

# Accounting for Remittance Effects on Children's Schooling and Child Labor

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April 10, 2015

## Abstract

*Conditional and unconditional transfers programs have been used as a mechanism to improve children's welfare. Unfortunately, not all the households in developing countries can access to this type of programs. This paper analyzes remittances as an additional source of income and its effects on children's school attendance and child labor in recipient Colombian households. In order to obtain causal effects and correct the selection bias, I implement Maximum Likelihood estimation with instrumental variables. The results indicate that a unit increase in remittances reduce the probability of child labor and increase the likelihood of school attendance. These findings underline the usefulness of remittances as an alternative to improve child welfare decreasing the probability of child labor, and improving school attendance.*

**Key words:** *School attendance, Child labor, Remittances, Colombia*

## 1 Introduction

Fewer people lived in conditions of extreme poverty in 2010 than in 1990. However, at the global level 1.2 billion people are still living in extreme poverty (United Nations, 2015). The intensified

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poverty causes that many children become child laborers in order to attain basic necessities as health and food. This issue becomes problematic because deprives children of their childhood and interferes with their schooling to the point of obligate them to leave school prematurely. Outlawing or using conditional transfers are solutions to this problematic, but the presence of 168 million child laborers in the world (ILO, 2012) indicates that relying in these alternatives is not enough. Remittances have become an alternative to lifting liquidity constraints for the households, avoiding child labor and improving investment in human capital. Yet, disentangle the effect of remittances is difficult. For example, while remittances can lift the budget constraint of the household and affect the decision of investing in human capital, the fact that this is preceded by migration of a working age member may induce changes in the structure of the household, probably making the house worse, which could lead to an increase in child labor.

Despite different programs that rely in conditional transfers (Programa de alimentación escolar, Gratuidad educativa, Ni uno ni menos, Familias en acción, Proyecto ícaro) and seek to improve the outcomes in education, the results haven't been very good. The country has one of the lowest children's school attendance rates in comparison to other Latin American countries. The primary school net enrollment rate was 92 percent in 2010, and the secondary enrollment rate increases only from 67 percent in 2007 to 74 percent in 2010 (UNESCO, 2010). Therefore, remittances can be an important alternative to improve investment in human capital.

In this paper, I analyze the effect of international remittances on child labor and schooling attendance in Colombia. As a result of the extensive migration during 80's and 90's caused by economic crisis and rising in unemployment during these periods, this country becomes one of the main recipients countries in absolute magnitude of these flows (Vargas Silva, 2009; Yang, 2011). From these funds, households spend around 60 percent in groceries and utilities, and 40 percent in education, healthcare, rent payments, leisure and entertainment, and home appliances and furniture (Garay and Rodriguez, 2005), which make of these transfers a relevant factor in the decision making of the household.

Several studies have found evidence that remittances are associated with educational outcomes and child labor. Calero et al. (2009) find that remittances increase school enrollment and decrease child labor in Ecuador. In a similar vein, using the impact of 2008-2009 reces-

sion on remittances receipt for Mexico, Alcaraz, et al. (2012) find that this negative shock caused a significant increase in child labor and a significant reduction of school attendance. Amuedo-Dorantes and Pozo (2009) find that girls school attendance rises with the receipt of remittances, but are school-age children and younger siblings the ones who most benefits from these flows, while remittances positive effect also seem to disappear when it is included children in households with members residing abroad. Salas (2014) focuses on the quality of school and uses migration patterns to instrument migration and remittances and finds that international remittances have a positive effect on the likelihood to send children to private schools.

This paper contributes to this literature accounting for the effect of remittances in school attendance and child labor for Colombia. However, it is important to take into account that different to previous studies, there is a considerable geographical distance between Colombia and the United States, which makes that more affluent people with different liquidity constraint, in comparison to other countries as Mexico or other regions as Central American, migrate. To do this, I use the repeated cross-section survey Gran Encuesta Integrada de Hogares (GEIH), which includes information of the amount of remittances, rather than a dummy indicator of receiving remittances; and information of the characteristics of the children and the household where they live. For the econometric analysis, I address the endogeneity of remittances using a Pooled Probit with IV. The identification strategy is based on previous literature and relies in the historical department-level net migration rate; details of this strategy are discussed below. The main results show that an increase in remittances have a negative effect in the likelihood of sending children to work, and a positive effect of sending children to school.

The paper is organized as follows: Section 2 presents a background of Colombian remittances, school attendance, and child labor. Section 3 describes the data and the variables. Section 4 describes the estimation strategy. Section 5 indicates the main results. Section 6 concludes.

## **2 Background on remittances, schooling, and child labor**

In the last decade, remittances have become an important factor for smoothing consumption and facilitate investment decisions in developing countries (Barajas et al. 2009). However, after the financial crisis the remittance flows for Colombia drop from US\$4,842 million dollars in 2008

to US \$4,023 millions of dollars in 2010 as it can be seen in Figure 1(a) (ASOBANCARIA, 2011).

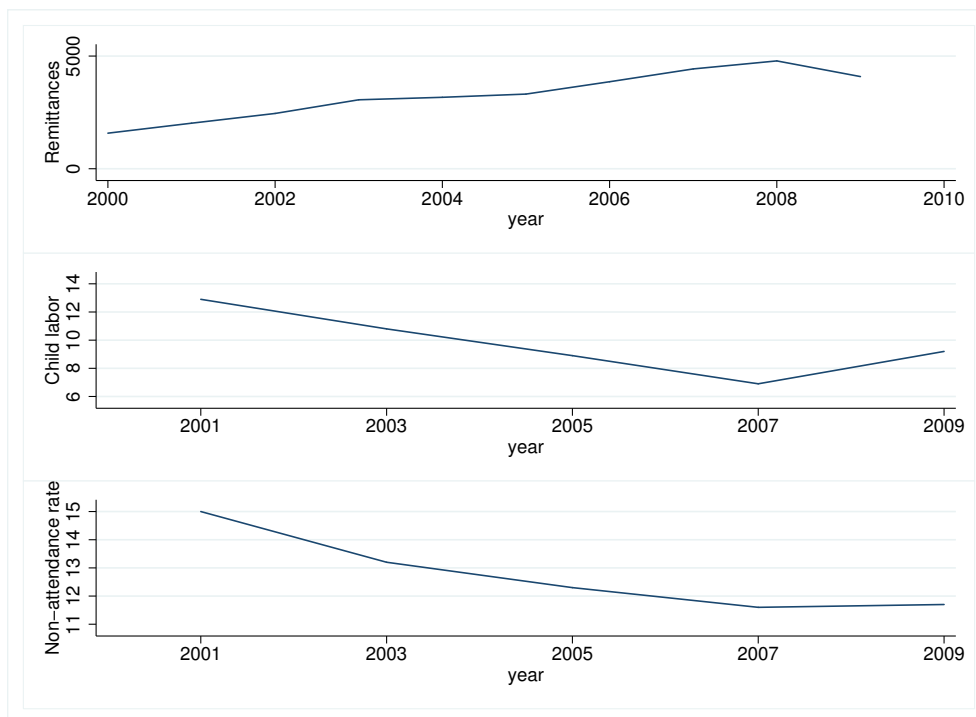
Despite the drop of remittances after the financial crisis, Colombia is the third main recipient country of Latin America (ASOBANCARIA, 2011), and one of the main recipients in the world (Yang, 2011). From these funds, Valle del Cauca is the main recipient region with 28 percent; follow by Antioquia with 15 percent; and Cundinamarca with 14 percent, where this last region includes the capital Bogota. These funds come mainly from three countries, Spain with a participation of 34 percent, United States with a participation of 32 percent, and Venezuela with 11 percent. The other percentage is divided between other countries, which do not reach 3 percent individually.

With respect to the use of these international transfers, Garay and Rodriguez (2005) indicate that 59 percent of the money remitted is used on recurrent expenditure of the household (consumption, utilities, education, and health) where around 30 percent of the recipients use this money on education expenditure. The presence of a high percentage of remittances funds in this type of expenditure indicates a high dependency of the households in remittances to survive, which suggests that a negative shock in these transfers may induce not only a reduction in education expenditure, but also may induce child labor in order to cover some basic necessities.

Child labor affects the development of children and adolescents. This activity deprives children of their childhood, affects their physical and mental development, and interferes with their opportunity to attend school. Figure 1(b) shows the historical child labor rate and Figure 1(c) the historical non-attendance rate in Colombia. The first graph shows an increase in child labor in 2009 where the rate was 2.3-percentage points higher than in 2005 and 0.3-percentage points higher than in 2007. The second graph shows a reduction between 2001 and 2009 from 15.0 percent to 11.7 percent, however during the last two years the rate increases 0.1-percentage points.

In this paper, I test if part of this reduction in school attendance and the increase in child labor is explained by the reduction in remittances flows, carefully addressing the endogeneity of remittances. I take into account the fact that previous to receive remittances, the household experienced a period of migration that may induce changes in the schooling and the likelihood of working of the non-migrant children. For example, children may quit school in order to take

FIGURE 1: BANCO DE LA REPUBLICA DE COLOMBIA AND DANE



Source: International Monetary Fund and World Bank Indicators.

care of younger siblings or may attend to remunerate activities formerly undertaken by the absent member.

### 3 Data and variables

#### 3.1 Descriptive statistics

To account for the impact of remittances on children's attendance and child labor, I use Colombian data from the Gran Encuesta Integrada de Hogares (GEIH). This survey consists in a repeated cross-section data. In order to exploit the data available, this paper follows the cohort of children between 6 and 18 years old in 2008. In 2008 this cohort consists of 23,841 children; in 2009 consists in 22,684 children between 7 and 19 years old; and in 2010 consists in 22,778 children between 8 and 20 years old. This survey covers information of the 13 main cities of Colombia (Medellin, Barranquilla, Bogota, Cartagena, Manizales, Monteria, Villavicencio, Pereira, Cucuta, Pasto, Bucaramanga, Ibague, and Cali) and their metropolitan areas.

Table 1 displays some descriptive statistics for all the children, as for children in remittances-receiving household and non-remittances-receiving. Of the 69303 children, 2686 live in remittances-receiving households with a higher proportion of female household head and absenteeism of parents, both variables related to migration patterns. The descriptive statistics suggest that the average school attendance is higher for children in remittances recipient households, and the proportion of children in child labor is higher in non-recipients. Also the proportion of married household head is higher in non-recipient households.

In the analysis of educational outcomes is important to take into account that the first 9 year of education are compulsory in Colombia, then there should not be great differences in the number of children with primary education and secondary education between households that receive remittances and household that do not receive. However, additional costs as uniforms or material may affect the attendance of the children. Table 1 indicates that in average the number of children with primary education is higher in recipient households, but surprisingly it's lower for secondary levels. One possible explanation is that if there is a disruptive effect after a member of the household migrates, older children will have to fill the activities of the absent member.

### **3.2 The variables**

This paper aims to account for the effect of remittances in the likelihood that children go to school or go to work. The dependent variable in both cases is a dichotomous variable, in the first case takes the value of one if the child is working any hour; and in the second case if the child is currently attending to school.

The independent variables are divided in two groups: child characteristics, and household characteristics. The main independent variable is the total amount of remittances received in a year. The remittances information is collected by member of the household and is added to calculate the total amount of remittances in the household.

The child characteristics include gender of the child, age, and absenteeism of his parents. The absenteeism variable is constructed identifying the kinship with the household head, and

TABLE 1: DESCRIPTIVE STATISTICS FOR CHILDREN AND HOUSEHOLDS

	All	Recipient	Non-recipient*
<i>Individual Characteristics</i>			
Male	49.85	50.22	49.84
Age	13.09	13.23	13.09
Attend to school	84.71	85.88	84.66
Labor	9.73	9.15	9.76
Absenteeism	15.95	25.91	15.55
<i>Household characteristics</i>			
Members	5.40	5.60	5.39
Female household head	38.20	60.27	37.31
Married household head	36.34	32.72	36.48
# children in primary	1.66	1.68	0.37
# children in secondary	1.44	1.47	1.66
Total remittances amount	87.77	2264.65	0
N	69303	2686	66617

Source: sample wave of GEIH. Children between 6-18 years.

\* Non-recipient includes households where noone of its members receive remittances in the last twelve months

using the question “does his father/mother lives in the household?” This variable has been used as a proxy of migrant parents (Salas, 2014; Bennet et al. 2012; and Kandel and Kao, 2001) and the idea behind is that the effect of a migrant member in a household is similar to a disrupted family, which allows controlling for the disruptive effect of parents.

The household characteristics include the total amount of remittances described above; the number of children in the household, as a constraint for resources to be invested by the household; a dummy variable that takes the value of one if the household head is female, and a dummy variable that takes the value of one if the household head is married, both variables related to migration. This group also includes household assets as a proxy of income. The reason is that there might be an endogenous relationship between income and the outcome variables, since schooling and child labor affect household expenditure. Then, instead of using labor income and other non-labor income different to remittances, I use household assets, which different to income that changes according to current circumstances, reflect a more permanent economic status. These assets are ownership of a house and characteristics of the house as electricity service, water service, and telephone service.

One of the concerns at the moment of account for the effect of remittances is the presence of idiosyncratic shocks. For example if one of the household members suffer an specific shocks such as illness or death, then remittances may be used as an informal insurance alternative. In order to avoid these confounding factors, I control for the fact that one of the non-migrant member in the household stops working for illness or accident.

## 4 Estimation strategy

To estimate the effect of remittances in school attendance and child labor, I use a Pooled Probit. The empirical model consists in:

$$Y_i = \alpha_0 + X\beta + \gamma R_i + \varepsilon_i \quad (1)$$

$$i = 1, \dots, N$$



Where  $Y_i$  denotes the propensity of the child attending to school or going to work. The vector  $X_i$  includes child characteristics and household characteristics, and  $R_i$  is the amount of remittances in logarithms that the household receives.

However, there is an endogenous relationship between remittances and the outcome variables that will bias the estimates. First there is a reverse causality between investment in education and child labor with the amount of remittances the household receive. Second, there may exist unobserved characteristics included in the error term that may be correlated with the decision of sending remittances and the decision to send children to school or to work. For example, it can be that having school age children motivates a household member to migrate in order that his children can attend to school in which case is the children's schooling that induces remittances and not remittances, which facilitate human capital investments. In the case of child labor, it may be that the remittances alleviate the resources constraints allowing not sending children to work, but it may be possible that these resources are used for family business, which will induce more child labor. Therefore, in order to address these issues, I will use a two-stage instrumental variable approach.

In the first stage, I estimate the endogenous variable remittances using a Tobit specification, taking into account that the remittances flows are left censored. Then the remittances equation is:

$$R_i^* = \pi_0 + X\delta + \pi_1 z_i + \eta_i \quad (2)$$

Where  $R_i^*$  denotes the partially unobservable remittances received, as  $R_i = R_i^*$  if  $R_i^* > 0$  and zero otherwise.  $X$  is the vector of exogenous variables including child and household characteristics as in equation (1), and  $Z_i$  is the net migration rate, the instrumental variable. In this stage, the F-test $>10$  is used as rule to determine if the instrument fulfills the relevance condition. Table 4 in the appendix show the results and confirm that the instrument is relevant.

The presence of migration rates and migration networks as instrument has been used in different studies (Hanson and Woodruff, 2002; Acosta, 2006; McKenzie and Rapoport, 2010; Hu, 2012). The identification strategy relies in the fact that historical migration at department level

determines current migration behavior, which is a good indicator from remittances, but does not affect current schooling and labor decision at the household level. In this sense, the only channel through the net-migration rate affects education or child labor is through remittances.

One concern is that the instrument is capturing department effects. In order to test if this is true, I include regional variables as controls, in particular two variable related to migration patterns and wealth, the average year of education of the department, and the average number of household with female household head. If the instrument is not capturing regional effects, the estimates should not change with the inclusion of these variables.

Finally, with the predicted remittances  $\hat{R}$ , the second stage estimates the Pooled Probit model:

$$Y_i = \alpha_0 + X\beta + \gamma\hat{R}_i + \varepsilon_i \quad (3)$$

## 5 Results

The impact of remittance in child labor and school attendance is estimated using an IV Probit for the sample of 69,303 children of age from 6 to 18. The marginal effects for the logarithm of remittances are reported in Table 2 for child labor and Table 3 for school attendance. In both tables, column (1) reports the results ignoring the endogeneity problem. Column (2) reports the results from the instrumental variable approach, and column (3) includes the regional variable to check if the instrument is capturing any regional effects.

First, the impact of remittances on child labor without controlling for endogeneity (Table 2 column 1) indicates that remittances are significant at 5 percent, but with a small effect. The results indicate that a unit increase in the log of remittances reduces child labor in 0.4 percentage points. Column 2 shows the results of the second stage of the IV Pooled Probit, the results suggest that remittances are significant at 1 percent level, and a unit increase in the log of remittances will reduce the probability of sending children to work by 3.5 percentage points. Columns 3 reports similar results but with a higher effect. The log of remittances is significant at 1percent and a unit increase in remittances reduce in 5.9 the probability of child labor.

In the case of school attendance in Table 3, without controlling for endogeneity, Column 1 shows that the effect is not significant at 5 percent level. However, using the instrumental variable approach in Column 2, the results indicate that a unit increase in the log of remittances increases the probability of attend to school by 1.5 percentage points at 1 percent of significance. These results are not very different when it is included the regional variables in Column 3, the effect increases to 2.0 percentages point at the same level of significance.

With respect to the child characteristics, children age has a positive effect in child labor and a negative effect in school attendance. One explanation is that older children have more significant role at the moment of collaborate with the expenses of the household than younger children. Also being male increases the probability of child labor and reduces the probability of school attendance. In order to control for the disruptive effect of the absence of a family member, the model includes the variable absenteeism. As it was expected, the absence of the parents increases the probability of child labor and reduces the probability of school attendance.

With respect to the structure of the household, the number of children has a negative effect in child labor and in school attendance; the first result can be explained by the fact that if there is a higher number of children, not all of them have to supply labor, presumably the older ones as the estimate of age suggests. However, it may be possible that the presence of additional children creates more constraints for the household at the moment of invests in human capital, which can explain the negative coefficient in the second case. This is also coherent with the fact that a higher number of members in primary level reduces the probability of school attendance and increases the probability of child labor. The results also show that wealthier households, measured with the assets and characteristics of the household, higher the probability of the children to go school and lower the probability of child labor.

With respect to the variables related to the household head, once it is controlled the endogeneity, having a female household head does not affect the probability of going to school, but it increases the probability of child labor. This can be related to migration patterns and the disruptive effect by the absence of a household member that makes that children have to go to the labor market. This is also coherent with the fact that living in a household with married household head reduces the probability of child labor and increases the probability of school

attendance.

Finally, the introduction of the idiosyncratic shock appears not to affect the probability of child labor or the probability of going to school. Unfortunately, only the year 2008 of the survey includes additional negative shocks, which restricts the chance of using more shock for 2009 and 2010. Since the survey is a repeated cross-section, I use the cohort to follow the individuals on time, the estimates of the years suggest that compare to 2008 the probability of working is higher and the probability of going to school is lower. Different factors can explain this results, but in particular the economic conditions after the financial crisis may have affected the resources of the household and with that the decision of invest in human capital and child labor.

In sum, the international remittances' effect on school attendance and child labor is the same without addressing the endogeneity problem and using the instrumental variable approach, but the magnitude varies under the different specifications. These results suggest that receiving a higher amount of remittances increase the probability of children to go to school and reduces the probability of child labor.

## **6 Conclusions**

During the last ten years Colombia experienced and improvement in its indicators of education and child labor. However, after 2008 remittances flows decrease and with that the country experienced an increase in its non-attendance rate and child labor rate. Several papers have found a relationship between remittances, school outcomes, and child labor where these international transfers lift the budget constraint of the household, serve as mechanism of smoothing consumption, and mitigate vulnerability to negative shocks. This paper analyze the relationship of these variables and as main contribution provides empirical evidence on the role of remittances as a source for investment in human capital and a mechanism to reduce the probability of sending children to work.

The identification strategy relies in instrumental variables, which is based on the historical net migration rate. This instrument captures information of current migration behavior, which is a good indicator from remittances, while they are no expected to affect school attendance and

TABLE 2: IV-TOBIT

	(1)		(2)		(2)	
	Child labor		Child labor		Child labor	
	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E
<i>Child characteristics</i>						
Log remittances	-0.004**	0.002	-0.035***	0.003	-0.059***	0.004
Age	0.032***	0.002	0.035***	0.000	0.035***	0.000
Male	0.025**	0.010	0.029***	0.002	0.028***	0.002
Absenteeism	0.035	0.0232	0.026***	0.004	0.032***	0.004
<i>Household characteristics</i>						
Female household head	-0.028**	0.011	0.012***	0.003	0.021***	0.003
Married household head	-0.015	0.012	-0.009***	0.002	-0.009***	0.002
Members	-0.009***	0.003	-0.005***	0.001	-0.004***	0.001
# Children with primary	0.011**	0.005	0.011***	0.001	0.007***	0.001
# Children with secondary	0.016***	0.005	0.005***	0.001	0.002	0.001
Own home	-0.026**	0.011	-0.001	0.002	0.009***	0.002
Electricity service	-0.063	0.092	-0.054***	0.018	-0.094***	0.018
Water service	-0.011	0.057	-0.029***	0.006	-0.041***	0.006
Telephone service	-0.031***	0.011	0.008***	0.003	0.017***	0.003
Ill member	0.007	0.016	-0.011***	0.004	-0.006	0.004
Regional variables	NO		NO		YES	
2009.year	0.036*	0.020	0.018***	0.003	0.022***	0.003
2010.year	0.038*	0.020	0.034***	0.004	0.051***	0.004

Sample: Children 12-16. The outcome variable is child labor. Column (1) presents estimation of equation 1. Column (2) and (3) presents estimation of equation 3. Column (3) includes regional variables. All regressions include a constant term.

\*\*\*p<0.01, \*\*p<0.05, \*p<0.10.

TABLE 3: IV-TOBIT

	(1)		(2)		(2)	
	School attendance		School attendance		School attendance	
	Coefficient	S.E	Coefficient	S.E	Coefficient	S.E
<i>Child characteristics</i>						
Log remittances	0.004*	0.002	0.015***	0.004	0.020***	0.004
Age	-0.040***	0.002	-0.043***	0.000	-0.043***	0.000
Male	-0.015	0.011	-0.008***	0.002	-0.008***	0.002
Absenteeism	-0.007	0.026	-0.041***	0.005	-0.042***	0.005
<i>Household characteristics</i>						
Female household head	0.028**	0.013	-0.001	0.003	-0.003	0.003
Married household head	0.032**	0.014	0.031***	0.003	0.031***	0.003
Members	-0.004	0.004	-0.006***	0.001	-0.006***	0.001
# Children with primary	-0.017***	0.005	-0.016***	0.001	-0.016***	0.001
# Children with secondary	0.006	0.006	0.016***	0.001	0.016***	0.001
Own home	0.018	0.012	0.017***	0.003	0.015***	0.003
Electricity service	-0.008	0.121	0.0121	0.023	0.022	0.023
Water service	0.019	0.069	0.037***	0.008	0.040***	0.008
Telephone service	0.041***	0.014	0.033***	0.004	0.033***	0.003
Ill member	0.010	0.019	0.000	0.004	-0.001	0.004
Regional variables	NO		NO		YES	
2009.year	-0.043*	0.023	-0.041***	0.004	-0.042***	0.004
2010.year	-0.029	0.023	-0.037***	0.005	-0.040***	0.005

Sample: Children 12-16. The outcome variable is school attendance. Column (1) presents estimation of equation 1. Column (2) and (3) presents estimation of equation 3. Column (3) includes regional variables. All regressions include a constant term.

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05.

child labor. In order to check if the instrument is capturing regional effects, I include regional variables as a sensitivity analyses, and the results does not change.

The results show that remittances increase the probability of going to school and reduce the probability of child labor. Also the results suggests that being a male, being older, living in a household with a higher number of children in primary increases the probability of child labor and reduces the probability of going to school. This same result is found with living in a household with female household head and the absenteeism of the parents, both variables related with migration patterns. With respect to the household assets, variables used as proxies of economic status, the results indicate that better to do households have a higher probability sending their children to work and a lower probability of sending them to school. Perhaps one of the most striking results is the fact that the cohort of children in the years 2009 and 2010 are more likely to work and not go to school compare to 2007. This may be explained by the economic conditions experienced after the financial crisis and indicate the vulnerability of children against negative shocks experienced by the household.

In sum, the results in this paper indicates that international remittances are an alternative for household to improve the living condition of their children reducing their probability of going to work and increasing the likelihood of going to school. One alternative to facilitate the use of these resources and improve their use is to reduce the cost of transfer. The World Bank has carried out calculation of the cost of sending a remittance, using as reference the average cost of sending a remittance for US\$ 200 for all providers of these services: commercial banks, postal service, and Money Transfer Operator. However, the target of reaching a 5 percent in the scale of this indicator is far away. At 2010 this indicator was 8.7 percent. The World Bank reported that the high cost of shipping lies in the uncertainty and existing regulatory barriers, which constitute a limitation to the new entrants and discourage the use of technologies that reduce the cost to users, such as transfers through mobile devices. Then a policy intervention can be an alternative to increase the amount of remittances a household receive and with that the conditions of the household. Other initiative is to reduce the transaction costs using tools as the one implemented by the World Bank, the Inter-American Development Bank and the Center for Latin American Monetary Studies (CLAMS), which consists in a developed a web tool that allows determine the shipping service more convenient for the user, both in terms of tariffs and

exchange rates.

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# A Appendix

TABLE 4: SOME NOINSENSE TEXT.

	(1)	(2)
Net migration	-0.155*** (-6.59)	-0.150*** (-6.41)
Age	-0.007 (-0.54)	-0.007 (-0.53)
Male	-0.019 (-0.21)	-0.009 (-0.10)
Absentism	0.257 (1.43)	0.244 (1.36)
Female household head	0.417*** (4.00)	0.412*** (3.97)
Married household head	0.072 (0.67)	0.06 (0.59)
Members	0.042 (1.46)	0.040 (1.40)
# Children with primary	-0.124*** (-2.85)	-0.117*** (-2.69)
# Children with secondary	-0.171***	-0.154***
Year	YES	YES
Negative shock	YES	YES
Household assets	YES	YES
Regional variables	NO	YES
F-test	43.37	41.11

Sample: Children 12-16. The outcome variable is log of remittances. Colum (1) presents estimation of equation 2. Column (2) presents estimation of equation 2 including regional variables. All regressions include a constant term. Standar errors in parentheses.

\*\*\*p<0.001, \*\*p<0.01, \*p<0.05.