

---

# The Impact of Risk and Uncertainty on Remittances into Latin American Economies

Blen Solomon

Grand Valley State University • Grand Rapids, MI

---

## Abstract

This study investigates the effects of exchange rate uncertainty and political risk, after controlling for the conventional macroeconomic determinants, on remittances transfers into eight Latin American countries during the period of 1990-2006. The results suggest that an increase in exchange rate uncertainty reduces remittances flows into these countries. Furthermore, an increase in political risk seems to have a negative but statistically insignificant impact on remittances transfers. Based on the findings of this paper, we can say that governments of the remittance receiving countries can influence the inflow of remittances by means of adopting appropriate macroeconomic policies to reduce exchange rate uncertainty and also by improving their political environments.

---

## Introduction

Remittances have become an increasingly important and fast growing source of external finance for many developing countries.<sup>1</sup> By 2005, the total remittances inflows into developing countries reached \$167 billion. This amount had more than doubled from its value of \$58 billion in 1995 (United Nations Habitat, 2006). The increase in remittances flows into developing regions is welcomed because remittances have a potentially significant impact on the recipient country's economy. First, remittances are a more stable source of external finance as opposed to capital flows which tend to rise during favorable economic cycles and fall during less favorable ones. This acyclical nature of remittances exerts a stabilizing influence, and thus helps insulate vulnerable countries from economic shocks (Ratha, 2003; Global Economic Prospects, 2006). Moreover, remittances increase the recipient country's foreign exchange reserves and promote economic growth if households use remittances for investment. If they are used for consumption, they can also generate positive multiplier effects, offsetting some of the output losses that a developing country may suffer from emigration of its highly skilled workers (Ratha, 2003).

By 2005, Latin America and the Caribbean (LAC) were the largest remittances destination in the world, with inflows around \$53.6 billion. This amount exceeded, for the third consecutive year, the combined flows of all net Foreign Di-

rect Investment (FDI) and Official Development Assistance (ODA) to the region (Inter-American Development Bank, 2006). Because of their increasing volume and their potential to reduce poverty and enhance economic growth, remittances are receiving growing attention from policymakers in the developing countries of Latin America.

There is a wide range of important issues related to remittances. In this study, we focus on a very important issue, namely, the determinants of remittances to Latin American countries. Assuming that remittances have a positive effect on the recipient economy, what are the determinants of remittances into Latin American economies? The remittances literature is divided into two broad categories. The first category of determinants deals with microeconomic determinants of remittances such as the social and demographic characteristics of migrants and their families, while the second category considers macroeconomic variables of the host (sending) as well as home (receiving) countries. Our study fits into the second category as we investigate the macroeconomic determinants of remittances into nine Latin American countries.<sup>2</sup>

Generally, studies that investigate the determinants of remittances assume that migrants are risk neutral in their preferences with respect to risk and return in that they do not include risk variables in their regressions (Higgins et al., 2004). However, remittances for investment would be influenced by risk and return considerations. Ratha (2003) reviews cross-country studies on remittances and reveals that remittances are affected by the investment climate in recipient countries in the same manner that capital flows are; though to a lesser degree. Therefore, determinants of remittances in an investing framework would have to include rates of return to investment and the risk of investing in the home (receiving) country such as political risk and/or exchange rate uncertainty. However, to our knowledge, only one study (Higgins et al., 2004) has considered risk variables as determinants of remittances and no study has used the rate of return to investment measure that we use in this study.<sup>3</sup> We employ a measure of political risk that captures multiple facets of risk faced by investors in the Latin American countries. We use the political risk index from the International Country Risk Guide (ICRG) that measures the combined effects of political and institutional instabilities faced by investors. We also include a GARCH measure of exchange rate uncertainty to investigate the exchange rate risk faced by investors. These risk variables are included in addition to the traditional determinants used by other studies. Thus, this paper contributes to the literature by filling a long-standing void in exploring the links between remittances, risk and return in Latin America.

The rest of the paper is organized as follows. Section 2 discusses some basic facts about remittances inflows into Latin American countries and provides a brief literature review. The sources of data and the variables used in the study are discussed in Section 3. Section 4 outlines the empirical methodologies and discusses the empirical findings. Conclusions and policy implications are included in Section 5.

---

## **Facts About Remittances to Latin America and Brief Literature Review**

---

### ***Facts about Remittances to Latin America***

In 1995, the share of remittances going to Latin America and the Caribbean accounted for 23.2% of the total world remittances, but by the year 2005 this share had increased to 31% , making it the largest remittance recipient region in the world. In dollar terms, LAC received about \$53.6 billion in remittance transfers in 2005. Out of the \$53.6 billion sent, an estimated \$20 billion were sent to Mexico, nearly \$6.4 billion were destined to Brazil, and about \$4.1 billion were sent to Colombia (Inter-American Development Bank, 2006). In most Latin American countries, remittances have exceeded official development assistance and other capital inflows such as FDI (see Table 1).

**Table 1**  
**Remittances (for 2003) Relative to Foreign Direct Investment (FDI) and GDP, and Remittances per Capita**

<b>Country</b>	<b>Remi % FDI</b>	<b>Remi % GDP</b>	<b>Remi. Per Capita</b>
Argentina	15%	0.09%	6.42
Bolivia	835%	1.05%	10.73
Brazil	46%	0.33%	11.43
Colombia	111%	3.40%	68.64
Mexico	178%	2.26%	130.96
Nicaragua	270%	10.44%	80.87
Peru	117%	1.49%	31.68
Venezuela	18%	0.5%	10.23

Source: Inter-American Development Bank (2006)

Some key factors could explain the tremendous growth seen in remittances inflows into Latin American countries over the last decade. One of the most impor-

tant reasons has been the increase in emigration of workers from Latin American countries to regions with demand for labor such as the U.S. and Western Europe. The Inter American Development Bank estimates that in 2005 over 25 million Latin American born adults were living outside their countries of origin. Out of these 25 million migrants, approximately 65% send money home on a regular basis. The amount of money they send typically ranges between \$100 and \$300 a month (Inter-American Development Bank, 2006).

The main source of remittances to Latin America is the U.S. as about 75% (\$40 billion) of Latin American remittances originate in the U.S. The next largest source of remittances is Western Europe with a share of almost 15% (about \$7.5 billion).

---

### ***Brief Literature Review***

There is a wide range of important issues related to remittances. In this study, we focus on the macroeconomic determinants of remittances to Latin American countries. However, much of the remittances literature has focused on the microeconomic determinants of remittances (for example, see Lucas & Stark, 1985; Russell, 1986; Djajic, 1989; Hoddinot, 1992; Durand et al., 1996; Ilahi & Jafarey, 1999; Agarwal & Horowitz, 2002). The studies that have recognized the importance of the macroeconomic determinants of remittances include Straubharr (1986), Faini (1994), El-Sakka and McNabb (1999), Chami et al., (2003), Higgins et al., (2004), and Vargas-Silva and Huang (2006). These studies investigate the impacts of home (receiving) and host (sending) country variables such as inflation, income, exchange rates, wage levels, interest rates, and interest rate differentials on remittances flows. Studies have found mixed evidence on the impacts of these variables on remittances flows.

For example, a higher host country interest rate compared to the home country rate (a high premium) is expected to discourage remittances flows. However, Straubhaar (1986), using data of remittances from Germany to Turkey, finds that interest rate differentials between the host and home countries have no effect on remittance flows. Similarly, Elbadawi and Rocha (1992), using data from Western Europe and North Africa, find the interest rate differential to have no significant impact on remittances. In contrast, Katselli and Glytsos (1986), and El-Sakka and McNabb (1999) argue that interest rates and interest rate differentials significantly affect remittances inflows into Greece and Egypt respectively.

The real exchange rate (XR) also has the potential to affect remittances. Many studies have investigated the impact of exchange rates on remittances. These

studies have found exchange rates to be important in explaining remittances flows (see Chandavarkar, 1980; Amuedo-Dorantes & Pozo, 2004; Higgins et al., 2004). Most studies expect the depreciation of the real exchange rate to encourage the flow of remittances from the host to home country (see Higgins et al., 2004). Interestingly, Amuedo-Dorantes and Pozo (2004) also find that surges in workers' remittances may contribute to real exchange rate appreciation. Furthermore, Higgins et al. (2004) show that exchange rate volatility (a measure of risk) is an important determinant of remittances.

The macroeconomic variables mentioned above have also been used to test the altruistic versus self-interest motive for remitting. If downturns in the receiving economy prompt workers to increase remittances to their home countries, then their motives can be thought of as altruistic. If, on the other hand, immigrant workers are self-interested, remittances will respond positively to economic conditions in the receiving country. Faini (1994) and Glytsos (1997), using income to measure the economic condition of the receiving country, find that workers motives are altruistic because downturns in the home economy prompt workers to increase the amount they remit. In contrast, Higgins et al. (2004) find evidence for the investment or self-interest hypothesis since they find favorable economic conditions at home increase remittances inflows into the home country. This paper investigates if risk and return variables, in addition to the conventional macroeconomic determinants, have a role in determining remittances flows into Latin American countries.

---

## Data Description

Our analysis covers nine Latin American countries between 1990 through 2006.<sup>4</sup> The variables used in this study are annual in frequency; however, the exchange rates used to generate the conditional variances are monthly.<sup>5</sup> The data sources for our variables are the World Development Indicators (WDI), the International Financial Statistics (IFS) CD-ROM, the U.S. Census data, the Immigration and Naturalization Services (INS) statistical yearbook, and the International Country Risk Guide (ICRG). All variables except the political risk indicators, were retrieved from the World Bank's World Development Indicators (WDI) and the International Financial Statistics (IFS) CD-ROM. The political risk indicators were taken from the ICRG dataset.

It should be noted that some problems exist in the measurement of remittances. One of the problems is that there is no consensus on the boundaries of the phenomenon under study. That is, should only workers' remittances be counted,

or should compensation of employees and migrant transfers be included as well (Ratha, 2003)? In this study, we use the definition of migrant remittances used by The World Bank, which is the sum of workers' remittances, compensation of employees, and migrant transfers.

Another problem arises because many types of informal remittances flows go unrecorded due to weakness in data collection (Jongwanich, 2007). For example, money transfers through informal channels such as family members are rarely documented. If remittances sent through informal channels are included in official remittances data, total remittances could be as much as 50% higher than the official record (World Bank, 2006). However, the collection of remittances data is improving. For example, Ratha (2003) shows that countries such as Mexico have improved their system of unrecorded portion of remittances which has significantly increased the remittances statistics.

Another potential problem arises because the available data on remittance flows does not identify the source (host) country of these flows. However, remittances literature identifies macroeconomic variables in the sending as well as the receiving country as being important determinants of remittances. To incorporate both the sending and receiving countries' macroeconomic variables, we use data from Latin American countries since 75% of Latin American remittances are sent from the U.S. For this reason, for Latin American countries, it is reasonable to assume that the error is relatively small.

In order to investigate the determinants of remittances into Latin American countries, we use the following variables: the share of remittances in GDP (REMG), the stock of immigrants in the U.S. (for each Latin American country) (IMMI), per capita income of each of the nine Latin American countries ( $Y$ ), median Hispanic income in the U.S. (MHI), real exchange rate (XR), rate of return to investment (RR), exchange rate uncertainty (GARCH), and political risk (POLRISK).<sup>6</sup>

The median Hispanic income in the U.S. (MHI) is used to measure economic well being of migrants in the host (sending) country.<sup>7</sup> An increase in the income of migrants (i.e. an improvement in their well-being) is expected to increase remittances sent by these migrants to their native countries. Other studies have used the host country's GDP as well as the unemployment rate of the host country in order to measure the economic well being of migrants in the sending country.

The per capita incomes ( $Y$ ) of the nine Latin American countries are used to measure the economic well-being of the home (receiving) countries. The home country's GDP per capita may affect remittances either positively or negatively. However, the stock of immigrants (IMMI) in the host country is expected to have

a positive relationship with remittances flows, that is, an increase in the number of immigrants in the host country will increase the money sent back home. The real exchange rate (XR) also has the potential to affect remittances. The depreciation of the real exchange rate is expected to encourage the flow of remittances from the host to home country (Higgins et al., 2004). Some studies highlight the fact that some governments in developing countries have devalued the exchange rates in order to encourage remittances inflows (Wahba, 1991).

In addition to the variables mentioned above, measures for rate of return (RR) to investment, macroeconomic uncertainty (GARCH), and political risk (POLRISK) are included in our regressions. Most studies take account of the RR by using the interest rate differentials between the host and home countries. However, we take account of RR by using log of the inverse of the real GDP per capita.<sup>8</sup> This substitution is made since market interest rates for most of the selected years are not available. In addition, the reported interest rates in many of these countries do not reflect true asset returns (Higgins et al., 2004). Therefore we use our measure of the rate of return to investment. This variable is expected to have a positive relationship with remittances inflows if the motive to remit is for investment. On the other hand, GARCH measures of the real exchange rates are used to proxy exchange rate uncertainty.<sup>9</sup> Increases in exchange risk will decrease the level of remittances assuming that a part of these flows in fact are private investment flows made by immigrants (Higgins et al., 2004).

The overall political risk indices (POLRISK) for each home country are used to proxy the political risk prevailing in the countries. The ICRG provides a composite political risk index (for each country) that is made up of particular components of political instability as well as home country institutional quality. The unpredictability and volatility in the political environment of the home country increases the perceived risk and uncertainty experienced by the migrant. As a result, a negative relationship between political risk and remittances inflows is to be expected.

---

## **Estimation Methodology and Results**

---

### ***Exchange Rate Uncertainty Specification and Results***

The ARCH/GARCH measure of uncertainty involves obtaining the variance of the unpredictable part of the series. Unlike the ad-hoc measures of uncertainty such as rolling variances, the ARCH/GARCH approach is obtained on the basis of an estimated econometric model. This method captures volatility in each period more

accurately. The ARCH model characterizes the distribution of the stochastic error conditional on the realized values of the set of variables that may include lagged values of the conditional variance. The generalized ARCH model, the GARCH (p, q) model, is specified as follows:

$$y_t = f(x_t; \delta) + e_t \quad e_t/\psi_{t-1} \sim D(0, h_t^2) \quad (4.1.1)$$

$$h_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^p \delta_i h_{t-i}^2 \quad (4.1.2)$$

where  $f(x_t; \delta)$  refers to the conditional mean,  $x_t$  is a vector of explanatory variables that may include lagged  $y_t$ 's,  $\delta$  is a  $M \times 1$  vector of parameters,  $\psi_{t-1}$  is the information set that contains all the information available through time  $t-1$ , and  $e_t$  is the error term which follows, conditional on  $\psi_{t-1}$ , a  $D$ -distribution. That is, the conditional errors have zero mean and time varying variance,  $h_t^2$ . The conditional variance follows a GARCH process as in (4.1.2). The conditional variance,  $h_t^2$ , the proxy for uncertainty, is the one period ahead forecast variance based on the past information. It is a function of three terms: the mean level of volatility  $\alpha_0$ , the ARCH term  $\varepsilon_{t-1}^2$  and the GARCH term  $h_{t-1}^2$ .<sup>10,11</sup>

To generate measures of uncertainty, monthly real exchange rates for each of the countries were used. Before estimation of our ARCH/GARCH models, we conducted some preliminary data analysis such as checking for the presence of unit roots. The results from the Augmented Dickey Fuller (ADF) Test for unit roots suggest that the log of the real exchange rates for all the countries under consideration are  $I(1)$  processes. That is, the real exchange rate for each country has a unit root in levels while they are difference stationary. As a result, to ensure the stationarity of our variables, we use the first differences to fit ARCH/GARCH models and to generate the conditional variances.

Argentina, Bolivia, Colombia, Nicaragua, and Venezuela had fixed exchange rate regimes during a portion of our period of study. Therefore, in order to account for this fact, we include dummy variables in the GARCH estimations. The dummy variable for each country is defined as 1 if the country had a fixed exchange rate regime during the period of study, and 0 otherwise.

Table 2 presents the coefficients of the GARCH (p, q) estimation. As can be seen from Table 2, the coefficients of the GARCH (p, q) have the expected theoretical signs. Figure 1 shows a plot of exchange rate uncertainty ( $h_t$ ) for each country in our study. Once the monthly exchange rate uncertainty measures ( $h_t$ ) are obtained,

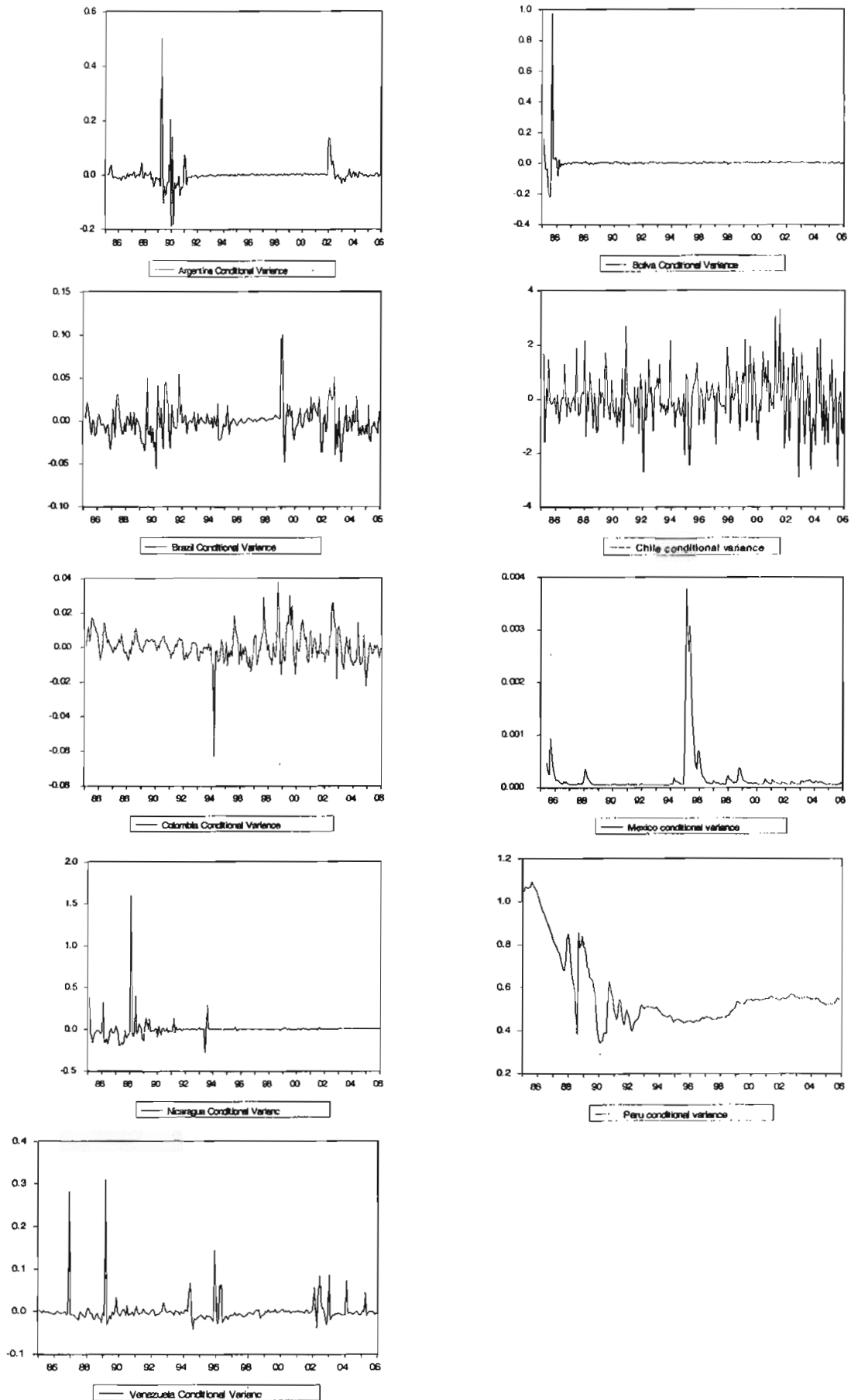


they are aggregated to produce annual series, and included into our regressions.

**Table 2**  
**ARCH/GARCH Models of the Log Difference of Exchange Rates (Monthly)**

Countries	AR Process	MA Process	C	$A_1$	$A_2$	$\delta_1$
Argentina	AR(8)	MA(2)	0.0019	1.0025 (0.0257)***	—	
Bolivia	AR(1)	MA(1)	0.0005 (0.0010)	0.3610 (0.0431)***	—	0.3184 (0.0950)***
Brazil	AR(3)	—	0.0182 (0.0082)***	0.4123 (0.1268)***	—	
Colombia	AR(3)	—	0.0012 (0.0001)***	1.0430 (0.2001)***	—	
Chile	AR(3)	—	0.0008 (0.0008)	0.1863 (0.4855)***	—	0.0957 (0.1449)***
Mexico	AR(3)	—	0.1900 (0.0035)***	0.2592 (0.0385)***	—	0.5799 (0.0514)***
Nicaragua	AR(3)	—	0.0101 (0.0026)***	0.1239 (0.0031)***	—	0.6000 (0.0083)***
Peru	AR(3)	—	0.0100 (0.0005)***	0.4452 (0.0584)***	—	0.7181 (0.0119)***
Venezuela	AR(3)	—	0.0047 (0.0049)***	1.0001 (0.0037)***	—	

**Figure 1**  
**Conditional Variances of the Exchange Rates**



## ***Estimation Methodology and Results for the Determinants of Remittances***

In this paper, the Arellano-Bond dynamic panel GMM estimator is the method of choice. Using this estimator has many advantages. First, it includes the lagged dependent variable as an additional regressor and therefore addresses the problem of autocorrelation of the residuals. In addition, it deals with the fact that some of the control variables are endogenous. For example, remittances may increase the home country's capital stock and boost GDP growth rates in addition to boosting GDP per capita. As a result, in order to take the endogeneity issue into account, we employ this instrumental variable type approach, namely Arellano-Bond dynamic panel generalized method of moments (GMM).

One of the basic assumptions for applying the Arellano-Bond estimator is no second-order serial correlation in the residuals of the differenced specification. Therefore, before we employ the Arellano-Bond GMM dynamic panel estimator, we have to test for second order serial correlation of our residuals. In addition, the overall appropriateness of the instruments is verified by the Sargan test of over-identifying restrictions.

Before estimation we also check for the stationarity properties of our variables. A Fisher type test for panel unit root is first applied to examine the null of a unit root in the variables under consideration. The Fisher test combines the p-values of unit root tests for each cross section  $i$  as proposed by Maddala & Wu (1999) and Choi (2001). Based on the p-values of individual unit root tests, Fisher's test assumes that all series are non-stationary under the null hypothesis against the alternative that at least one series in the panel is stationary. The results suggest that 4 of the variables (namely,  $Y$ ,  $RR$ ,  $GARCH$ , and  $IMMI$ ) are  $I(1)$  processes. That is, these variables have a unit root in levels while they are difference stationary.<sup>12</sup> As a result, to ensure the stationarity of our variables, we use the first differences in our regression. All the remaining variables are  $I(0)$  processes. The results are reported in Table 3.

Our model specification uses remittances share in GDP as the dependent variable. All the variables included are in real terms and, therefore, we do not include the home and host country inflation rates. Thus, the model to be estimated is as follows:

$$\text{REMG}_{it} = \beta_0 + \beta_1 \text{MHI}_{it-1} + \beta_2 \Delta Y_{it-1} + \beta_3 \Delta \text{GARCH}_{it-1} + \beta_4 \Delta \text{RR}_{it-1} + \beta_5 \text{XR}_{it-1} + \beta_6 \text{POLRISK}_{it-1} + \beta_7 \Delta \text{IMMI}_{it-1} + \varepsilon_{it} \quad (4.2.1)$$

where, is the country specific fixed-effect. The right-hand variables are as defined in Section 3.<sup>13</sup>

**Table 3**  
**Fisher Test for panel unit root**

<b>Variable</b>	<b><math>\chi^2</math> Statistic</b>	<b>p-value</b>
REMG	69.2808	0.0000
Median Hispanic Income (MHI)	79.7396	0.0000
Exchange Rates (XR)	68.4213	0.0000
GDP per capita (Y)	0.5272	1.0000
Rate of Return to Investment (RR)	15.9693	0.5947
Uncertainty (GARCH)	16.2994	0.5717
Political Risk (POLRISK)	30.3325	0.0343
Immigrant Stock (IMMI)	19.4291	0.4490

Notes:  $H_0$ : Series non-stationary

Tables 4 shows the Arellano-Bond dynamic panel GMM estimation results with robust standard errors. This table shows that all of the variables have their expected signs and are mostly significant. For example, the coefficient for growth of the median Hispanic income (MHI), which measures the economic well-being of a migrant, is significant. This result is to be expected because a migrant's income is an important determinant for the money they send back home. The result implies that as the income of migrants in the U.S. increases; they are more likely to increase the remittances they send to their home countries. This is supportive of previous studies that show remittances respond directly to the ability of the remitter to send earnings home (Loser et al., 2006). For comparison with other studies, we used the U.S. GDP as well as U.S. unemployment rate to measure the economic well being of migrants in the U.S. The results, though not significant, show that U.S. unemployment is negatively related to remittances inflows into Latin American countries. This is consistent with previous studies such as Higgins et al. (2007).

**Table 4**  
**Arellano-Bond Dynamic Panel GMM Estimation Results**  
**Using Remittances per Immigrant**  
*Dependent Variable: Remittances per GDP*

<b>Variable</b>	<b>(1)</b>
Lagged Remittances per GDP	0.4476 (0.0678)***
Median Hispanic Income (MHI)	0.7795 (0.2182)***
Exchange Rates (XR)	-0.0088 (0.0210)
GDP per capita (Y)	0.0131 (0.0101)
Rate of Return to Investment (RR)	0.1301 (0.3107)
Uncertainty (GARCH)	-2.0028 (0.8741)***
Political Risk (POLRISK)	-0.2586 (0.1015)***
Immigrant Stock (IMMI)	0.0089 (0.0051)*
Observations	144
Countries	8
Sargan Test	0.2724
Second Order Serial Correlation Test	0.1590

Notes: Standard Errors are in parenthesis and \*\*\*, \*\* and \* denote significance at 0.01, 0.05, and 0.10 levels respectively. The null hypothesis for the Sargan test is that the instruments are valid (p-values are reported above). The null-hypothesis for the second order serial correlation test is that the errors don't exhibit second order serial correlation (reported above are the p-values)

The estimated coefficient of the growth of the GDP per capita (Y) of the home countries indicates that this variable is positively (but not significantly) related to remittances. The result suggests that a higher growth of income in home country increases remittances sent home by immigrants. That is, remittances increase when economic activity in the home country accelerates and they decrease when economic conditions worsen. This result is contrary to the commonly held belief that remittances are used to smooth out fluctuations in economic activity. In our case, immigrants choose to keep more of their money in the host country during

periods of economic trouble in the home country due to a possible loss of confidence in their country's economic situation.

In addition, a change in the rate of return to investment is positively related to remittances inflows into the selected Latin American countries. A few studies have attributed these results to the investment motive to remit. A high rate of return to investment and high income in the home country would both encourage more investment (see, for example, Higgins et al., 2004). This in turn would increase remittances for investment purposes. However, the estimated coefficient is not statistically significant. Furthermore, as expected, the growth of the immigrants (IMMI) in the host country shows an increase in the money sent back home.

The coefficient for real exchange rate return (XR) is not significant. However, it indicates that remittances tend to increase when the exchange rate depreciates. This result shows that remitters choose to send more to their home country when the currency of their home country depreciates. This is because exchange rate depreciations permit the remitter to buy more home currency with a given level of host currency thereby getting 'more credit for the transfer' (Amuedo-Dorantes & Pozo, 2007; Higgins et al., 2004; Wahba, 1991).

One of the main variables of interest, namely, the exchange rate uncertainty (GARCH) is significant. This result indicates that as exchange rate volatility increases, the level of remittances per immigrant decreases. The result supports the hypothesis that uncertainty in the exchange rate lowers the level of remittances sent for investment purposes (for similar results, see Higgins et al., 2004). The migrant will ignore investing opportunities in the home country if he/she expects a high variability of the exchange rate. In addition, exchange rate volatility would reduce remittances because exchange rate volatility decreases confidence in the home country's financial system.

Similarly, the political risk (POLRISK) is found to be negatively and significantly related to remittances inflows. This result shows that when the political situation in the home country worsens remittances flow decrease. Immigrants may choose to keep more of their money in the host country during periods of political turmoil in the home country due to lack of belief in their country's political system.

---

## **Concluding Remarks**

The Latin America and the Caribbean region is the largest remittances destination in the world. By 2005, remittances inflows exceeded the combined flows

of all net FDI to the Latin American countries (Inter-American Development Bank, 2006). Because of their increasing volume and their potential to reduce poverty, remittances are and should be receiving growing attention from policymakers in the region. There is a wide range of important issues related to remittances. In this study, we focus on investigating the macroeconomic determinants of remittances to nine Latin American countries.

The empirical evidence presented in this paper shows that for the period of 1990-2006, macroeconomic variables of the host as well as home countries affected remittances inflows. Host country variables such as median Hispanic income in the U.S. significantly affected remittances inflows. In addition, the results show that home country risk variable such as exchange rate uncertainty is an important determinant of remittances to Latin American countries. An increase in political risk seems to have a negative but insignificant impact on remittances. Based on the findings of this paper, we can say that governments of the home countries can influence the inflow of remittances by stabilizing their currency and by improving their institutional and political environments. Because government institutions and political instability matter for the manner in which remittances are used, governments should try to encourage remittances to be utilized for productive investment and thereby economic growth. The best way for these countries' governments to ensure that remittances contribute to positive economic growth is to foster better quality of institutions, political stability, and stable currency.

---

## Notes

1. Remittances are the portion of international migrant workers' earnings sent back from the country of employment to the country of origin. World Bank defines international flows of remittances as the sum of three items, namely, worker remittances, income (compensation) of migrant workers, and migrant savings (the net wealth of migrants when they return home).
2. The countries included in this study are: Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Nicaragua, Peru, and Venezuela. These countries were chosen due to data availability.
3. Most studies take account of the return to investment by using the interest rate differentials between the host and home countries. In this study, we use the inverse of the log of GDP per capita to account for the rate of return to investment. For an explanation on how to construct this rate of return to investment variable, see Aseidu, 2002. This substitution is made since market interest rates for most of the

selected years are not available. In addition, the reported interest rates in many of these countries do not reflect true asset returns (Higgins et al, 2004).

4. The selection of the LAC was based on data availability.

5. We aggregate the monthly conditional variances into annual frequency to obtain our annual volatility measures.

6. The stock of immigrants in the U.S. for each of the sample country was constructed from U.S. Census data and annual data on U.S. immigration flows from each of the sample countries.

7. Most studies use U.S. GDP to measure the economic well being of the migrants. However, MHI more closely maps the U.S. income of this group. MHI measures income of Hispanic households (migrant and U.S. nationals) in the U.S (Loser et al, 2006).

8. For explanations of how to construct this variable see Asiedu (2002).

9. We use the real rather than the nominal exchange rate, since uncertain price levels as well as exchange rates are relevant for long-term investments. All real exchange rates used in this chapter are bilateral exchange rates vis-à-vis the U.S. dollar. The real exchange rates are calculated by multiplying the ratio of prices in the United States relative to national prices by the nominal exchange rates. Thus an increase in the real exchange rate index would indicate an appreciation of the U.S. dollar.

10. The ARCH term is the lag of squared errors from the mean equation or news about volatility from the previous period.

11. To ensure a well-defined process, all the parameters in the infinite order AR representation must lie outside the unit circle. For a GARCH (1,1) process this will be the case if  $\alpha_1$  and  $\delta_1$  are non-negative. It is also required that  $\alpha_1 + \delta_1 > 1$  for covariance stationarity.

12. The results for the differenced variables' unit root tests are available upon request.

13. The variables with the presence of unit roots have been first-differenced. Therefore they are in growth terms.



---

## References

- Agarwal, R., & Horowitz, A. (2002). Are international remittances altruism or insurance? Evidence from Guyana using multiple-migrant households. *World Development*, 30, 2033-2044.
- Amuedo-Dorantes, C., & Pozo, S. (2007). *Remittances and the macroeconomy: The case of small island developing states*. San Diego State University, Department of Economics. Working Papers 0018.
- Amuedo-Dorantes, C., & Pozo, S. (2004). Worker's remittances and the real exchange rate: A paradox of gifts. *World Development*, 32, 1407-1417.
- Asiedu, E. (2002). On the determinants of foreign direct investment to developing countries: Is Africa different? *World Development*, 30(1), 107-119.
- Chami, R., Fullenkamp, C., & Jahjah, S. (2003). *Are immigrant remittance flows a source of capital for development?* IMF Working Paper 03/189.
- Chandavarkar, A. G. (1980). Use of migrants' remittances in labor-exporting countries. *Finance and Development*, 17, 6-39.
- Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20(2), 249-272.
- Djajic, S. (1989). Migrants in a guest-worker system: A utility maximizing approach. *Journal of Development Economics*, 31, 327-339.
- Durand, J., Kandell, W., Parrado, E., & Massey, D. S. (1996). International migration and development in Mexican communities. *Demography*, 33(2), 249-64.
- Elbadawi, I., & Rocha, R. (1992). *Determinants of expatriate workers' remittances in North Africa and Europe*. World Bank Working Paper Series 1038.
- El-Sakka, M., & McNabb, R. (1999). The macroeconomic determinants of migrant remittances. *World Development*, 27, 1493-1502.
- Faini, R. (1994). Workers remittances and the real exchange rate: A quantitative framework. *Journal of Population Economics*, 7, 235-245.
- Global Economics Prospects (2006).
- Glytsos, N. P. (1997). Remitting behavior of "temporary" and "permanent" migrants: The case of Greeks in Germany and Australia. *Labour*, 11, 409-435.
- Hoddinott, J. (1992). Modeling remittance flows to Kenya. *Journal of African Economies*, 1, 206-232.
- Higgins, M. L., Hysenbegasi, A., & Pozo, S. (2004). Exchange-rate uncertainty and workers' remittances. *Applied Financial Economics*, 14, 403-411.

- Ilahi, N., & Jafarey, S. (1999). Guestworker migration, remittances and the extended family: Evidence from Pakistan. *Journal of Development Economics*, 2, 485-512.
- Inter-American Development Bank (2006).
- International Country Risk Guide (ICRG) (2006).
- Jongwanich, J. (2007). *Workers' remittances, economic growth and poverty in developing Asia and Pacific countries*. UNESCAP Working Paper (WP/07/01).
- Katseli, L. T., & Glytsos, N. (1986). *Theoretical and empirical determinants of International Labour Mobility: A Greek-German perspective*. Centre for Economic Policy Research Working Paper 148.
- Loser, C., Lockwood, C., Minston, A., & Balcazar, L. (2006). *The macro-economic impact of remittances in Latin America: Dutch disease or Latin cure?* Inter-American Dialogue.
- Lucas, R., & Stark, O. (1985). Motivations to remit: Evidence from Botswana. *The Journal of Political Economy*, 93, 901-918.
- Maddala, G., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61, 631-652.
- Ratha, D. (2003). Worker's remittances: An important and stable source of external development finance. *Global Development Finance*, 157-172.
- Russell, S. (1986). Remittances from international migration: A review in perspective. *World Development*, 14, 677-696.
- Straubhaar, T. (1986). The determinants of workers' remittances: The case of Turkey. *Weltwirtschaftliches Archiv*, 122, 728-740.
- United Nations Habitat (2006).
- Vargas-Silva, C., & Huang, P. (2006). Macroeconomic determinants of workers' remittances: Host versus home country's economic conditions. *Journal of International Trade & Economic Development, Taylor and Francis Journals*, 15(1), 81-99.
- Wahba, S. (1991). What determines workers' remittances? A framework for examining flows from migrant workers, with a focus on Egypt's experience in the 1980s. *Finance & Development*, 28(4), 41-4.
- World Bank (2006).

---

## **Biographical Sketch of Author**

Blen Solomon was born in Addis Ababa, Ethiopia and started her college education at Addis Ababa University in 1996-97. At the end of her first year, she transferred to Lawrence University in Appleton, WI where she received her B.A. in 2000. She received her M.A. in Economics in 2004 and her Ph.D. in economics in 2007 from Western Michigan University. Currently, she has a visiting position at Grand Valley State University.

