Log of consumption	0.0007*	0.0775*	0.0086**
	(0.0001)	(0.0287)	(0.0043)
Log of food expenditure	0.0004*	0.0208	0.0023
	(0.00006)	(0.0302)	(0.0034)
Log of education expenditure	0.0012*	0.2301*	0.0186***
	(0.0002)	(0.0859)	(0.0105)

Log of health expenditure	0.0011*	0.1894*	0.0256**
	(0.0002)	(0.0649)	(0.0129)

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.

Table 6. Impact of remittances on other variables

Dependent variable	OLS	Reduced form	2SLS
Enrolment on private schools	0.0002*	0.102*	0.006**
	(0.00007)	(0.0276)	(0.0025)
Use of private health centers	0.0001*	0.0046	0.0018
	(0.00004)	(0.0291)	(0.0114)
Private health insurance	0.00006	-0.0001	-0.0003
	(0.00004)	(0.0302)	(0.0702)
Medicine expenditure	0.001*	0.2351*	0.0405***
	(0.0001)	(0.0709)	(0.0251)

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.

Table 7. Test scores for students in Ecuador (out of 20).

Grade		3rd				7th				10th			
	Year	Total	Private Urban	Public Urban	Rural	Total	Private Urban	Public Urban	Rural	Total	Private Urban	Public Urban	Rural
Language	1996	10,4	12,4	10,2	8,7	11,2	13,4	10,7	9,4	12,9	14,3	12,2	12,0
	1997	8,2	n.a.	n.a.	n.a.	9,3	n.a.	n.a.	n.a.	11,2	n.a.	n.a.	n.a.
	2000	9,5	11,0	9,8	8,4	9,8	11,5	10,1	8,7	11,7	13,6	11,3	10,9
	2007	10,8	12,7	10,5	9,8	12,0	14,1	12,1	10,7	11,1	11,7	10,9	10,6
Mathematics	1996	9,3	10,9	9,0	8,1	7,2	8,3	7,0	6,3	7,3	8,6	6,7	6,7
	1997	7,2	n.a.	n.a.	n.a.	4,9	n.a.	n.a.	n.a.	5,4	n.a.	n.a.	n.a.
	2000	8,5	9,7	8,9	7,5	6,0	7,0	6,2	5,5	6,0	7,2	5,9	5,3
	2007	8,2	9,4	8,0	7,7	5,9	6,6	5,9	5,6	5,6	6,2	5,4	5,3

Source: Ministry of Education of Ecuador. Based on Aprendo. Several years.

Table 8. Length of time that people have been receiving remittances (percentage of total)

	less than 3	From 3 to 5	More than 5	Mean (years)
quintile 1	0.3%	0.7%	1.5%	4.9
quintile 2	2.3%	4.5%	1.0%	3.9
quintile 3	3.6%	12.7%	4.9%	5.0
quintile 4	3.4%	15.4%	14.1%	5.5
quintile 5	6.0%	13.5%	16.1%	6.9
Total	15.5%	46.9%	37.6%	5.7

Annex 1.

OLS estimates of remittances on several human development variables (Different specifications).

Dependent variable	Specific 1	Specific 2	Specific 3
School enrolment	0.00007*	0.00005*	0.00005*
	(0.00002)	(0.00001)	(0.00001)
Child malnutrition	0.0002	-0.0001	0.00001
	(0.0002)	(0.0001)	(0.0001)
Respiratory diseases	-0.0002*	-0.0002*	-0.0002*
	(0.00007)	(0.00007)	(0.00006)
Diarrhea	-0.0001	-0.00002	-0.00003
	(0.00007)	(0.00007)	(0.00007)
Access to health services	0.00001	9.2800E-06	6.37E-06
	(0.00001)	(0.00001)	(0.00001)
Log of consumption	0.001*	0.0008*	0.0007*
	(0.0001)	(0.0001)	(0.0001)
Log of food expenditure	0.0004*	0.0004*	0.0004*
	(0.00007)	(0.00007)	(0.00006)
Log of education expenditure	0.0019*	0.0016*	0.0012*
	(0.0002)	(0.0002)	(0.0002)
Log of health expenditure	0.0016*	0.0013*	0.0011*
	(0.0002)	(0.0002)	(0.0002)

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.

Annex 2.

Reduced form estimates of remittances on several human development variables (Different specifications)

Dependent variable	Specific 1	Specific 2	Specific 3
School enrolment	0.0655*	0.0329*	0.0203
	(0.0107)	(0.0101)	(0.0130)
Child malnutrition	0.4131*	0.1958*	0.1176**
	(0.0976)	(0.0706)	(0.0603)
Respiratory diseases	-0.0132	-0.0087	-0.0591***
	(0.0188)	(0.0200)	(0.0333)
Diarrhea	-0.0324*	0.0045	0.0600*
	(0.0156)	(0.0156)	(0.020)
Access to health services	0.0247*	0.0204*	0.0232*
	(0.0049)	(0.0049)	(0.0067)
Log of consumption	0.5193*	0.2722*	0.0775*
	(0.0572)	(0.0327)	(0.0287)
Log of food expenditure	0.1868*	0.1137*	0.0208
	(0.0321)	(0.0296)	(0.0302)
Log of education expenditure	1.1442*	0.6619*	0.2301*
	(0.1403)	(0.1060)	(0.0859)
Log of health expenditure	0.548*	0.2625*	0.1894*
	(0.0585)	(0.0490)	(0.0649)

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.

Annex 3.

2SLS estimates of remittances on several human development variables

(Different specifications)

Dependent variable	Specific 1	Specific 2	Specific 3
School enrolment	0.0066*	0.0077	0.0015
	(0.0028)	(0.0072)	(0.0011)
Child malnutrition	0.046*	0.0496	0.0183
	(0.015)	(0.0346)	(0.0156)
Respiratory diseases	-0.0014	-0.0021	-0.0097
	(0.0021)	(0.0049)	(0.0087)
Diarrhea	-0.0036*	0.0011	0.0099
	(0.0018)	(0.0039)	(0.0075)
Access to health services	0.0025*	0.0043*	0.0057
	(0.0008)	(0.0026)	(0.0073)
Log of consumption	0.0475*	0.0451*	0.0086**
	(0.0109)	(0.0173)	(0.0043)
Log of food expenditure	0.017*	0.0188*	0.0023
	(0.0043)	(0.0085)	(0.0034)
Log of education expenditure	0.1141**	0.1478	0.0186***
	(0.0451)	(0.1288)	(0.0105)

Log of health expenditure	0.0504*	0.0405*	0.0256**
	(0.0106)	(0.014)	(0.0129)

Standard errors in parentheses. Estimates corrected by heteroskedasticity and clustered at parish level.

*Significant at 1%, ** significant at 5%, *** significant at 10%.