THE POWER OF REMITTANCES ON THE PREVALENCE OF CHILD LABOR

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Abstract

This article examines the relationship between migrants' remittances and the prevalence of child labor by using a large sample of developing countries. In particular, we investigate whether the inflows of remittances help to offset the effects of financial constraints and income shocks on the prevalence of child labor. Starting from a simple theoretical model, then based on a sample of 97 developing countries (of which 31 are African) observed over the period 1998-2002, we show that remittances reduce significantly child labor in developing countries characterized by weak financial systems and by strong income instability. These results were robust even after taking into account the potential endogeneity of remittances and financial development in the regressions. Policy recommendations for specific strategies to facilitate receipt of remittances by households are more than ever appropriate for a region like Sub-Saharan Africa, which currently receives a small fraction of these funds compared to other developing countries, and where the prevalence of child labor is still a serious issue.

Key words : Remittances, Financial development, Income variability, Child labor, LDCs
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1 Introduction

This article examines the relationship between migrants' remittances and the prevalence of child labor by using a large sample of developing countries. In particular, we investigate whether the inflows of remittances help to offset the effects of financial constraints and income shocks on the prevalence of child labor. Starting from a simple theoretical model, then based on a sample of 97 developing countries (of which 31 are African) observed over the period 1998-2002, we show that remittances reduce significantly child labor in developing countries characterized by weak financial systems and by strong income instability. These results were robust even after taking into account the potential endogeneity of remittances and financial development in the regressions. Policy recommendations for specific strategies to facilitate receipt of remittances by households are more than ever appropriate for a region like Sub-Saharan Africa, which currently receives a small fraction of these funds compared to other developing countries, and where the prevalence of child labor is still a serious issue.

The question and our results are important for a number of reasons. First, the problem of child labor is a crucial issue for economic development in the extent to which this strategy has irreversible consequences. Indeed, it is generally difficult for children who have early left school to embrace life to return even if the economy has improved. Just as children who are forced to work several times a week while going to school may have more difficulty than others in the training. In addition, for regions like sub-Saharan Africa and South Asia, the issue of child labor is important in terms of extremely high prevalence rates observed in these two regions (See Figure 1 in Appendix 1). Second, remittances are one of the most visible dimension of the current globalization. The World Bank estimates for example to 251 billion U.S. dollar, the amount of remittances in the world in 2007. Developing countries are the main recipient of these funds which are rapidly growing and whose characteristics and effects have been studied in several aspects. First, remittances are less volatile than other capital flows to developing countries (See Graph 4 in Appendix 1). Second, they now exceed the volume of official development assistance received by developing countries (See Graph 3 in Appendix 1). Finally, remittances do not pass through government budgets, and arrive directly in the pockets of households. While developing countries are the main recipients of these funds, we note that remittances in sub-Saharan Africa represent only 1.5% of GDP in the region compared to the most important figures in other parts of the development world (See Figure 2 in Appendix 1).

Several studies have shown the role of remittances in reducing poverty (Adams & Page, 2005; Gupta et al., 2009), promotion of education in the families (Edwards & Ureta, 2003), promotion of entrepreneurship (Woodruff & Zenteno, 2007), economic growth (Giuliano & Ruiz-Arranz, 2008; Catrinescu et al., 2009) and reduction of inequalities (Koechlin & Leon, 2007; Chauvet & Mesplé-Somps, 2007). While the development potential of remittance flows is increasingly being recognized by researchers and policymakers, the effect of remittances on child labor at the cross-country level remains unexplored. This paper is a first effort to try to fill this gap in the literature.

The main reasons usually put forward to explain the prevalence of child labor are : household poverty (Krueger, 1996), income shocks (Beegle et al., 2006; Guarcello et al., 2003; Duryea et al., 2007) and financial constraints(Ranjan, 1999, 2001; Dehejia & Gatti, 2005). At the same time, recent work on remittances has highlighted their importance as a vehicle for poverty reduction, as a substitute for inefficient or nonexistent credit markets and as an insurance mechanism. One of the main contributions of this paper is to link the literature on remittances and child labor and show how remittances could mitigate the impact of the main determinants of child labor in developing countries.

If we take for example the result of micro and macroeconomic studies which conclude that remittances reduce poverty, it is therefore understandable that remittances may reduce child labor through a reduction of poverty in countries. Remittances can also be more effective in reducing child labor as the country and thus households are hit by major shocks. Based on one of the conclusions of the recent literature (Kapur & McHale, 2005; Yang & Choi, 2007; Halliday, 2006) which concludes that remittances tend to rise when the recipient economy suffers a downturn in activity, an economic crisis, natural disaster, or political conflict, we understands that remittances may reduce child labor through their stabilizer impact. Finally, based on the results of the study conducted by Giuliano & Ruiz-Arranz (2008), which concludes that remittances act as a substitute for inefficient or nonexistent credit markets by providing an alternative way to finance investment and helping overcome liquidity constraints, we can therefore consider that remittances will be most effective in terms of reducing child labor when an economy have a low level of financial development. In other words, remittances mitigate the impact of financial constraints on the prevalence of child labor.

This study is a continuation of papers that were interested in econometric analysis of determinants of child labor at the macroeconomic level (Drenovsky, 1992; Shelburne, 2001; Cigno et al., 2002; Edmonds & Pavcnik, 2006; Neumayer & De Soysa, 2005; Davies

& Voy, 2009; Dehejia & Gatti, 2005). The six first studies analyzed the impact of trade liberalization and foreign direct investment on the prevalence of child labor and led for the most part, a negative effect of trade and financial openness on child labor. Dehejia & Gatti (2005) have analyzed the effect of financial development and variability of income on child labor. They have concluded that financial development reduces the prevalence of child labor while the variability of income increases it, and that financial development helps to mitigate the impact of income variability.

But we must be cautious when estimating the causal impact of remittances and of financial development on the prevalence of child labor because of the endogeneity of these two variables. For example, the positive reverse causality between remittances and child labor (remittances increase if child labor increases) will result in an underestimation of the effect of remittances on child labor. Just as the endogeneity of financial development may be due to omitted variables that may simultaneously affect the prevalence of child labor and the quality of financial institutions. The endogeneity problem may also be due to measurement error. The coefficient of financial development may also be biased to the extent that those countries with developed financial systems may also be those for which data on child labor are well measured.

We try to solve these problems by using the instrumental variables estimators. Remittances for each country are instrumented by the coastal area of a country (defined as the ratio of the area within 100 KM from a sea or an ocean to the total area of the country), by the existence a *dual* exchange rate regime and the distance between this country and the main destination of his international migrants. These variables have been used in the recent literature as exogenous determinants of remittances in developing countries (Abdih et al., 2008; Freund & Spatafora, 2008; Gupta et al., 2009). The level of financial development measured by the ratio of bank credit as a percentage of GDP is instrumented by the creditors rights and by the existence of a credit registries. As demonstrated by Djankov et al. (2007), securing the rights of creditors and the sharing of financial information on the indebtedness of borrowers are fundamental determinants of the allocation of credit in an economy.

Econometric analysis are conducted on variables evaluated at their average for the period 1998-2002. We test the robustness of our results by applying the Tobit estimator methods applied for instrumental variables to overcome the bias that might result from the fact that child labor is censored at zero for some countries. The results are not influenced by the estimator used.

The rest of the article is organized as follows. Section 2 presents an overview of previous work on the topic of the relationship between migration, remittances and child labor. Section 3 is devoted to building a theoretical model of the relationship between financial constraints, income shocks, remittances and child labor. Section 4 is devoted to the construction of the econometric model, the presentation of the variables used in this article and estimation method. Section 5 discusses the results. Section 6 tests the robustness of results. We conclude in Section 7.

2 Literature review

We present an overview of the main findings of empirical work which have examined the relationship between remittances and child labor in developing countries. This section is build partially on the literature review made by Calero et al. (2008).

Several studies have found evidence that remittances and international migration are associated with increased educational attainment and reduction in child labor supply. For example, using migration networks and household migration history as instruments for remittances, for El Salvador, Acosta (2006) finds that girls and boys under 14-years-old from recipient families are more likely to attend school than those from non-recipient households, while remittances also seem to reduce child labor supply. In a similar vein, also based on data from El Salvador, Edwards & Ureta (2003) find that remittances reduce school dropout hazard rates. Borraz (2005) instruments remittances using historical migration patterns and distance to the United States and finds that remittances have a positive but small effect on schooling for boys and girls with low educated mothers and who reside in cities with less than 2,500 inhabitants. Hanson & Woodruff (2003) use migration patterns to instrument migration and find that having a migrated family member has a positive effect on educational outcomes for girls in Mexico (aged 10–15) whose mothers have a very low level of education. Using a similar empirical strategy, Mansuri (2006) finds strong positive effects of temporary economic migration on investments in children's schooling in Pakistan, especially for girls.

Yang (2008)uses the Asian currency crisis to map out how variations in remittance receipts affect education and child labor in the Philippines. He uses the fact that the magnitude of the economic shock differed across Philippine recipient families depending on the

host country of the family's emigrating members (because of differences in currency depreciation). Exploiting this variation across households he concludes that favorable economic shocks (which he translates into greater remittance flows) increases educational investments in girl children and decreases the number of hours worked by boy children. Milligan & Bohara (2007) show that in the case of Nepal, remittance income from international sources positively contributes to child welfare, but much less so than the same amount of income from other sources.

Dimova et al. (2008)examines the extent to which migration and remittances may reduce child labor even in households that do not participate in the migration and therefore do not receive remittances. They argue that the reduction of the amount of labor available in the aftermath of migration and the remittances sent by emigrating parents may enable not only the children, but also other family members to stop working. The wage increase emanating from the fall in labor supply may then make it possible for parents to withdraw their children from the labor force. The authors successfully tested this hypothesis on panel data from several surveys of Tanzanian households. Calero et al. (2008) investigates how remittances via transnational networks affect human capital investments through relaxing resource constraints and facilitate households in consumption smoothing by reducing vulnerability to economic shocks. By using micro data for Ecuador, they show that remittances increase school enrollment and decrease incidence of child work, especially for girls and in rural areas. Furthermore, they find that aggregate shocks are associated with increased work activities, while remittances are used to finance education when households are faced with these shocks.

However, other findings present mixed results of the effect of migration and remittances. In a study on 11 Latin American countries, Acosta et al. (2007) find that remittances are associated with increased educational attainment in only six countries (Nicaragua, Guatemala, Honduras, Ecuador, Haiti, and El Salvador), the effect being larger for children whose mothers have a low level of education. Similarly, using historical migration rates to instrument current migration, McKenzie & Rapoport (2006) find a negative effect of migration on schooling attendance and education attainment among 16–18-year-old girls and 12–18-year-old boys, but a positive effect for younger girls with uneducated mothers in rural Mexico. They attribute these outcomes to side effects of migration. For instance, the absence of parents in the household due to migration could lead to reduced investment in their children's education and an increase in the incidence of child work. Relying on rainfall data as instrument for remittances, Lopez-Cordova (2004) shows that these effects

are especially relevant for secondary school age children in Mexico, as receiving remittances positively affect school attendance for children aged 6–14, but negatively for boys and girls aged 15–17.

3 The theoretical model

We now turn to the theoretical model of the relationship between remittances, financial constraints, shocks and child labor. Our model is similar to those of Baland & Robinson (2000), Rogers & Swinnerton (2004) and Dustmann & Speciale (2005).

There are N identical households in the economy. Each family consists of a child and an adult. The model is built on two periods, $t = 1, 2$. The discount rate is given by β with $0 < \beta \leq 1$. We assume further that the parent works only in the first period and supplies one unit of labor which has value of A_1 (with $A_1 \geq 1$). We assume that the household starts with an initial level of wealth (which may come from the inheritance, and consists of farmland or livestock), which is valued at A_0. It follows that the parent's income in the first period is the sum of income from his job and his inheritance $A = A_0 + A_1$. At time $t = 1$ children may also work. Time not spent working is spent in school. The time children spend at work has a value of 1 (in efficiency units). The child has a unit time endowment. In the first period parents decide how to allocate their children's unit time endowment between labour (l) or schooling ($1-l$). The only cost to acquire education is an opportunity cost. In the second period, children become adults and they supply one unit of labour, which has value $h[1-l]$. Following Baland & Robinson (2000) and Rogers & Swinnerton (2004), the function $h[1-l]$ has the following properties : $h[0] = 1$, $h\prime[1-l] > 0$, $h\prime\prime[1-l] < 0$.

Let c_1 and c_2 be the household consumption in the first and second period, respectively. The household utility function is assumed to be separable :

$$W(c_1, c_2) = U(c_1) + \beta U(c_2) \tag{1}$$

The function W is twice continuously differentiable, strictly increasing and strictly concave. We distinguish in this analysis, three possible cases : (1) the credit market works, (2) the credit market does not work and (3) the household faces uncertainty (risk) on pa-

rent first period income.

3.1 Credit market case

In the first best situation, households can borrow and lend freely in the credit market. To simplify notation, let the interest rate be equal to zero. Parents decide the optimal allocation of their children's unit time endowment between labour (l) or schooling ($1-l$) and the optimal value of saving (s) :

$$max_{l,s} U(c_1) + \beta U(c_2) \tag{2}$$

$$c_1 = A + l + R(1-l) - s$$

$$c_2 = h[1-l] + s$$

where R is remittances which is targeted to "buy" children's education (more precisely, to cover a fraction R of the opportunity cost of schooling, where $(0 < R \leq 1)$. The first order conditions with respect to l and s are respectively :

$$(1-R)\,U\prime(c_1) = \beta h\prime[1-l]\,U\prime(c_2)$$

$$U\prime(c_1) = \beta U\prime(c_2)$$

The first-best children's time allocation between labour and schooling is such that :

$$h\prime[1-l] = 1 - R \tag{3}$$

By implicit function theorem on $h\prime[1-l] - 1 + R = 0$, we can analyze the impact of remittances on children's labor :

$$\frac{dl}{dR} = \frac{1}{h\prime\prime[1-l]} < 0 \tag{4}$$

We concludes that child labor decreases with remittances. What happens when there is no credit market ?

3.2 No credit market case

Household problem is given by :

$$max_{l,s} U(c_1) + \beta U(c_2) \tag{5}$$

$$c_1 = A + l + R(1-l)$$

$$c_2 = h[1-l]$$

First order condition with respect to l lead to :

$$(1-R)\,U\prime(c_1) = \beta h\prime[1-l]\,U\prime(c_2)$$

Childen's time allocation between labor and schooling is such that :

$$h\prime[1-l] = \frac{(1-R)\,U\prime(c_1)}{\beta U\prime(c_2)} \tag{6}$$

By implicit function theorem on $h\prime[1-l] - \frac{(1-R)U\prime(c_1)}{\beta U\prime(c_2)} = 0$, we get the impact of remittances on child labor when there is no credit market :

$$\frac{dl}{dR} = \frac{U\prime(c_1)}{\beta U\prime(c_2)\,h\prime\prime[1-l]} < 0 \tag{7}$$

with $h\prime\prime[1-l] < 0$.

When we compare expression 7 with the expression in 4, we see that remittances impact on child labor when there is no credit market is higher than impact when there is a credit market. Thus, the marginal impact of remittances on child labor reduction decreases with the level of financial development. Now, we look what happen if parent's income in the first period is uncertain.

3.3 Remittances, income shocks and child labor

We assume now that household faces a risk[1] on the parent's income in the first period. In this case, A becomes stochastic and follows a distribution with a mean equal to A_m and with a variance σ^2. We write the household probem as follow :

$$max_l EU(c_1) + \beta U(c_2) \tag{8}$$

$$\widetilde{c}_1 = \widetilde{A} + l + R(1-l)$$

$$c_2 = h[1-l]$$

with E, the operator of mathematical expectation.

A second order Taylor's expansion around A_m lead to the following expression of the expected utility function :

$$max_l U(A_m + l + R(1-l)) + \beta U(h[1-l]) + \frac{1}{2}\sigma^2 U''(A_m + l + R(1-l)) \tag{9}$$

First order condition with respect to l gives :

$$h'[1-l] = \frac{(1-R)\left(\frac{1}{2}\sigma^2 U'''(c_1) + U'(c_1)\right)}{\beta U'(c_2)} \tag{10}$$

[1]This risk faced by household could be climatic shocks which destroy livestock or reduces the harvest.

The impact of remittances on child labor is given by :

$$\frac{dl}{dR} = \frac{\frac{1}{2}\sigma^2 U'''(c_1) + U'(c_1)}{\beta U'(c_2)\, h''[1-l]} < 0 \tag{11}$$

with $U'''(c_1) > 0$ when the parent is prudent.

We can conclude that the greater the risk to the parent's income is high, the greater the impact of remittances on the reduction of child labor.

To sum, the theoretical model proposed in this article predicts two importants things. In fact, the marginal impact of remittances on child labor reduction : (1) decreases with the access to financial services and (2) increases with the riskiest nature of the environment in which households evolves.

4 Econometric analysis

4.1 Econometric models

We build an econometric model with the aim to test the theoretical hypotheses formulated in this study. More precisely, we verifies that the marginal impact migrants' remittances increases with the inefficiency of the credit market as well as the severity of the shocks faced by households.

4.1.1 An econometric equation of the relationship between remittances, financial development and child labor

We specify the following equation :

$$ChildLab_i = \alpha + X_i'\beta + \theta_1 FD_i + \theta_2 R_i + \theta_3 (R_i \times FD_i) + \varepsilon_i \quad (12)$$

where $ChildLab$, X, FD and R represents respectively the prevalence of child labor, matrix of controls variables, level of financial development and remittances. ε is an error term and the index i reflects the country. We expects that $\theta_1 < 0$, $\theta_2 < 0$ and $\theta_3 > 0$.

We follows Dehejia & Gatti (2005) for the choice of controls variables. We controls for the level of economic development proxied by GDP per capita, for the globalization of the economies (proxied by trade openess), for the importance of rural population and finally for importance of agriculture in the country. We add also the migration share in this equation as control variable to ensure that we really measure the impact of remittances not that of migration on child labor[2]. We control also for the level of child labor in 1960, for the quality of domestic institutions (law and order) as well as for regional dummies.

4.1.2 An econometric equation of the relationship between remittances, income shocks and child labor

Do migrants' remittances reduces the most child labor in a context of income instability ? For answer this question, we specifiy the following model :

$$ChildLab_i = \alpha + X_i'\beta + \gamma_1 FD_i + \gamma_2 R_i + \gamma_3 Sh_i + \gamma_4 (R_i \times Sh_i) + \varepsilon_i \quad (13)$$

[2] Data on migration rates are drawn from United Nations and they concern the year 2000.

where Sh is the shock variable. Our hypothesis will be verified if on the one hand, income variability is a significant determinant of the prevalence child labor ($\gamma_3 > 0$) and on the other hand, if remittances mitigates the effect of income shocks ($\gamma_4 < 0$). The same previous controls variables will be introduced this model.

4.2 Data

We measure the extent of child labor as the percentage of the population in the 10–14-year-old age range that is actively engaged in work. These data were compiled by the International Labour Organisation (ILO) and are available at 10-year intervals, beginning in 1950 for 172 countries. "Active population" includes people who worked (for wage or salary, in cash or in kind, as well as for family unpaid work) for at least 1 hour during the reference period (International Labour Organisation 1996). The structure of the data does not allow us to infer the intensity of child labor, so we cannot distinguish between light work (which some might argue is beneficial for adolescents) and fulltime labor, which might seriously conflict with human capital accumulation. Moreover, like most official statistics on child labor, these data are likely to suffer from underreporting, because work by children is illegal or restricted by law in most countries, and children often are employed in agriculture or the informal sector. These problems notwithstanding, the ILO data have the advantage of being carefully adjusted on the basis of internationally accepted definitions, thereby allowing cross-country comparisons over time (Ashagrie, 1993). Child labor data for the period 1998-2002 are taken from World Bank Development Indicators (2004).

While it may naturally be tempted to use appropriate estimators to capture the dimension of panel data (for example, the fixed effects estimator) in the regressions, Edmonds and Pavcnik (2006) noted that only few developing countries have data on the prevalence of child labor over several years. Otherwise, much of the intertemporal variation in child labor in the ILO data is thus driven by the imputations and adjustments done by ILO rather than independent observations on child labor based on household surveys. Hence, when most countries have one independent observation on child labor, inclusion of a country fixed effect leads to identification based solely on ILO imputations rather than actual changes in child labor. Moreover, as we subsequently discuss, our empirical framework does not require panel data for identification. An another argument could justify our empirical

framework. Most of exogenous determinants of financial development and remittances proposed by the recent literature, are constants over the time (creditor rights, credit registries, coastal area, distance or *dual* exchange rate regime). Thus, in an instrumental variables estimation, we cannot introduce country fixed-effects[3].

Remittances data are drawn from the World Bank database (World Development Indicators, 2008). This variable include three categories : "unrequited transfers" which refer to money sent by migrants to family and friends to the home country, "migrant transfers" which are equal to the net worth of the migrants (considered here as individual's change of residence for at least one year) and finally "compensation of employees" which represent funds sent back by temporary workers who work abroad for less than a year. This database provides informations for a lot of countries and over a long period. We use in our estimation the ratio of remittances received by the home country on its GDP. We have to bear in mind the fact that this remittances data underestimates the effective volume received by households in developing countries, this volumes which transites through informal channels. But, this World bank's data are commonly used by several authors in the studies of remittances at the macro-economic level.

Financial development is measured as the ratio of domestic credit to private sector provided by deposit banks. This series are drawn from the data base compiled annually by Beck, Demirgüç-Kunt et Levine for the World Bank. The choice of this variable to proxy the level of financial development is justified by two importants reasons. On the one hand, the dimension of financial intermediation in which we are interested is the capacity of banks to provide funds to households or firms. On the other hand, the variables retained as exogenous instruments for financial development are more pertinent if financial development is proxied by the credit ratio.

In this paper, income shocks are measured by the instability of GDP per capita. In fact, several approaches are possible to measure instability. What makes the difference between these approaches is the hypothesis made on the nature of the long term trend. One can postulate the existence of a pure stochastic trend in the logarithm of GDP per capita. Instability is then given by the standard deviation of GDP per capita growth rate. One could also assume a pure deterministic trend. In this case, instability is given by the

[3]Remittances and financial development could be instrumented by their respectives lags. While using lagged values of the regressors as instruments can help deal with the problem of reverse causality, it does not address biases arising due to measurement error, since lagged values of the regressors are likely to suffer from this problem as well.

standard deviation of the residual from a regression of the logarithm of GDP per capita on a linear tend. The inconvenient of these two approaches is the *a priori* choice made on the nature of the trend. This problem is strenghtened in the case of panel data in which the nature of the trend could vary across the units of observations. To overcome these pitfalls, a solution is given by the construction of a mixed trend which combines a stochastic trend with a deterministic trend for the same serie. In this paper, we build the instability of GDP per capita from a mixed trend. The trend is estimated from a global adjustment over the whole period 1960-2002. But for the purpose of comparison, we retain also as measure of income variability, the standard deviation of GDP per capita growth rate. The two instability variables are constructed alternatively for a 5-years period or 10-years period. More precisely, instability around a mixed trend is measured as follow :

$$I_{it} = 100 \times \sqrt{\frac{1}{n}\sum_{t=1}^{n}\left(\frac{y_{it} - \hat{y}_{it}}{\hat{y}_{it}}\right)^2} \tag{14}$$

where $\hat{y}_{it}$ is the fitted value of y_{it} from the following regression for each country over the whole period 1960-2002 :

$$y_{it} = a_i + b_i y_{it-1} + c_i t + \zeta_{it}$$

GDP per capita chain series are drawn from Penn World Tables 6.2. For the other explanatory variables used in this paper, the definitions, sources and descriptives statistics are available in Appendix 3.

4.3 Econometric Methods

Two distincts econometrics methods are used for the estimation of the parameters. We begins by ordinarly least squared (OLS) and given the fact that our interest explanatory variables are suspected to be endogenous (remittances, financial development and

the interaction terms) we estimate the models with instrumental variables techniques (IV)[4].

4.3.1 Identification strategy of the causal impact of migrants' remittances

Finding an appropriate instrument or set of instruments that corrects for the endogeneity of remittances has been a challenge for researchers. Two key features govern the selection of an instrument for remittances : the instrument must be correlated with remittances, and its effect on individual country prevalence of child labor must operate solely through its impact on remittances or through the effect on other variables we already control. In this paper, remittances are instrumented by three variables.

The first instrument is the coastal area of a country (defined as the ratio of the area within 100 KM from a sea or an ocean to the total area of the country). This variable has been used for the instrumentation of remittances in a recent work by Abdih et al. (2008). The reason for the observed correlation between the coastal area and remittances is clearly through emigration. A higher coastal area is generally associated with a higher ratio of emigrants to the total population, which for obvious reasons leads to higher remittances on average. One problem with this instrument is that it may be correlated with other determinant of child labor like trade openess, institutional quality, urbanization rate or regional dummy. However, we control in regressions for these variables. Another problem may arise from the correlation between coastal area and migration and the correlation between migration and child labor. Migration could affect the pravalence of child labor by at least two channels. Firstly, migration can induce an incitation for the accumulation of human capital (the brain gain hypothesis) and thus, reduces the incidence of child labor. Secondly, migration alters the demographic structure of households. In consequence, there is more ressources per capita in the household which permit education funding. We then controlled in all regressions, for the direct impact of migration on child labor. Coastal area data are drawn from the works of Gallup et al. (1999).

[4]Several authors in micro-econometric studies on the remittances-child labor relationship, have instrumented migrrants' remittances by historical migration rates, by the existence of migrants' networks and by the presence of Money Tranfer Operators in the region of interest (Acosta, 2006; Acosta et al., 2007; Hanson & Woodruff, 2003; Mansuri, 2006; McKenzie & Rapoport, 2006; Calero et al., 2008).

The second instrumental variable is the distance between a developing country and the main destination country of its international migrants. More important is the distance, the less the volume of remittances received. This variable was chosen as instrument for migrants remittances in a recent paper by Gupta et al. (2009).

The last instrumental variable is an indicator of the presence of a *dual* exchange rate in a country. This binary indicator specifies if a country has more than one exchange rate that may be used simultaneously for different purposes and/or by different entities. It comes from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions, ARREAR (2003). This variable proved to be an important determinant of remittances in a recent paper by Freund & Spatafora (2008).

4.3.2 Identification strategy of the causal impact of financial development

Two variables are chosen as instruments for financial development (proxied by the ratio of credit to private sector). They are creditors rights and binary variable on the existence of public (i.e., government-owned) and private credit registries in different countries. These registries collect information on credit histories and current indebtedness of various borrowers and share it with lenders.

Djankov et al. (2007) have shown that the level of creditors right is an important determinant of private credit. In fact, when lenders can more easily force repayment, grab collateral, or even gain control of the firm, they are more willing to extend credit. They have also shown that what matters for lending is information. When lenders know more about borrowers, their credit history, or other lenders to the firm, they are not as concerned about the lemons problem of financing nonviable projects and therefore extend more credit. We think that these two variables are a good exclusion restrictions in the sense that we cannot consider that information-sharing or creditors right may be directly linked to child labor prevalence other than through their respectives impacts on private credit.

4.3.3 Instrumentation techniques in the case of non-linear terms in endogenous regressors

We present the technique chosen for the instrumentation of endogenous regressors in a non-linear equation. We specify the following model :

$$ChildLab_i = \alpha + X_i'\beta + \theta_1 FD_i + \theta_2 R_i + \theta_3 \left(R_{it} \times FD_i\right) + \varepsilon_i \tag{15}$$

In this model, we suspect remittances and financial development (R and FD) to be endogenous. However, the interaction between remittances and financial development ($R \times FD$) is also endogenous. Let Z_1 and Z_2 be the vector for excluded instruments of remittances and financial development respectively. The set of instruments for ($R \times FD$) is the various interactions of the elements in Z_1 and the elements in Z_2. We then consider the following first-stage equations:

$$R_i = \alpha^R + X_i'\beta^R + Z_{2i}'\theta_1^R + Z_{1i}'\theta_2^R + \left(Z_{2i} \times Z_{1i}\right)'\theta_3^R + \varepsilon_i^R \tag{16}$$

$$FD_i = \alpha^{FD} + X_i'\beta^{FD} + Z_{2i}'\theta_1^{FD} + Z_{1i}'\theta_2^{FD} + \left(Z_{2i} \times Z_{1i}\right)'\theta_3^{FD} + \varepsilon_i^{FD} \tag{17}$$

$$\left(R_i \times FD_i\right) = \alpha^{RFD} + X_i'\beta^{RFD} + Z_{2i}'\theta_1^{RFD} + Z_{1i}'\theta_2^{RFD} + \left(Z_{2i} \times Z_{1i}\right)'\theta_3^{RFD} + \varepsilon_i^{RFD} \tag{18}$$

Although this strategy is appropriate, the risk is to see the first stage equations with a lot of instruments (the additive and multiplicative terms), what could produce an *overfit* problem. For example if the vectors Z_1 and Z_2 contains respectively two variables, we obtain first stage equation with eight instruments! As a result of Wooldridge (2002), we can render things compact by adopting another strategy. As a first step, we regress each of the variables R and FD on the set of included and excluded instruments:

$$R_i = \alpha^R + X_i'\beta^R + Z_{2i}'\theta_1^R + Z_{1i}'\theta_2^R + \varepsilon_i^R \tag{19}$$

$$FD_i = \alpha^{FD} + X_i'\beta^{FD} + Z_{2i}'\theta_1^{FD} + Z_{1i}'\theta_2^{FD} + \varepsilon_i^{FD} \tag{20}$$

We obtain the predictions of the endogenous variables, named respectively $\widehat{R}_i$ and $\widehat{FD}_i$. We construct also a new variable $\widehat{R}_i \times \widehat{FD}_i$. Finally, we estimate the structural model of child labor with instrumental variables techniques in which, remittances, financial development and the interaction of the two are instrumented by $\widehat{R}_i$, $\widehat{FD}_i$ and $\widehat{R}_i \times \widehat{FD}_i$[5].

5 Estimations results

We presents the results of the impact of remittances on child labor which depends on the level of financial development and the importance of income shocks. OLS and IV-GMM results are presented side by side for the purpose of comparison. Results with the Tobit estimator applied for instrumental variables are also presented.

5.1 Remittances, financial development and child labor (OLS and IV-GMM results)

We begins by the predictions of remittances, financial development and we interact this predictions. These predictions are obtained from a regression of remittances and financial development on all the included and excluded instruments and on regional dummies. The results of these regressions are shown in Table 2 in Appendix. In line with our expectations, all the coefficients of the instruments retained have the correct sign and in the majority of cases, they are statistically significant (columns 1 and 2, Table 2). We then use the fitted values of remittances and financial development to construct a third variable, precisely,

[5]This approach is also chosen for the estimation of the parameters in the model of child labor which includes income shocks. However, we assume that income shocks are exogenous, in this case only remittances, financial development and the product of remittances with income shocks are instrumented.

the product of the two predictions. All these three predictions are used as instrumental variables for the endogenous regressors in the structural model of child labor. Estimations are realized by the generalized method of moments (IV-GMM). Results are shown in Table 3.

The first two columns show the first-stage results only for remittances and financial development. The third column presents OLS results and finally, the last column presents the results obtained with IV-GMM. We note that the coefficient of remittances, financial development and the interaction of the two are not statistically significant in the case of OLS regressions (column 3). However, when we control for the endogeneity of these variables with instrumental variables, we obtain a significant impact with the expected signs (column 4). When we look at the results of column 4, we see that the coefficients of controls variables have the expected sign and the more important, the marginal impact of remittances on child labor reduction decreases with the level of financial development.

Perhaps a better sense of the quantitative significance of the impact of migrants' remittances can be obtained from the following calculation based on the results of column 4. A one standard-deviation increase in remittances ratio (5,64) is associated with a 18% decrease in child labor relative to the mean (13,47%) for a developing country with a credit ratio which corresponds to the 25th percentile of the distribution of the variable (9,19%).

5.2 Remittances, income shocks and child labor (OLS and IV-GMM results)

As we have doing in the previous analysis, we estimate the model by OLS and by IV-GMM. The equations used to generate the fitted values of remittances and financial development are presented in Table 4. We use the predicted value of remittances to construct a third variable, the interaction of the predicted value of remittances with the shocks variables. We then use these variables as instruments for remittances, financial development and the product of remittances with the four measures of income shocks in the structural model of child labor. Results are presented in Table 6. The effective first-stage regressions are shown in Table 5. Income shocks are measured alternatively as the deviation from a

mixed trend or as the standard-deviation of the GDP per capita growth rate. The periods retained to compute instability are alternatively 5 and 10 years.

In the quasi-totality of regressions, the estimated coefficients of remittances and remittances in interaction with the different measure of income shocks are lower in absolute value in the OLS regressions than in IV-GMM regressions. More importantly, the estimated coefficient of remittances when the variable enters additively is statistically significant and positive while the coefficient of the interaction terms are negative and statistically siginificant in all columns. Whatever how income instability is measured (standard-deviation of the residuals, standard-deviation of GDP per capita growth rate, instability over 5 years or over 10 years), our regressions lead to the following result : the marginal impact of migrants' remittances on child labor reduction increases with the intensity of shocks faced by countries.

On the basis on the results of column 4 of the Table 6, we can quantify the impact of remittances on child labor in a context of income instability. A one standard-deviation increase in remittances ratio is associated with a 13% decrease in child labor relative to the mean for a developing country with a level of income shock which corresponds to the 75th percentile of the distribution of the variable (5,12%).

6 Robustness check : IV-Tobit results

In the sample we use, there is a non-negligeable number of countries for which the serie of the prevalence of child labor is censored at 0. Precisely, there are 15 countries which are concerned. It could be a serious problem in the sense that the estimators used before gives biased results when the dependent variable is censored at a certain value. To solve this problem, we retain the Tobit estimator applied to instrumental variables procedure. Results are presented in Table 7.

There are broadly the same results as before. In column 1, we note that the coefficient of remittances is negative and statistically significant while the coefficient of the product of migrants' remittances with the credit ratio is positive. This result confirms the hypothesis

of a decreasing impact of remittances with the level of financial development. When we turn on the models with income shocks, we get the same results as in the IV-GMM regressions : the marginal impact of remittances increases with the intensity of shocks faced by developing countries. Finally, all the coefficient of our interest variables estimated by IV-Tobit are similar in value, than those obtained with the IV-GMM.

7 Concluding remarks

Workers' remittances, flows received from migrant workers residing abroad, have become the second largest source of external finance for developing countries in recent years. In addition to their increasing size, the stability of these flows despite financial crises and economic downturns make them a reliable source of funds for developing countries. While the development potential of remittance flows is increasingly being recognized by researchers and policymakers, the effect of remittances on child labor at the cross-country level remains unexplored.

This paper is a first effort to try to fill this gap in the literature. We have tested the hypothesis that remittances are more effective when the constraints faced by households of these countries are high. On the basis of a large sample of developing countries observed over the period 1998-2002, we have shown that the marginal impact of migrants' remittances on child labor increases with the levels of financial constraints and the intensity of income shocks. These results are robust to using different estimation techniques and accounting for endogeneity biases arising from omitted factors, reverse causation, and measurement error.

Our results suggest that all strategies to facilitate the inflow of remittances in these countries are important for the accumulation of child human capital and a reduction in the prevalence of child labor. Such a policies have distinct advantages over other remedies. Compared with legal restrictions and direct bans, it can decrease child labor without lowering household welfare, and it is arguably a simpler goal than general economic development and can have a more immediate impact. There would be substantial potential

benefits to the world's poor if more international attention were focused on integrating ‘‘migration policy" within the larger global dialogue on economic development and poverty reduction. With respect to remittances, the international community needs to take efforts to reduce the current high transaction costs of remitting money to labor-exporting countries. At present, high transaction costs resulting from lack of competition, regulation, and/or low levels of financial sector performance in labor-exporting countries act as a type of regressive tax on international migrants, who often tend to be poor and to remit small amounts of money with each remittance transaction. Lowering the transactions costs of remittances will help to increase the economic development-increasing impact of international remittances and will also encourage a larger share of remittances to flow through formal financial channels.

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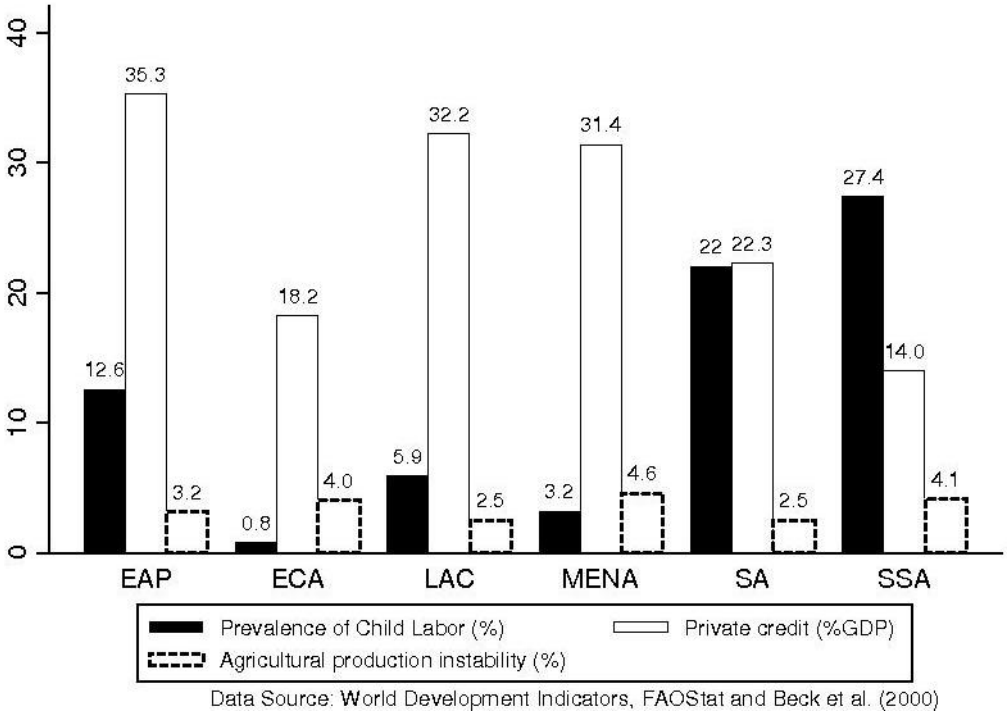
Appendix 1 : Stylized facts on remittances, financial development and the prevalence of child labor in developing countries

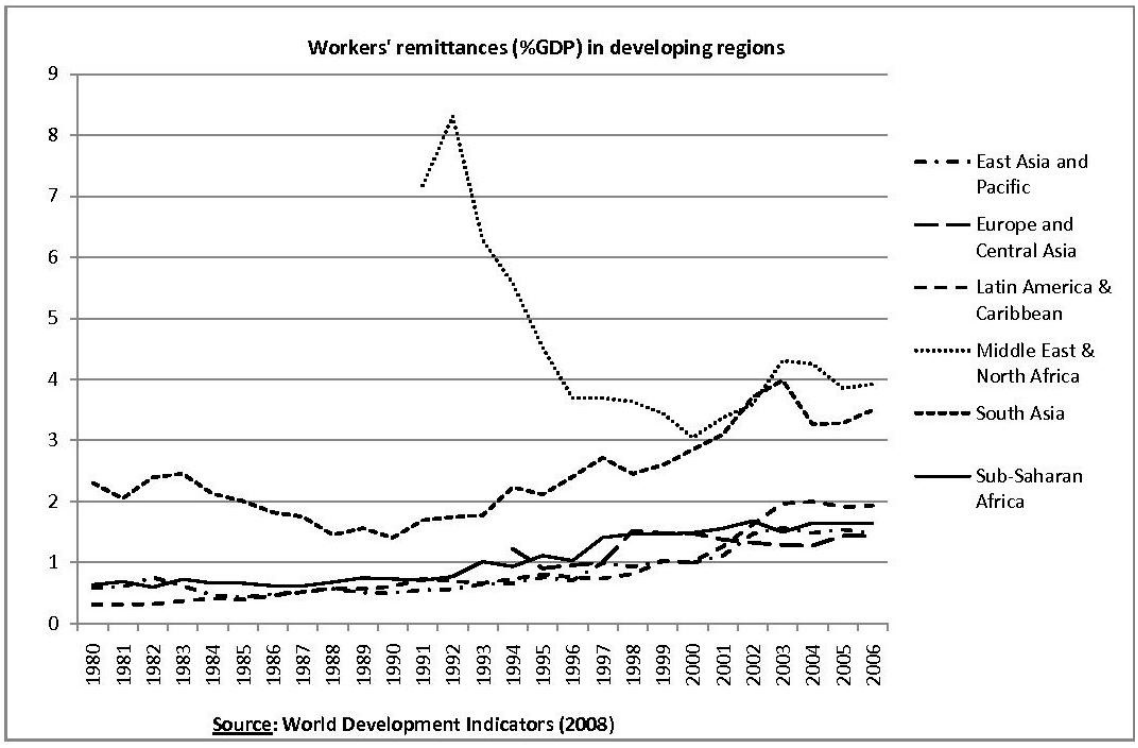
Graph 1 : Prevalence of child labor, financial development and agricultural instability in the developing world



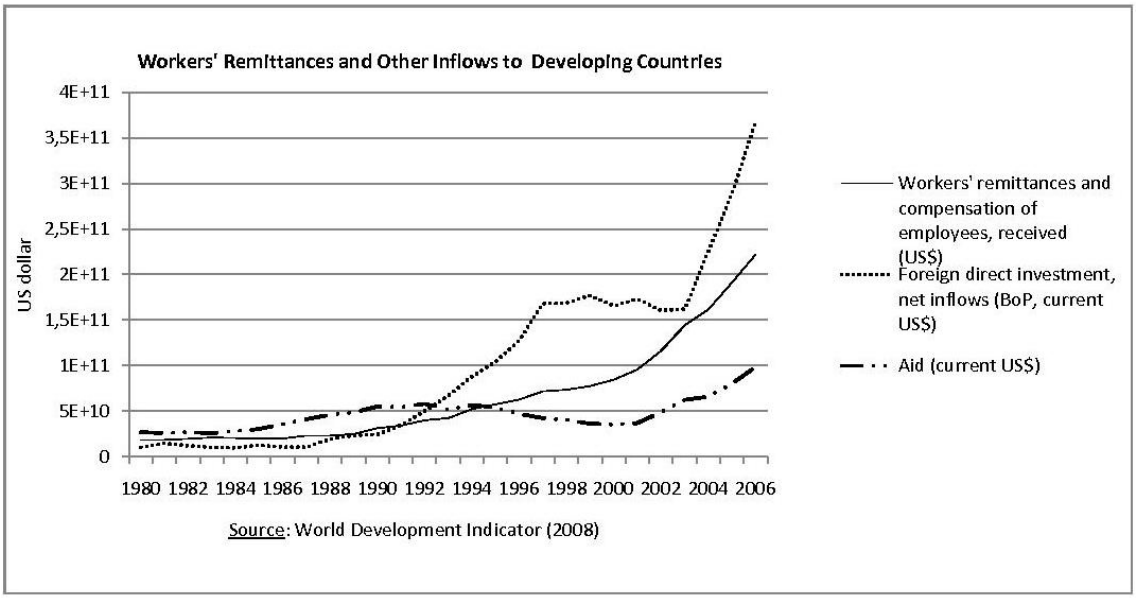
Data Source: World Development Indicators, FAOStat and Beck et al. (2000)

Note : EAP = East Asia and Pacific, ECA=Europe and Central Asia, LAC=Latin America and Caribean, MENA= Middle East and North Africa, SA=South Asia, SSA= Sub-saharan Africa

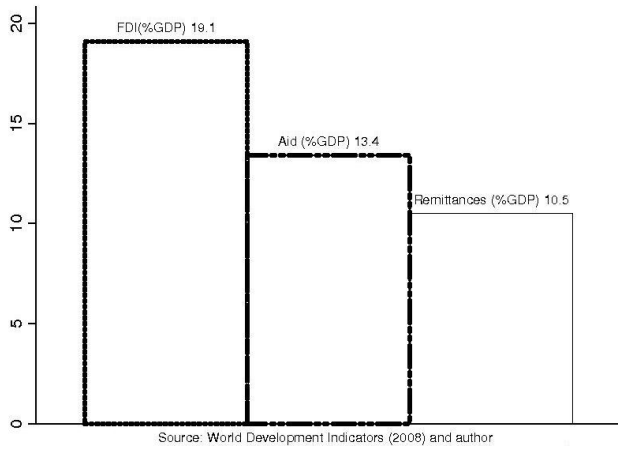
Graph 2 : Remittances trends since 1980 in developing regions



Graph 3 : Workers' Remittances and Other Inflows to Developing Countries



Graph 4 : Volatility of Inflows to Developing Countries (1980-2006)



Note : Volatility is measured as the standard-deviation of the growth rate of the variable.

Appendix 2 :

Table 1 : Descriptive statistics

Variable	Observations	Mean	Standard-deviation	Min	Max
Child labor 10-14 years (%)	132	13.47115	14.78077	0	51.1312
Remittances (%PIB)	114	3.891674	5.640604	.0172776	33.00707
Privatecredit (%PIB)	112	23.17532	22.06808	.55132	137.3211
Instability from a mixed trend (5 years)	127	4.988677	5.609823	.4706776	41.51845
Standard-deviation of GDP per capita growth (5 years)	127	5.63504	6.338833	.410161	42.61995
Instability from a mixed trend (10 years)	124	5.439279	5.438478	1.174775	38.48299
Standard-deviation of GDP per capita growth (10 years)	124	6.714526	6.919691	.76305	44.73448
GDP per capita 1998 (log)	127	7.991583	.9234148	5.920403	9.70868
Rural population (%)	132	53.63764	20.98305	8.712	91.388
Agricultural production per capita 1990 (FAO index)	131	4.589212	.1297413	4.268718	4.956531
Trade openess (%)	125	79.24884	39.5721	1.530677	216.3228
Migration (%) 2000	128	4.01114	5.84104	.035695	40.52468
Law & Order	99	3.4383	1.095323	1	6
Coastal area (%area 100km)	125	.2860509	.3159494	0	1
Dual exchange rate *dummy*	127	.1417323	.3501566	0	1
Distance (log)	119	7.590163	.8281206	5.225291	8.9986
Creditor rights index	101	1.70495	1.143186	0	4
Credit registries *dummy*	101	.6891089	.4458477	0	1

Table 2: Prediction of remittances and private credit

	Dependent variables	
	remittances	crédit
Child labor 1960	-0.0260	0.102
	(-0.479)	(0.519)
International migration stock (% population) 2000	0.107	0.410
	(1.126)	(1.135)
GDP per capita 1998 (log)	-1.921	10.26**
	(-1.603)	(2.270)
Rural population (%)	0.0435	0.285
	(0.749)	(1.342)
Agricultural production per capita 1990 (log)	5.488	-0.0544
	(1.234)	(-0.00338)
Trade openess	0.0195	0.173**
	(0.924)	(2.168)
Law&Order	-0.573	14.70***
	(-0.510)	(3.370)
lc100km	**4.823****	**-3.853**
	(2.491)	**(-0.534)**
ldist	**-2.356****	**7.690****
	(-2.483)	**(2.042)**
dexrt	**-1.829**	**-9.391***
	(-1.221)	**(-1.692)**
Credit registries	**-0.760**	**11.93****
	(-0.527)	**(2.314)**
Creditor rights	**-0.352**	**4.405****
	(-0.724)	**(2.537)**
Constant	3.796	-165.4*
	(0.155)	(-1.813)
Number of observations	88	86
R^2	0.427	0.641

Note : t-statistics in parentheses. lc100km : Ratio of coastal area (area within 100km of sea/ocean) to total area. ldist : logarithm of the distance beteween a developing country i and a country j which contains the largest share of country i's migrant workers. dexrt : binary indicator specifies if a country has more than one exchange rate that may be used simultaneously for different purposes and/or by different entities. Credit registries : The variable equals one if either a public registry or a private bureau operates in the country, zero otherwise. Creditor rights : An index aggregating creditor rights. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights). remittances : Remittances in percentage of GDP. Crédit : Private credit by deposit banks in percentage of GDP. Regional dummies are included in all regressions but they are not reported in the table. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Remittances, financial development and child labor: Results with migration

Dependent variable: Child labor	First Stage		OLS	IV-GMM
	remittances	credit	3	4
Child labor 1960	0.00973	0.0444	0.462***	0.481***
	(0.307)	(0.279)	(7.426)	(7.559)
International migration stock (% population) 2000	0.0877	0.0249	0.0220	-0.161
	(0.623)	(0.0748)	(0.236)	(-1.029)
GDP per capita 1998 (log)	0.387	1.051	-3.955***	-2.679
	(0.157)	(0.170)	(-3.988)	(-1.600)
Rural population (%)	-0.00494	-0.0376	0.0813*	0.114*
	(-0.0690)	(-0.151)	(1.950)	(1.764)
Agricultural production per capita 1990 (log)	-0.688	-4.999	2.938	2.264
	(-0.131)	(-0.235)	(0.609)	(0.371)
Trade openess	0.0115	-0.00369	-0.0318	0.00621
	(0.213)	(-0.0349)	(-1.441)	(0.189)
Law&Order	-0.374	-1.600	-0.377	-0.101
	(-0.185)	(-0.320)	(-0.361)	(-0.0783)
$\widehat{R}$	1.468***	0.447		
	(3.232)	(0.330)		
$\widehat{FD}$	0.0460	1.084***		
	(0.354)	(3.479)		
$\widehat{R} \times \widehat{FD}$	-0.0159	-0.00915		
	(-1.533)	(-0.223)		
Remittances (%PIB)			-0.167	-0.609**
			(-1.165)	(-2.088)
Private credit (%PIB)			0.0259	-0.0553
			(0.789)	(-0.707)
Remittances×Private credit			0.00308	0.0186*
			(0.592)	(1.749)
Constant	-4.128	12.32	20.89	10.84
	(-0.198)	(0.0904)	(1.066)	(0.389)
Number of observations	82	82	95	82
R^2	0.475	0.645	0.911	0.898

Note : Robust t-statistics in parentheses. Remittances, credit and the interaction of the two, are instrumented by the predictions of remittances ($\widehat{R}$), credit ($\widehat{FD}$) and by the product of these two predictions ($\widehat{R} \times \widehat{FD}$). These predictions are obtained from the regressions presented in Table 2. Regional dummies are included in all regressions. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Prediction of remittances and private credit

Dependent variable:	remittances	credit	remittances	credit	remittances	credit	remittances	credit
Child labor 1960	-0.00576	0.163	-0.00954	0.152	-0.00919	0.158	-0.0117	0.135
	(-0.123)	(0.926)	(-0.208)	(0.862)	(-0.202)	(0.887)	(-0.264)	(0.730)
International migration stock (% population) 2000	0.0614	0.318	0.0646	0.333	0.0707	0.319	0.0769	0.352
	(0.300)	(0.693)	(0.318)	(0.737)	(0.335)	(0.666)	(0.370)	(0.743)
GDP per capita 1998 (log)	-2.344*	9.691*	-2.345*	9.709*	-2.198*	9.701*	-2.115*	10.05*
	(-1.896)	(1.739)	(-1.891)	(1.771)	(-1.789)	(1.724)	(-1.719)	(1.815)
Rural population (%)	-0.0190	0.174	-0.0169	0.185	-0.0155	0.185	-0.0127	0.206
	(-0.633)	(0.783)	(-0.570)	(0.846)	(-0.502)	(0.830)	(-0.413)	(0.929)
Agricultural production per capita 1990 (log)	4.445	-13.49	4.423	-13.03	3.752	-14.31	3.519	-15.24
	(1.080)	(-0.660)	(1.085)	(-0.656)	(0.934)	(-0.709)	(0.875)	(-0.779)
Trade openess	0.00687	0.197**	0.00748	0.198**	0.00881	0.194**	0.00845	0.191*
	(0.278)	(2.048)	(0.300)	(2.048)	(0.347)	(2.005)	(0.334)	(1.950)
Law&Order	-0.935	13.85***	-1.056	13.47***	-1.270	13.91***	-1.318	13.42***
	(-1.060)	(3.186)	(-1.216)	(3.064)	(-1.429)	(3.205)	(-1.487)	(2.999)
lc100km	**7.383*** **	**5.134**	**7.295*** **	**5.031**	**7.061*** **	**4.994**	**7.070*** **	**5.056**
	(4.164)	**(0.675)**	**(4.045)**	**(0.664)**	**(3.794)**	**(0.657)**	**(3.769)**	**(0.672)**
ldist	**-2.493****	**7.266****	**-2.469****	**7.407****	**-2.686****	**7.107****	**-2.702****	**6.966****
	(-2.417)	**(2.311)**	**(-2.447)**	**(2.336)**	**(-2.500)**	**(2.220)**	**(-2.519)**	**(2.186)**
dexrt	**-1.138**	**-2.763**	**-1.144**	**-2.878**	**-0.809**	**-2.885**	**-0.774**	**-2.908**
	(-1.233)	**(-0.554)**	**(-1.219)**	**(-0.570)**	**(-0.832)**	**(-0.573)**	**(-0.786)**	**(-0.573)**
Credit registries	**-0.557**	**13.49*** **	**-0.618**	**13.31*** **	**-0.317**	**13.69*** **	**-0.281**	**13.64*** **
	(-0.279)	**(3.006)**	**(-0.307)**	**(2.995)**	**(-0.153)**	**(3.072)**	**(-0.134)**	**(3.052)**
Creditor rights	**-0.383**	**3.630****	**-0.368**	**3.639****	**-0.311**	**3.747****	**-0.298**	**3.818****
	(-0.895)	**(2.393)**	**(-0.863)**	**(2.397)**	**(-0.744)**	**(2.451)**	**(-0.716)**	**(2.491)**
Instability from a mixed trend (5 years)	-0.130	-0.562						
	(-1.114)	(-1.097)						
Standard deviation of GDP per capita growth (5 years)			-0.134	-0.615				
			(-1.252)	(-1.467)				
Instability from a mixed trend (10 years)					-0.0971	-0.568		
					(-0.734)	(-1.255)		
Standard deviation of GDP per capita growth (10 years)							-0.0433	-0.415
							(-0.379)	(-1.257)
Constant	20.60	-85.39	20.55	-88.66	23.42	-80.74	23.62	-79.09
	(0.968)	(-0.655)	(0.976)	(-0.686)	(1.070)	(-0.604)	(1.079)	(-0.600)
Number of observations	88	86	88	86	85	85	85	85
R^2	0.352	0.563	0.355	0.566	0.355	0.561	0.354	0.561

Note : t-statistics in parentheses. lc100km : Ratio of coastal area (area within 100km of sea/ocean) to total area. ldist : logarithm of the distance beteween a developing country i and a country j which contains the largest share of country i's migrant workers. dexrt : binary indicator specifies if a country has more than one exchange rate that may be used simultaneously for different purposes and/or by different entities. Credit registries : The variable equals one if either a public registry or a private bureau operates in the country, zero otherwise. Creditor rights : An index aggregating creditor rights. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights). remittances : Remittances in percentage of GDP. Crédit : Private credit by deposit banks in percentage of GDP. Regional dummies are included in all regressions but they are not reported in the table. *** p<0.01, ** p<0.05, * p<0.1. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: First-stage regressions of remittances and credit wih a control for migration effects

Dependent variable:	remittances	crédit	remittances	crédit	remittances	crédit	remittances	crédit
Child labor 1960	0.0112	0.0384	0.0123	0.0410	0.0101	0.0361	0.0111	0.0384
	(0.206)	(0.278)	(0.234)	(0.300)	(0.188)	(0.247)	(0.221)	(0.254)
International migration stock (% population) 2000	0.0434	0.0875	0.0438	0.100	0.0384	0.0859	0.0393	0.0932
	(0.254)	(0.211)	(0.254)	(0.243)	(0.226)	(0.205)	(0.231)	(0.220)
GDP per capita 1998 (log)	0.312	0.730	0.319	0.612	0.0643	0.544	0.0154	0.362
	(0.170)	(0.143)	(0.174)	(0.122)	(0.0351)	(0.105)	(0.00832)	(0.0719)
Agricultural production per capita 1990 (log)	1.342	-5.260	1.307	-4.883	1.488	-4.904	1.562	-4.365
	(0.278)	(-0.219)	(0.273)	(-0.211)	(0.330)	(-0.202)	(0.342)	(-0.184)
Rural population (%)	0.00468	0.00201	0.00613	0.00629	0.00724	0.00732	0.00682	0.00797
	(0.118)	(0.0102)	(0.152)	(0.0329)	(0.178)	(0.0373)	(0.160)	(0.0414)
Trade openess	0.00694	0.0127	0.00641	0.0151	-0.000303	0.00770	0.00416	0.0191
	(0.152)	(0.142)	(0.139)	(0.166)	(-0.00662)	(0.0849)	(0.0921)	(0.203)
Law&Order	-0.119	-0.215	-0.107	-0.237	0.206	-0.0548	0.0884	-0.392
	(-0.0675)	(-0.0521)	(-0.0633)	(-0.0571)	(0.116)	(-0.0132)	(0.0522)	(-0.0942)
Instability from a mixed trend (5years)	-0.258	-0.504						
	(-1.401)	(-0.643)						
$\widehat{R}$(a)	0.650**	-0.901						
	(2.079)	(-0.738)						
$\widehat{FD}$(a)	-0.00500	1.009***						
	(-0.0436)	(4.671)						
$\widehat{R}(a)$×Instability from a mixed trend (5years)	0.0877	0.217						
	(1.280)	(1.154)						
Standard-deviation of GDP per capita growth (5years)			-0.182	-0.524				
			(-1.279)	(-0.818)				
$\widehat{R}$(b)			0.703**	-0.963				
			(2.583)	(-0.798)				
$\widehat{FD}$(b)			-0.00479	1.007***				
			(-0.0411)	(4.684)				
$\widehat{R}(b)$×Standard-deviation of GDP per capita growth (5 years)			0.0650	0.197				
			(1.486)	(1.535)				
Instability from a mixed trend (10 years)					-0.324*	-0.646		
					(-1.899)	(-0.805)		
$\widehat{R}$(c)					0.514*	-1.189		
					(1.859)	(-0.820)		
$\widehat{FD}$(c)					0.00755	1.019***		
					(0.0647)	(4.662)		
$\widehat{R}(c)$×Instability from a mixed trend (10 years)					0.111**	0.252		
					(2.639)	(1.513)		
Standard-deviation of GDP per capita growth (10 years)							-0.268**	-0.595
							(-2.043)	(-0.888)
$\widehat{R}$(d)							0.607**	-1.007
							(2.512)	(-0.751)
$\widehat{FD}$(d)							-0.000121	1.000***
							(-0.00103)	(4.555)
$\widehat{R}(d)$×Standard-deviation of GDP per capita growth (10 years)							0.0671***	0.153
							(3.684)	(1.489)
Constant	-8.539	18.00	-8.713	17.29	-6.693	18.69	-6.784	17.63
	(-0.483)	(0.150)	(-0.485)	(0.147)	(-0.395)	(0.150)	(-0.399)	(0.144)
Observations	82	82	82	82	81	81	81	81
R^2	0.381	0.567	0.381	0.573	0.395	0.569	0.396	0.570

Note : Robust t-statistics in parentheses. Remittances, credit and the interaction of the two, are instrumented by the predictions of remittances ($\widehat{R}$), credit ($\widehat{FD}$) and by the product of these two predictions ($\widehat{R} \times \widehat{FD}$). These predictions are obtained from the regressions presented in Table 4. The first-stage equations of $R \times FD$ are nor reported. Letters a to b next to each of the predicted variables reflect the prediction obtained when we consider each of the measure of instability following the order retained in Table 4. Regional dummies are included in all regressions. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Remittances, income shocks and child labor: Estimations results with a control for migration

Dependent variable:	OLS	IV-GMM	OLS	IV-GMM	OLS	IV-GMM	OLS	IV-GMM
Child labor	1	2	3	4	5	6	7	8
Child labor 1960	0.470***	0.499***	0.470***	0.497***	0.470***	0.499***	0.471***	0.515***
	(7.349)	(8.488)	(7.375)	(8.754)	(7.489)	(8.603)	(7.498)	(9.082)
International migration stock (% population) 2000	-0.00347	0.00537	-0.00297	-0.00770	0.0364	0.0413	0.0247	-0.000536
	(-0.0484)	(0.0766)	(-0.0425)	(-0.102)	(0.522)	(0.526)	(0.351)	(-0.00644)
GDP per capita 1998 (log)	-3.804***	-4.153***	-3.840***	-4.251***	-3.860***	-4.266***	-3.865***	-4.613***
	(-3.927)	(-2.966)	(-3.890)	(-3.162)	(-3.823)	(-3.067)	(-3.818)	(-3.448)
Agricultural production per capita 1990 (log)	0.746	7.431	1.238	7.463	1.206	7.490	1.781	8.418
	(0.160)	(1.332)	(0.270)	(1.338)	(0.252)	(1.364)	(0.378)	(1.527)
Rural population (%)	0.0705*	0.0503	0.0696*	0.0433	0.0681*	0.0389	0.0649	0.0188
	(1.795)	(1.040)	(1.762)	(0.914)	(1.670)	(0.820)	(1.551)	(0.382)
Trade openess	-0.0359*	-0.0195	-0.0369*	-0.0243	-0.0351*	-0.0281	-0.0357*	-0.0298
	(-1.841)	(-0.705)	(-1.891)	(-0.950)	(-1.761)	(-1.067)	(-1.741)	(-1.131)
Law&Order	-0.350	-0.314	-0.346	-0.159	-0.384	-0.519	-0.239	-0.160
	(-0.369)	(-0.218)	(-0.363)	(-0.111)	(-0.403)	(-0.367)	(-0.245)	(-0.111)
Private credit (%GDP)	0.0368	0.00310	0.0377	0.00936	0.0382	0.0282	0.0362	0.0400
	(1.285)	(0.0451)	(1.330)	(0.148)	(1.357)	(0.426)	(1.278)	(0.618)
Remittances (%PIB)	0.403*	0.234	0.302*	0.181	0.326	0.302	0.191	0.0929
	(1.920)	(0.673)	(1.979)	(0.598)	(1.604)	(0.769)	(1.426)	(0.269)
Instability from a mixed trend (5 years)	0.394**	0.489**						
	(2.537)	(2.210)						
Remittances×Instability from a mixed trend (5 years)	-0.110***	-0.129*						
	(-2.839)	(-1.893)						
Standard-deviation of GDP per capita growth (5 years)			0.330***	0.469**				
			(2.659)	(2.323)				
Remittances×Standard-deviation of GDP per capita growth (5 years)			-0.0791***	-0.0947**				
			(-3.484)	(-2.198)				
Instability from a mixed trend (10 years)					0.377**	0.623***		
					(2.253)	(2.802)		
Remittances×Instability from a mixed trend (10 years)					-0.0801**	-0.110**		
					(-2.581)	(-2.021)		
Standard-deviation of GDP per capita growth(10 years)							0.281**	0.492***
							(2.419)	(2.856)
Remittances×Standard-deviation of GDP per capita growth (10 years)							-0.0415***	-0.0497**
							(-3.472)	(-2.158)
Constant	29.28	-2.241	27.80	-1.122	26.83	-2.260	24.75	-2.833
	(1.541)	(-0.0923)	(1.474)	(-0.0459)	(1.393)	(-0.0937)	(1.281)	(-0.115)
Observations	95	82	95	82	94	81	94	81
R^2	0.918	0.880	0.919	0.884	0.915	0.879	0.916	0.883

Note : Robust t-statistics in parentheses. Regional dummies are included. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Remittances and child labor: IV-Tobit results with a control for migration effects

Dependent variable:	IV-Tobit				
Child labor	1	2	3	4	5
Child labor 1960	0.515***	0.568***	0.565***	0.566***	0.577***
	(7.828)	(9.000)	(9.016)	(8.734)	(9.033)
International migration stock (% population) 2000	-0.333	-0.0985	-0.109	-0.0507	-0.0895
	(-1.439)	(-0.784)	(-0.876)	(-0.408)	(-0.709)
GDP per capita 1998 (log)	-2.996	-5.142***	-5.257***	-5.360***	-5.797***
	(-1.402)	(-3.165)	(-3.286)	(-3.269)	(-3.552)
Agricultural production per capita 1990 (log)	5.611	6.639	6.776	7.226	8.581
	(0.869)	(1.092)	(1.134)	(1.193)	(1.444)
Rural population (%)	0.0913	0.00170	-0.00532	-0.0150	-0.0307
	(1.222)	(0.0304)	(-0.0959)	(-0.263)	(-0.533)
Trade openess	-0.00823	-0.0318	-0.0359	-0.0402	-0.0393
	(-0.217)	(-1.068)	(-1.194)	(-1.300)	(-1.257)
Law&Order	-0.539	-0.754	-0.635	-0.911	-0.702
	(-0.295)	(-0.453)	(-0.386)	(-0.539)	(-0.420)
Private credit (%GDP)	-0.0611	0.0564	0.0613	0.0804	0.0878
	(-0.597)	(0.760)	(0.838)	(1.070)	(1.155)
Remittances (%PIB)	-0.578	0.611	0.485	0.664	0.307
	(-1.627)	(1.258)	(1.138)	(1.167)	(0.680)
Remittances×Private credit	0.0248*				
	(1.872)				
Instability from a mixed trend (5 years)		0.663**			
		(2.256)			
Remittances×Instability from a mixed trend (5 years)		-0.165**			
		(-2.148)			
Standard-deviation of GDP per capita growth (5 years)			0.576**		
			(2.262)		
Remittances×Standard-deviation of GDP per capita growth (5 years)			-0.115**		
			(-2.326)		
Instability from a mixed trend (10 years)				0.794**	
				(2.483)	
Remittances×Instability from a mixed trend (10 years)				-0.138*	
				(-1.908)	
Standard-deviation of GDP per capita growth(10 years)					0.516**
					(2.089)
Remittances×Standard-deviation of GDP per capita growth (10 years)					-0.0572*
					(-1.682)
Constant	2.315	7.226	8.337	5.943	4.811
	(0.0707)	(0.242)	(0.281)	(0.198)	(0.161)
Observations	82	82	82	81	81

Note : t-statistics in parentheses. Regressions are carried out by the two step approach of Newey. As in all other previous estimations, remittances, financial developmment and the interactive terms are instrumented. *** p<0.01, ** p<0.05, * p<0.1.

Appendix 3

Table 8: Definitions and sources of variables

Variables	Definitions	Sources
Child labor	Percentage of the population in the 10–14-year-old age range that is actively engaged in work	World Development Indicators (2004)
Crédit	Private credit by deposit banks in percentage of GDP	Thorsten Beck, Asli Demirgüç-Kunt et Ross Levine: "A New Database on Financial Development and Structure
Trade openess	Sum of exports and imports of goods and services expressed in percentage of GDP	
Rural population	Share of rural population in the total population	
Remittances	This variable include three categories : "unrequited transfers" which refer to money sent by migrants to family and friends to the home country, "migrant transfers" which are equal to the net worth of the migrants (considered here as individual's change of residence for at least one year) and finally "compensation of employees" which represent funds sent back by temporary workers who work abroad for less than a year	World Development Indicators 2008
GDP per capita	Gross domestic product per capita in constant prices (Chain index)	Penn World Table 6.2.
Income variability	For each country, we define income variability by two distincts measures: (1) Standard-deviation of the residuals obtained from a regression of GDP per capita on his own one-year lag and on a linear trend. The trend is measured from a global adjustment (1960-2002). (2) Standard-deviation of GDP per capita growth rate	Penn World Table 6.2. and author's calculations
Credit registries	The variable equals one if either a public registry or a private bureau operates in the country, zero otherwise	Djankov et al. (2007)
Creditors rights	An index aggregating creditor rights. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights)	
Coastal area (*lc 100km*)	Ratio of coastal area (area within 100km of sea/ocean) to total area	CID, Harvard
Dual exchange rate regime (*dexrt*)	binary indicator specifies if a country has more than one exchange rate that may be used simultaneously for different purposes and/or by different entities.	IMF's Annual Report on Exchange Arrangements and Exchange Restrictions, 2003 (ARREAR)
Migration in 2000	International migration stock in percentage of total population	United Nations Population Division, Trends in Total Migrant Stock.