# REMITTANCES, FINANCIAL DEVELOPMENT AND EDUCATION IN LATIN AMERICA

**By**

**RUBIO CAMPOS, Lesly Yohana**

**THESIS**

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

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Committee in charge:

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# ABSTRACT

## REMITTANCES, FINANCIAL DEVELOPMENT AND EDUCATION IN LATIN AMERICA

**By**

Lesly Yohana Rubio Campos

This thesis studies the relationship between remittances and education in the period of 2000-2013, and how financial development interacts to influence the impact of remittances. We aim to focus on the Latin American region and use a fixed effect regression model to test our hypothesis. We find that remittances have a positive correlation with education, and it may be enhanced by the financial development of every country. The result is consistent with previous research regarding the positive impact of remittances on education, economic growth and other investments. There has been previous empirical work that proves how financial development influences the impact of remittances in areas such as economic growth. But the present study is the first to inquire on the interaction of financial development on education.

# ACKNOWLEDGEMENTS

First of all, I would like to express my gratitude to the Almighty God; it would have not been possible to write this thesis without His wisdom and favor. I also want to express my sincere thankfulness to my advisor Professor Shun Wang for his guidance, and continuous advice; and to Professor Taejong Kim, member of the POS committee. Finally, I would like to thank to all professors and KDI School staff members for their tremendous teachings and support.

I dedicate this thesis to my dearest parents, and family in Guatemala, for their constant prayers and encouragement during my time of studies at KDI School. They were an inspiration indeed.


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# INTRODUCTION

Immigration is a phenomenon that has been present throughout history. The motives vary from political repression, the search for economic development and social changes, among others. In the contemporary world, this issue generally occurs in developed countries since there is empirical evidence that people tend to migrate to those countries that offer better standards of living, as Gordon H. Hanson asserts (4364). One vivid example is the immigration flows to the United States of America. This country's history is shaped with the experience of foreigners seeking to attain the so-called *American Dream*[1]. Immigrant groups come and go across all continents; however, in the second half of the 20th. Century, the last immigration wave was reported. The Public Policy Institute of California, an organization that works to improve public policies in the State of California, U. S., reported that Latin American countries positioned in the top ten of source-countries of immigrants in the United States in 2009, and continue to be so (3).

Migration's impact is mostly reflected through remittances in Latin American countries. In fact, money transfers play an important role in the economic development in the last years. Many studies and reports show that remittances have surpassed the levels of ODA in developing countries and have been influential in the national and household budgets. For instance, Strielkowski found that in South Asia "remittances have contributed to the increase of GDP per capita" in a greater manner than ODA (120). Consistently, Adams Bodomo found that Africa receives more money as remittances than as ODA. It also showed evidence that remittances are more efficient than aid funds since they reach directly to households (21). In addition, international organizations like the

[1] According to Truslow Adams, the *American Dream* refers to the dream of a land where everyone could have opportunity to be richer and live life to the fullest.

OECD and World Bank have reported the steady increase of remittances over ODA and sometimes, even over Foreign Direct Investment (FDI) as well. The Migration and Remittances Factbook 2011 released by the World Bank shows that remittances have increased steadily and surpass ODA since the period of 2000 to present (39). As in April 4, 2012, the OECD also reported the fall of ODA levels in 2011, mainly due to the "global recession". Even though, both ODA and remittances recovered eventually, the impact of remittances remains greater.

Interestingly, there are mixed results regarding the impact of remittances in the economies as we will elaborate eventually. On one hand, these flows are used as substitutes of income from wages, which are not perceived due to unemployment; they can even be detrimental for the labor markets since they might discourage existent employment. They can also be used to increase the consumption behavior of people. On the other hand, there is evidence that people have increased savings and made investments in housing and education. Moreover, there are external conditions that may affect the impact of these money flows in the recipient countries such as, inflation or the degree of development of the financial institutions. In the case of Latin America, it is widely known that the financial institutions suffered instability and financial crisis in the 1980s and 1990s. However, in the early 2000s, they have been strengthened. As Augusto de la Torre et al. argue, the banking system and stock markets have expanded, and the institutions have diversified through an increase in savings, credits and payments (1-3). There are still many challenges ahead, but the institutions have also established the foundation for a better use of resources.

Since 1990s, remittances have grown in Latin America, and they play an important part of many economies. They have incentivized the creation of new

institutions in the private and public sectors. According to Dean Yang, financial institutions and "money transfer operators" have consolidated their services as a result (132). As stated on the Inter-American Development Bank's website, national governments have created agencies to support migrant workers, and international organizations, such as the before mentioned, have also initiatives to integrate remittances and migrants in development programs, such as the Multilateral Investment Fund[2]. Education has also been influenced by the creation and expansion of private schools, and vocational institutes. Latin America still lacks of a good implementation of education policies. Thus, private education has found a place in the region. Private schools offer different prices and quality options. This phenomenon has consolidated mainly in the higher education sector. In the last years, private higher education has grown from 3 to 34 percent of the region's total enrollment, according to Daniel C. Levy (2). Demand for education has increased since enrollment rates have risen.

This evidence shows how the financial and education sectors are awaken in Latin America. On the other side, remittances have grown in importance and they have been studied since the second half of the 20th century. However, the studies related to the effects of remittance flows in human capital development are still a few, especially in Latin America. Additionally, to the best of our knowledge, there is still no study that verifies the effect of remittances on education regarding the financial development of the countries. Therefore, the objective of this research is to identify whether there is an impact of remittances in education in Latin American countries, and if that impact is conditioned or affected by the degree of financial development of the countries.

[2] "Remittances", the Inter-American Development Bank. Accessed on March 13, 2015 http://www.iadb.org/en/topics/remittances/remittances,1545.html

This paper will proceed as follows. Chapter 2 includes literature review about previous empirical findings about the study of remittances, financial development and education. Chapter 3 describes the data used and the methodology adopted, which is the fixed effect regression model. Chapter 4 presents the results and main findings of the study. Finally, Chapter 5 contains the conclusions and comments regarding this study.

## LITERATURE REVIEW

Throughout history, Latin America has been left out in terms of education objectives. Public and private investment in this regard has always been low compared to other regions. Education quality and coverage have always faced challenges; it is until recent years that many countries in the region have had important achievements, such as higher literacy rates, and school enrollment rates. Interestingly, Latin America has increased the social investment, including education, in spite of many economic fluctuations in the period. At the same time, remittances have gained an important place in many household budgets since 1980s. Additionally, remittances account for over 10 percent of the GDP in many developing countries like El Salvador, Honduras and Jamaica (129), according to a poverty reduction report from UNDP in 2011.

Some studies have started to investigate how education is affected by remittances. On one side, education enrollment and investment has increased due to remittance flows. For instance, Richard H. Adams Jr. and Alfredo Cuecuecha used a two stage selection model to compare the effects of remittances on education in households receiving remittances and those that do not in Guatemala. Interestingly, they found that households that receive remittances spend less and invest more, mainly at the margin of two areas: education and housing (2, 13). In fact, "at the mean, households receiving internal and international remittances spend 377% and 194% percent more, respectively, on education than households which do not receive remittances" (8). In addition, the increase of housing investments is "136% or 81% more, [for international and national remittances] respectively, than what they would have spent on this good without the receipt of remittances" (9). The impact is thus, considerable. These investments increase human capital, boost the labor market and invigorate the economy.

In El Salvador, Cox Edwards and Ureta found a significant positive impact of international remittances on school retention. While they found that parents schooling is determinant for school retention, they also found a positive correlation of remittances with dropping out of school (429). Calero León et al. concluded that remittances increase school enrollment. Using instrumental variables, the authors also find it relevant to have remittances and child labor to be "coping mechanisms" (1143). Lopez-Cordova and Alexandra Olmedo also suggest that remittances can impact positively to the economic welfare of recipient countries and confirm the findings regarding school retention of children (1). C. Kenrick Hunte studied eighteen developing countries and confirmed that remittances respond negatively to income increase. That is, "one percentage increase in household income results in a 0.8 percent decrease in remittances." (82) This supports the fact that remittances substitute the lack of income. Therefore, people still use it wisely and prefer to invest it.

On the other side, some studies have also suggested that remittances are not beneficial. Chami et al. concludes that remittances reduce the labor market participation and have a negative correlation with GDP growth (5). This is consistent with previous findings that suggest dependency in remittances and decrease of incentives to pursue education and labor opportunities. The authors detect a "moral hazard problem" with remittances (4). In general, it is believed that international remittances impact positively education attainment in recipient countries. However, there is no consensus yet. The tools and studies performed up to the present are still not enough in order to unify into a single framework. The causes and effects are still dispersed and diverse among countries. But the trend of remittances continues to be positive in recipient economies.

All this evidence brings about further questions, such as what are the determinants for the positive or negative impact of remittances in recipient countries. Thus, there are many factors to examine; among them, the financial development of recipient countries and the extent of its impact. Aggarwal et al. studied particularly this issue. They found a significant and positive impact of remittances on financial development in 99 countries for a period of 28 years (255). This issue has awakened the interest of many researchers since remittances have become an important fund, especially for developing countries.

At present, there is much research on the direct impact of remittances in education, economic growth and now, financial development in the recipient countries. The case of Latin America becomes a good breeding ground since it is one of the biggest recipient regions in the last years. Particularly, Mexico, Central America and some Caribbean economies have shown the importance of immigrant workers' remittances.

As a new step further in the remittances studies, some research has arouse to determine how institutions determine the impact of remittances on areas such as economic growth, as studied by Natalia Catrinescu et al. That is, the more developed the institutions, the greater the impact and "efficiency" of remittances in the countries' economies (90). Paola Giuliano and Marta Ruiz-Arranz have also touched upon this mater. They questioned whether the impact of remittances on economic growth was linked through other factors, specifically, to financial development. Their findings confirm that remittances boost growth in countries with less developed financial systems. Thus, remittances replace the lack of access to credits of the population (144). Then, the contribution of remittances in Latin American is greater in some countries.

Regarding the study of education, there is no study yet that can help us determine the impact of remittances on education conditioned by the level of financial development.

Therefore, this study aims to answer that important question. Does the financial development of recipient countries conditions the impact of remittances on education? We look forward to find out whether this link is positive or negative.

## DATA AND METHODOLOGY

### A. DATA

In this section, we describe the data used in the regression model. The dependent variable will be education. Due to previous findings that confirm remittances have a positive impact, especially on higher education; secondary school enrollment is the chosen measurement[3]. This includes public and private schools and all secondary levels. It is known that secondary education is ideal to evaluate the improvements in education coverage and quality. When enrollment rates rise, it is a sign of more investments and household budget increase. Also, the compilation of the private and public investments will help to capture not only the government interests in education, but people's private investments as well. We use the secondary school enrolment rate, from the World Development Indicator 2014.

The main explanatory variable will be the ratio of remittances to GDP. This study does not include informal remittances which are presumed to be very high. According to Giuliano and Ruiz-Arrenz, the levels of informal remittances should have reduced in the last years due to the efforts to counteract "money laundering" (146). The creation of many institutions in the public and private sector has proven to be an attempt to formally receive these money flows in Latin America. They also argue that all research papers regarding remittances face this issue. Thus, it is difficult to determine whether these informal transfers may affect our results (146).

The estimation for financial development is still debatable among researchers. Among the most used indicators, there is M2. This represents liquid liabilities of the

[3] Levy, *Higher Education and the State in Latin America: Private Challenges to Public Dominance,* 2

financial system (M2 as a percentage of GDP). And the second one is the total of deposits as a percentage of GDP. There are many variations across countries in terms of the financial sector. For instance, M2 is not understood in a standard manner for all countries. Central American countries have a different concept than South American countries. That is why one indicator might not be suitable in all cases. Therefore, we use Deposits as a percentage of GDP as proxy to financial development. And a set of control variables are also included. These were chosen since they are closely related to education. That is, any slight change will affect directly or indirectly on education enrollment. Among these, (1) the population growth of countries as an annual percentage since we understand demographics and education have always been intertwined due to the challenges of coverage, sustainability, etc.; (2) inflation measured as the annual percentage change on consumer price. It is selected since any change in inflation rates affects directly the cost of higher education; (3) trade as a percentage of GDP is included as it may boost the human capital development of the workforce, and be an incentive to for others to join the economically active population; (4) GDP per capita (log), (5) capital formation as a percentage of GDP and (6) total of government expenditure as a percentage of GDP. The former to determine the share of expenditure placed on education.

The sample consists of 18 Latin American countries. All of them have dated from 2000 to 2013. Countries with insufficient data were dropped from the study in order to avoid biased results. All variables are taken from the World Bank's World Development Indicators (WDI) database and the Inter-American Development Bank database.

In Figure 1, we show the level of remittances as a percentage of GDP. Overall, we can see a moderate association between the two variables. But on the left side, we see

a pattern for negative correlation, that is, when school enrollment increases, remittances decrease since most of the date from left to right decreases gradually. In figure 2 the average total of deposits as a percentage of GDP. The former is used as measure for the financial development of countries from the sample. Here, we can identify some outliers that may affect the overall correlation. However, we can see that the direction of the scatter points denotes little or no correlation between the deposits as a percentage of GDP and enrollment of secondary education. Further on this paper, we will evaluate the relationship of all these variables together, and how they interact with each other.

Figure 1: Scatter plot of School Enrolment of Secondary Education on Remittances (% of GDP)

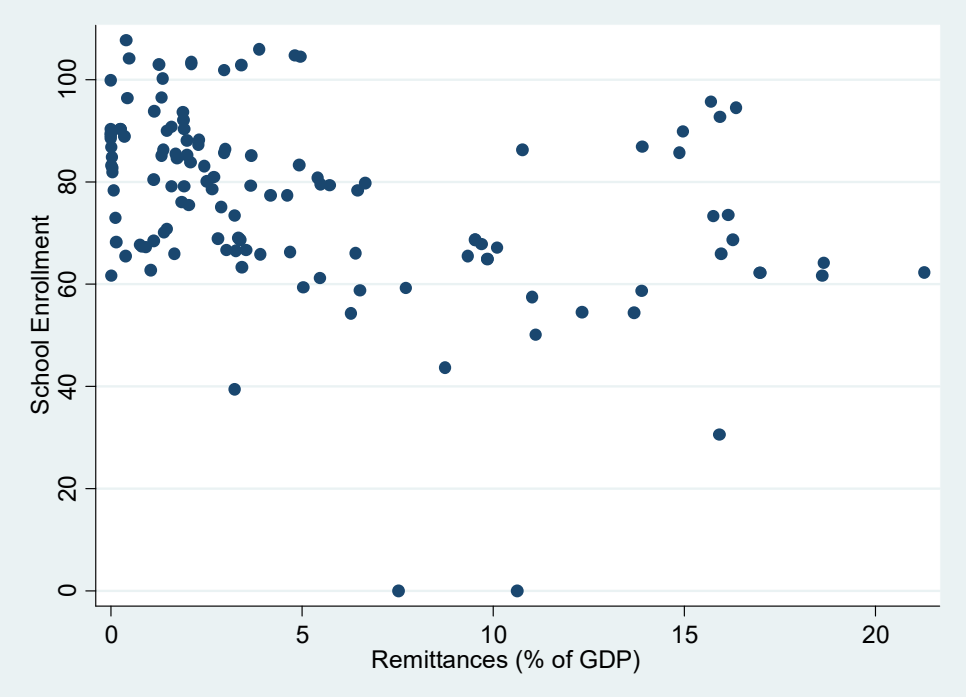


Figure 2: Scatter plot of School Enrolment of Secondary Education on Financial Development (Deposits as % of GDP)

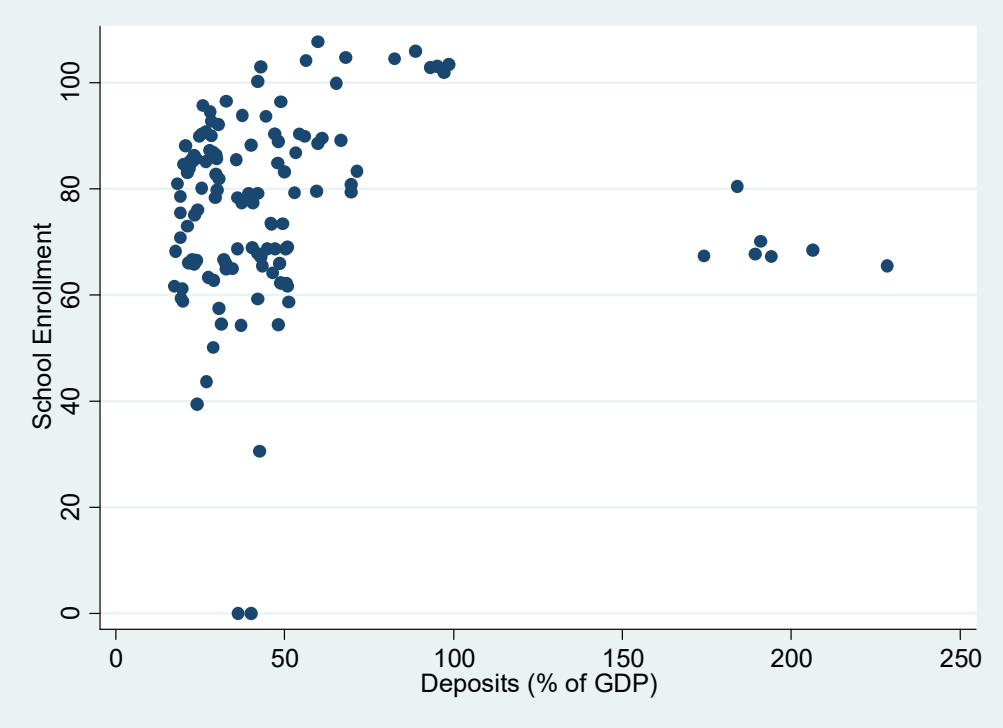



Figure 3 shows the list of countries and the levels of remittances flows as a percentage of GDP, respectively. It is important to mention that Central American and Caribbean countries like El Salvador, Guatemala, Honduras, Jamaica and Nicaragua receive the most remittances.

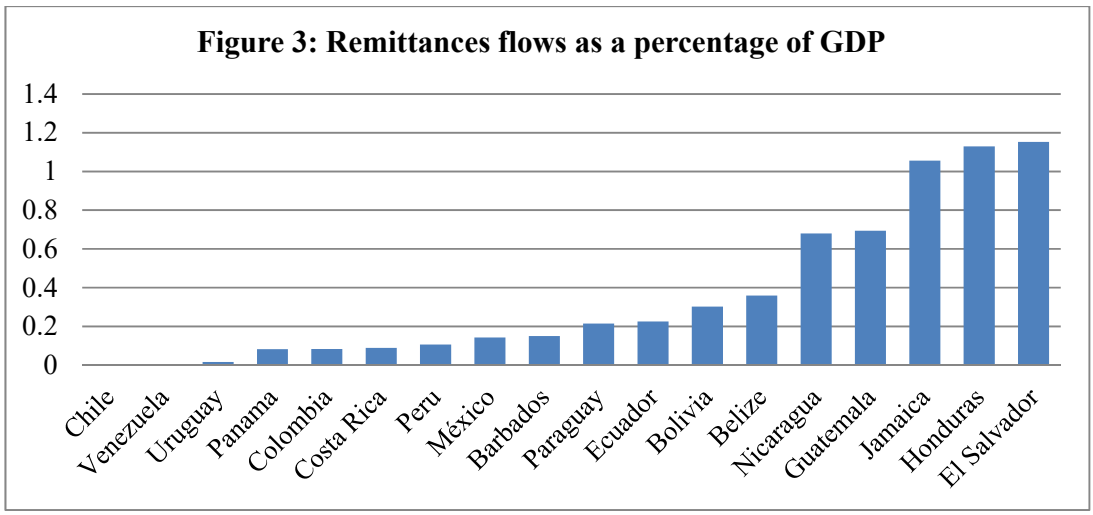


Table 1 shows the summary statistics and correlation matrix of variables. As we observe the standard deviation for the interaction of remittances is highly volatile since the standard deviation is 236.500.

***Table 1 – Summary Statistics***

**Panel A**

| Variables | Obs. | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| School Enrollment (%) | 126 | 76.669 | 17.797 | 0.000 | 107.655 |
| Deposits (% of GDP) | 126 | 48.674 | 40.055 | 17.425 | 228.590 |
| Remittances (% of GDP)[i] | 126 | 5.179 | 5.438 | 0.000 | 21.282 |
| Interaction Term (Deposits/GDP*Rem) | 126 | 214.749 | 236.500 | 0.000 | 1039.393 |
| Capital Formation (% of GDP)[ii] | 126 | 19.744 | 4.541 | 9.830 | 31.005 |
| Inflation (% of GDP) | 126 | 6.245 | 7.126 | 0.000 | 66.886 |
| Trade (% of GDP) | 126 | 74.698 | 31.165 | 0.000 | 149.017 |
| GDP per capita | 126 | 4191.655 | 3225.204 | 0.000 | 15050.350 |
| Population Growth (%) | 126 | 142.247 | 68.383 | -2.031 | 279.662 |
| Government Expenditure (% GDP) | 126 | 13.200 | 6.120 | 5.817 | 73.934 |

**Panel B - Correlation Matrix**

| | *scensec* | *totdepgdp* | *remgdp* | *inter1* | *kformgdp* | *infp* | *tragdp* | *gdpc* | *popgr2* | *govexpgdp* |
|---|---|---|---|---|---|---|---|---|---|---|
| School Enrollment (%) | 1.000 | | | | | | | | | |
| Deposits (% of GDP) | 0.060 | 1.000 | | | | | | | | |
| Remittances (%) | -0.372 | -0.173 | 1.000 | | | | | | | |
| Interaction Term (Deposits/GDP*Rem) | -0.327 | 0.082 | 0.917 | 1.000 | | | | | | |
| Capital Formation (% of GDP) | -0.157 | -0.072 | 0.133 | 0.090 | 1.000 | | | | | |
| Inflation (% of GDP) | -0.093 | -0.169 | 0.100 | -0.020 | 0.047 | 1.000 | | | | |
| Trade(% of GDP) | -0.278 | 0.571 | 0.216 | 0.359 | 0.141 | -0.069 | 1.000 | | | |
| GDP per capita (%) | 0.492 | 0.321 | -0.483 | -0.277 | -0.084 | -0.137 | 0.004 | 1.000 | | |
| Population Growth (%) | -0.530 | -0.005 | -0.092 | -0.097 | 0.036 | 0.006 | 0.275 | -0.328 | 1.000 | |
| Government Expenditure | 0.295 | 0.091 | -0.023 | 0.047 | -0.091 | -0.086 | 0.072 | 0.338 | -0.148 | 1.000 |

## B. 3.2 METHODOLOGY

To explore the relationship between remittances on education in Latin America and whether it is conditioned by the financial development, our main empirical strategy unfolds in OLS and Fixed Effect analysis. We first divide our data in 7 periods of 2 non-overlapping years respectively.

As a starting exercise, we will estimate the impact of remittances on education by Ordinary Least Squares (OLS), excluding the financial development indicator. However, we can observe that results might be biased. As it is well known, we cannot be completely certain that we have all the relevant control variables in our models; thus, the concern about unobservable factors is high. OLS regression model presents an omitted variable bias since it does not solve the problem of unobservable factors correlated with the variables in the regression. Then, we consider alternatives to OLS deficiencies. After applying the Hausman test, we determine that a fixed-effects model is suitable for this study. We worry there might be unobservable time-invariant factors among our variables. And it has been proven that fixed effects models are a good solution. We now control average differences in observable and unobservable factors. The model can be written as:

$$Edu_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Rem denotes remittances as a percentage of GDP, $X_{it}$ represents the set of control variables, $\mu_i$ equals a time specific effect, and $\varepsilon_{it}$ is the error term. The purpose is to test whether the impact of remittances on education is statistically significant.

Additionally, we take a step further and examine the effect of remittances on education. Particularly, we study remittances working through financial development in a second set of regressions. Thus, the equation is as follows:

$$Edu_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 FinDev + \beta_3 Rem_{it} \cdot FinDev_{it} + \beta_4 X_{it} + \mu_i + \varepsilon_{it} \quad (2)$$

As noticed, we use an interaction between the remittances variable and the financial development. Also we include these variables separately in order to avoid any bias in the result of the interaction term. Considering that the trend of each year may be subject of bias for the model, we remain to control the time specific effects as year dummies in model 1. The hypothesis we aim to test is whether the interacted coefficient is statistically significant, and whether its relationship on education is positive or negative. It looks forward to shedding more light on the factors that diminish or increase the effect of remittances in Latin America.

## ESTIMATION RESULTS

Table 2 reports the results for the first set of regressions. We use robust standard errors for all regressions. Column 1 and 2 show the OLS estimates, and we observe a negative impact of remittances on education. In both columns these coefficients are statistically significant at a 1% level. In column 2, financial development measured as *Deposits/GDP* is statistically insignificant. All coefficients, except *trade* (column1), *population growth* and *government expenditure,* are statistically insignificant. Column 3 and 4 show the fixed effect model results, which are positive and statistically significant at a 10% level for remittances. The former regressions give us a more precise estimate since it solves the problem of unobservable omitted bias. We also notice that in this model, financial development is statistically significant at a 10% level. For the control variables *inflation*, and *population growth* are statistically significant, and they show a negative correlation with education. The rest of control variables practically have nil impact on education. The former estimates go in line with previous literature about the positive effects of remittances on education behavior, and other investments.

***Table 2 – Impact of Remittances and Financial Development on Education***

| | **OLS** | | **FE** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Deposits/GDP | | 0.003 | | 0.371* |
| | | (0.035) | | (0.196) |
| Remittances/GDP | -1.313*** | -1.308*** | 2.945* | 2.818* |
| | (0.226) | (0.235) | (1.618) | (1.488) |
| Capital Formation/GDP | -0.281 | 0.279 | -0.535 | -0.538 |
| | (0.288) | (0.275) | (0.367) | (0.352) |
| Inflation | -0.01 | -0.009 | -0.205 | -0.222** |
| | (0.090) | (0.089) | (0.118) | (0.103) |
| Trade | -0.068* | -0.070 | -0.074 | -0.043 |
| | (0.040) | (0.067) | (0.069) | (0.062) |
| GDP per capita | 0.000 | 0.000 | 0.002 | 0.002 |

| | | | | |
|---|---|---|---|---|
| | (0.000) | (0.000) | (0.001) | (0.001) |
| Population Growth | -0.117*** | -0.117*** | -0.275** | -0.205* |
| | (0.018) | (0.018) | (0.112) | (0.112) |
| Government Expenditure | 0.742** | 0.743** | -0.033 | 0.122 |
| | (0.289) | (0.289) | (0.114) | (0.137) |
| _cons | 88.802*** | 88.720*** | 112.090*** | 80.371*** |
| | (9.023) | (8.670) | (18.877) | (24.98) |
| Year Dummies | Y | Y | | |
| $R^2$ (*Within*) | 0.62 | 0.62 | 0.43 | 0.48 |
| $R^2$ (*Overall*) | | | 0.08 | 0.05 |
| *N* | 126 | 126 | 126 | 126 |

*Dependent variable is Education (% Secondary school enrollment)*
*Standard errors in parenthesis.*
**Significance at 10%; ** significance at 5%; ***significance at 1%.*

A second set of regressions is shown in table 3. Here we come to include the interaction term of financial development and remittances. It will help us determine whether the financial development conditions positively or negatively in remittances impact. Once more, total deposits (as a percentage of GDP) are the proxy for financial development. In this model, we observe the sign of the interacted coefficient. If it is positive, the financial development gives a boost to the impact of remittances. If it is negative, remittances do not benefit from the financial development across countries.

In the first column, we find the results. On one hand, financial development continues to have a positive impact on education at a 5% level while remittances suggest a negative effect, but still statistically insignificant. On the other hand, the sign of the interacted coefficient provides information regarding the nature of remittances. In this regression, we observe that the positive interaction term is statistically significant at a 5% level. It suggests that the impact of remittances on education is enhanced by the financial development of countries. That is, the level of financial development will impact

positively in a greater manner on education, measured as secondary school enrollment. We know that financial development includes better and more access to credits for all population; higher savings rates; healthy macroeconomic policies and institutions. The financial sector has strengthened in the last years in Latin America. Therefore, the opportunities for economic development have been increasing. People have more options to finance consumption goods as well as investment. However, the disparity in the levels of financial development among Latin American countries, make it necessary to study further the interaction term. Does higher financial development enhances remittances impact on education? We can observe from this result, how the interaction term boosts human capital investments. Eventually, we will check the extent of impact of the levels of financial development of countries. Finally, the table suggests a statistically significant and negative relationship of *Capital formation* and *Population growth.* Inflation, trade, GDP per capita and government expenditure show a statistically insignificant relationship.

In general terms, findings in column 1 are supported by previous analysis done by Aggrawal et al. who concluded that financial development is positively affected by remittances (262). In this way, people have an alternative to gain access to all types of financial services. Especially, remittance recipients may demand for savings and credit services. In addition, the use of formal means of transfer contributes to gather data from senders, transactions, and recipients. It becomes an opportunity to incorporate those who were left out of the financial services before. It is also known that transaction fees from remittances have contributed to domestic financial sectors. In this regard, remittances do not have the same impact on education in both subgroups (low financial development countries and the high financial development countries). However, we can still suggest

that financial development paves the way for safer and more investments, including education.

***Table 3 – Impact of Interacted Coefficient of Financial Development and Remittances on Education***

| | FE |
|---|---|
| Deposits/GDP | 0.277* |
| | (2.360) |
| Remittances | -0.643 |
| | (0.520) |
| Interaction Term (Deposits/GDP*Rem) | 0.075** |
| | (3.020) |
| Capital Formation/GDP | -0.563** |
| | (2.700) |
| Inflation | -0.142 |
| | (1.280) |
| Trade | -0.012 |
| | (0.240) |
| GDP per capita | 0.001 |
| | (0.900) |
| Population Growth | -0.192** |
| | (3.110) |
| Government Expenditure | 0.151 |
| | (1.000) |
| _cons | 85.141** |
| | (5.740) |
| $R^2$ (*Within*) | 0.53 |
| $R^2$ (*Overall*) | 0.04 |
| *N* | 126 |

*Dependent variable is Education (%Secondary school enrolment)*
*Standard errors in parenthesis.*
**Significance at 10%; ** significance at 5%; ***significance at 1%.*

## A. ROBUSTNESS CHECKS

A robustness test will be performed by dividing the sample of Latin American countries according to the level of financial development and comparing the impact of remittances across sub-samples. In that way, we would find out whether the impact is larger in countries where the financial system is more developed or vice versa. This exercise has also been performed by Giuliano and Ruiz-Arranz as they studied the influence of financial development interacted with remittances on economic growth (148). Additionally, it will help us identify the real significance of the relationship of financial development and remittances.

Table 4 shows the results for two regressions. Fixed effect model is used for both cases, except that the second set of regressions includes the interacted coefficient for financial development and remittances. Robust standard errors are reported in this section.

In column 1 and 2 it is interesting to observe that remittances stay positive and statistically significant at a 5% level for countries below the mean. And it is statistically insignificant for countries above the mean of financial development. We also notice that financial development is also statistically significant at a 5% level for countries below the mean.

Columns 3 and 4 confirm the previous findings that low financial developed countries are the most benefited group. The financial development as an independent variable is not statistically significant for both groups of countries. Remittances also show to be statistically insignificant. But the interaction term of remittances and deposits/GDP is positive and statistically significant at a 5% level. The results for countries above the mean are nil except for *population growth*.

It is important to remember that the greatest money recipient countries are also the ones with the weakest financial sectors. In fact, 70 percent of our sample is categorized below the mean. According to Acosta et al., 9 of these countries are part of the group of 14 countries responsible for 90 percent of remittances in the Latin American region (690). In addition, countries like Chile, Panama or Venezuela (above the mean) are left behind regarding personal money transfers. Thus, the impact of remittances and financial development is greater for the group below the mean.

***Table 4: Marginal impact of remittances on education according to the level of financial development***

| | **Below the Mean (1)** | **Above the Mean (2)** | **Below the Mean (3)** | **Above the Mean (4)** |
|---|---|---|---|---|
| Deposits/GDP | 0.941** | 0.015 | 0.451 | 0.014 |
| | (0.337) | (0.043) | (0.357) | (0.035) |
| Remittance | 2.752** | 0.766 | -1.802 | 4.617 |
| | (1.106) | (0.797) | (1.568) | (2.918) |
| Interaction Term (Deposits/GDP*Rem) | | | 0.104** | -0.047 |
| | | | (0.044) | (0.044) |
| Capital Formation | -0.452 | -0.401 | -0.514 | -0.292 |
| | (0.413) | (0.277) | (0.406) | (0.277) |
| Inflation | -0.079 | 0.167 | 0.008 | 0.133 |
| | (0.071) | (0.090) | (0.054) | (0.134) |
| Trade | -0.021 | 0.009 | 0.008 | -0.003 |
| | (0.066) | (0.019) | (0.049) | (0.010) |
| GDP per capita | 0.003 | 0.000 | 0.002 | 0.000 |
| | (0.002) | (0.000) | (0.003) | (0.000) |
| Government Expenditure | 3.122** | -0.055* | 3.304** | -0.145 |
| | (1.252) | (0.021) | (1.141) | (0.071) |
| Population Growth | -0.081 | -0.296** | -0.129 | -0.348* |
| | (0.096) | (0.100) | (0.094) | (0.151) |
| _cons | -0.853 | 133.098*** | 25.2 | 141.761*** |
| | (35.761) | (10.238) | (35.399) | (18.931) |
| $R^2$ (*Within*) | 0.64 | 0.80 | 0.69 | 0.82 |

| | | | | |
|---|---|---|---|---|
| $R^2$ (*Overall*) | 0.01 | 0.70 | 0.01 | 0.75 |
| *N* | 91 | 35 | 91 | 35 |

*Dependent variable is Education (%Secondary school enrolment)*

*Standard errors in parenthesis.*

**Significance at 10%; ** significance at 5%; ***significance at 1%*

## CONCLUSIONS

According to the website of the Inter-American Development Bank, Latin America receives around US$60 billion annually in remittances. They have presented a boost since the second half of the 1990s and have slowly encountered a place in the banking sector of the countries. Even though there is much research and evidence about the positive effects of remittances in the economy, financial development and other sectors. This study moves forward to analyze not only the effect of remittances flows on education, but also to identify whether financial development is a positive or negative link in this relationship.

We used indicators from the World Bank and Inter-American Development Bank in order to construct the database. We gathered information for 18 Latin American countries over the period of 2000-2013, and estimations are based on a fixed effect regression model.

First, we find that remittances have promoted an increase in school enrollment in the secondary level by providing an alternative way of financing education. We also proved a statistically significant impact of financial development on education using total deposits as a percentage of GDP as the measurement. Eventually, we used an interaction term to capture the link that financial development has between education and remittances. The results imply that this link is positive. Financial development enhances the impact of remittances on education as an increase in school enrollment.

Finally, we divided the data in two subsamples to regress the same fixed effect model. There we found that the impact of remittances and financial sector is statistically significant in countries below the mean of financial development level; that is, countries which are the greatest recipients of money transfers. However, it is important to mention

that this study does not elaborate further on the particularities of financial development influence over education. It would be interesting and complimentary to shed some light upon the countries' institutions and circumstances. In addition, there might still be other factors that also boost the impact of remittances on education. In this study, the use of fixed effect model is helpful to avoid the omitted variable bias. However, we understand there might still be unobservable factors influence the results.

It is also important to remark the role of the financial development as an interaction term. There are previous studies that have tried to use it to determine the impact on growth or poverty[4]. In these particular cases, high financial development has proven to have low or nil effect on remittances. Our study demonstrates a similar pattern in the case of education. It seems that the more advanced the financial sector, the lower the impact of remittances on investments like education.

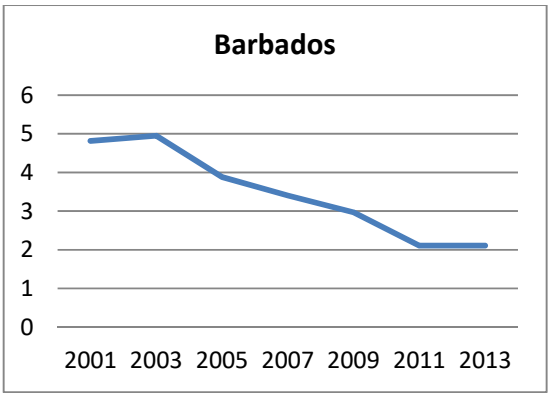
Our study provides the first empirical evidence about this issue, but it would also be important to validate these results by taking this study further. For policy makers, it is helpful since it confirms the idea that remittances flows are important for the economic development in general. But there is still a challenge; that is to work in favor of financial openness that benefit people in general. Remittances recipients generally do not possess a bank account and still use informal ways for transfers as well as for savings. Even though central banks have made efforts to provide formal channels for remittances, much needs to be done yet. For instance, rates for money transfers should be reduced; though demand for transmission operators is rising, costs are still high compared to the steady increase of remittances. Costs reduction would direct remittances to formal channels and

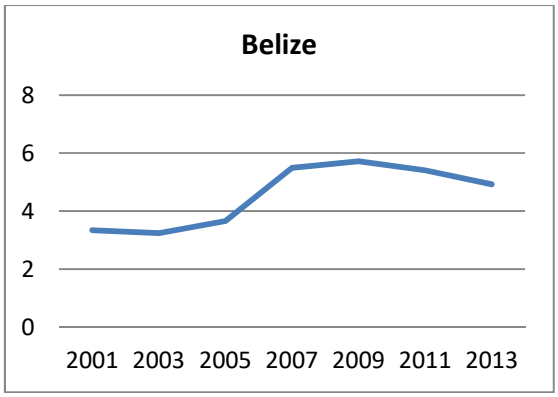
[4] Giuliano, Paola and Marta Ruiz-Arranz (2009) and R. Aggarwal et al. (2001)

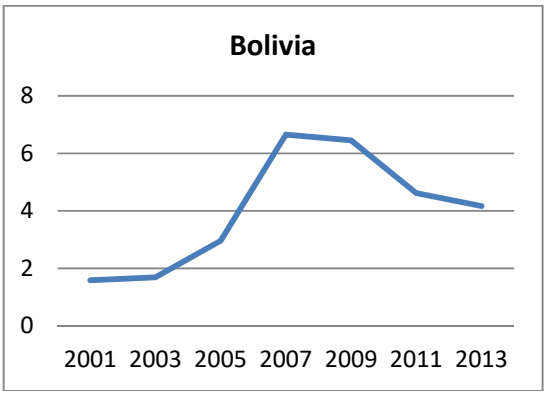
better options for recipients. Therefore, financial inclusion will be determinant for the better use of remittances. And a virtuous cycle begins. Governments will receive more taxes; the economy will be stimulated and there will be more and better human capital.

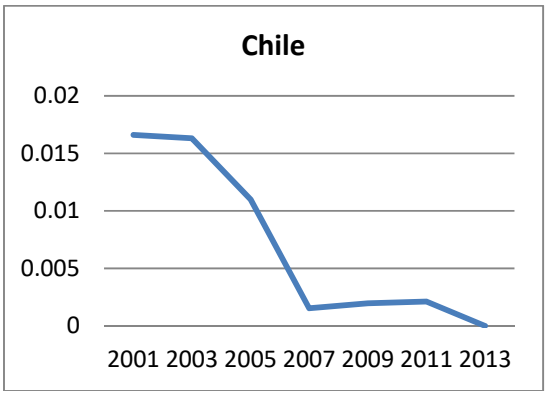
## APPENDICES

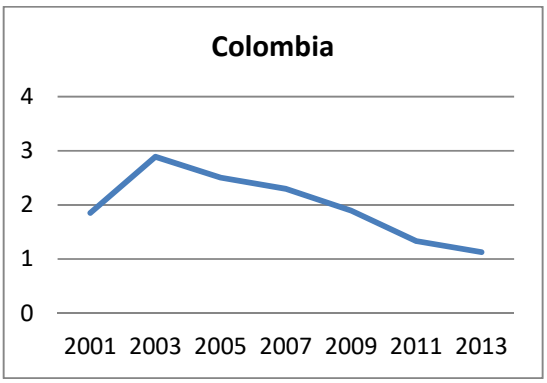
### *Remittances (% of GDP)*

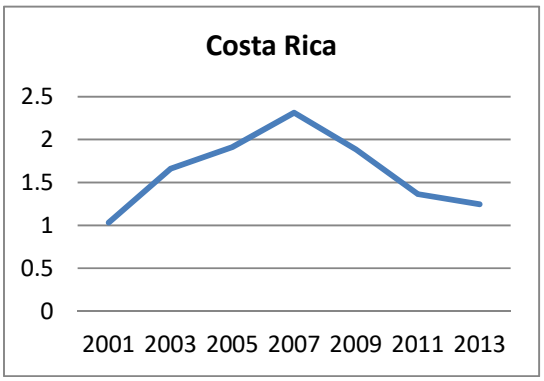


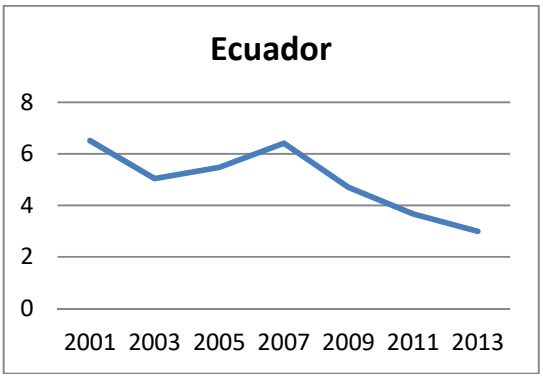

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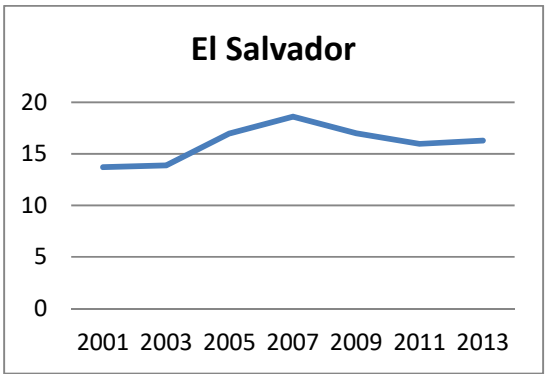
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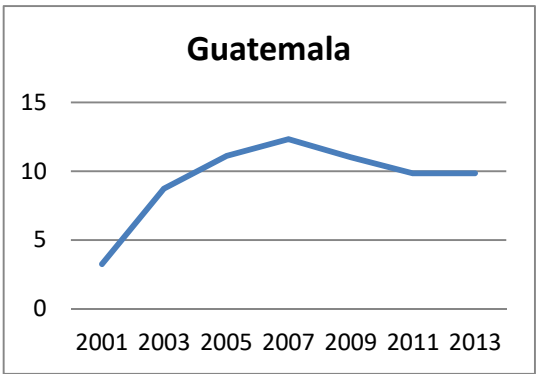
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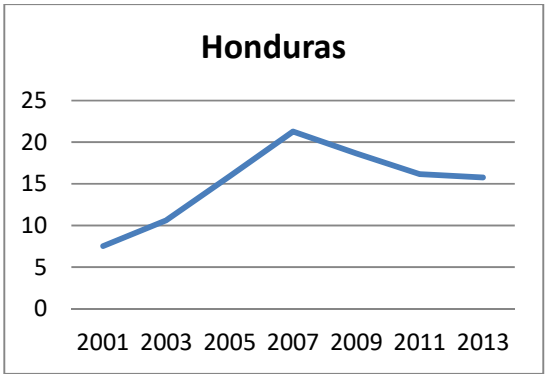
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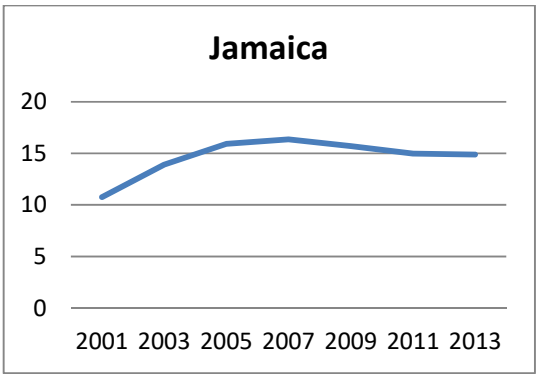
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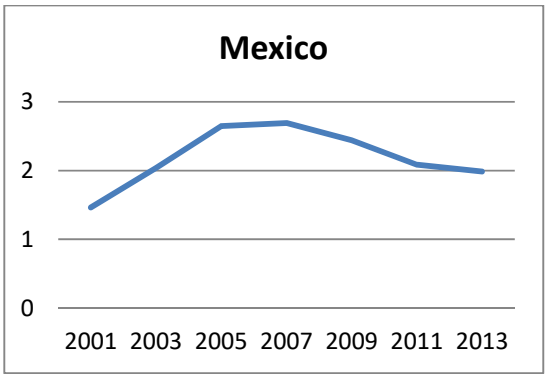
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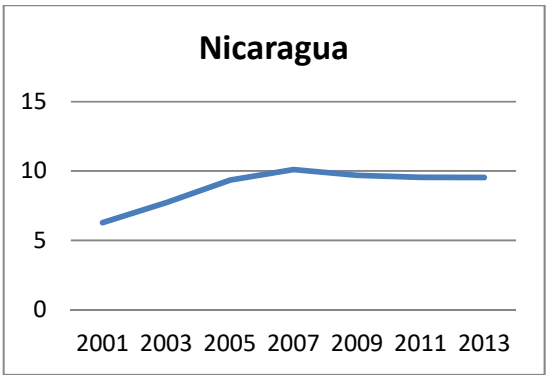
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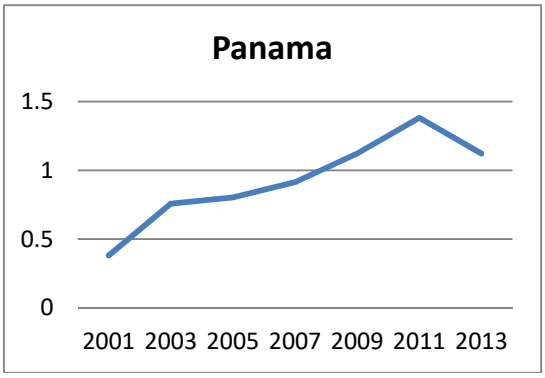
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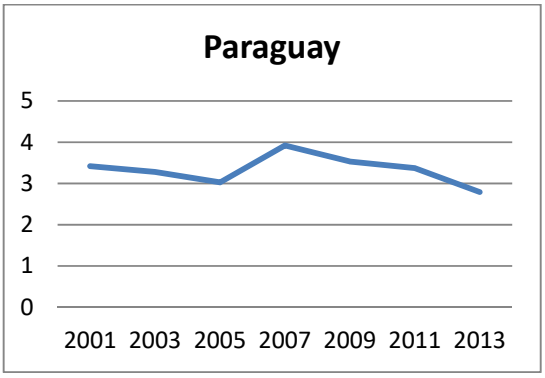
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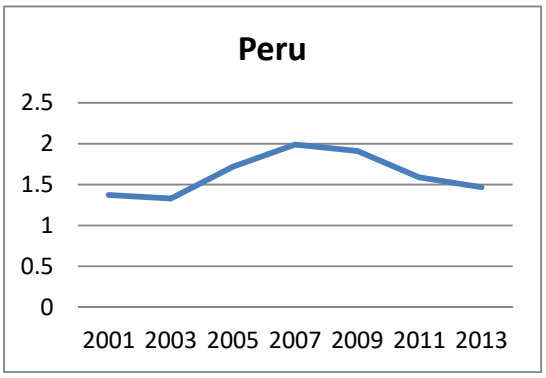
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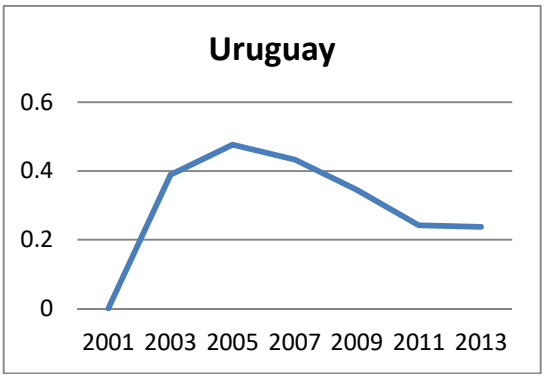
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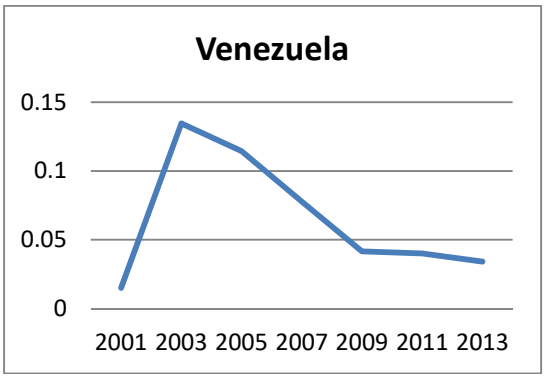
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2001 2003 2005 2007 2009 2011 2013

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[i] Remittances are comprised of personal transfers and compensation to employees, as defined by the International Monetary Fund.

[ii] The World Bank defines *capital formation* as "formerly gross domestic investment". It may include land improvements, purchase of machinery, plants, and other physical capitals.