This study investigates the determinants of remittances to 9 Latin American countries. In addition, it analyzes the effects of exchange rate uncertainty and political risk in affecting remittances inflows into the region. The empirical evidence from this study shows that for the period of 1986-2005, variables such as exchange rate uncertainty and political risk were important determinants of remittances into the selected Latin American countries. 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 and improving their political environments.

Key Words: Remittances, Exchange Rate Uncertainty, Political Risk, Latin American Economies.

JEL Classification: O11, O54, F02
1. INTRODUCTION

Remittances\(^1\) have become an increasingly important and fast growing external finance for many developing countries. By 2005, the share of developing countries in global remittances inflows was $167 billion. This amount had more than doubled from its value of $58 billion in 1995 (UN habitat, 2006). The increase in remittances flows into developing regions is welcomed since 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 countercyclical nature of remittances exerts a stabilizing influence, and thus helps insulate vulnerable countries from economic shocks (Ratha, 2003 and 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 consumed, 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: 164).

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 Direct 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

\(^1\) 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).
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.\(^2\)

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). In fact, 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 has considered risk variables as determinants

\(^2\) The countries employed in this study are: Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Nicaragua, Peru, and Venezuela. These countries were chosen due to data availability.
of remittances and no study has used the rate of return to investment measure\(^3\) that we use in this study (for the study considering risk variables, see Higgins \textit{et al}, 2004; for explanations about how to construct the rate of return to investment variable, see Aseidu, 2002). 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. Therefore, the purpose of this paper is to examine the macroeconomic determinants of remittances as well as to investigate if risk and return variables have a role in determining remittances flows into Latin American countries.

Following this introduction, the rest of the paper is organized as follows: section 2 discusses the trend of remittances inflows to Latin American countries and provides a brief literature review. Section 3 gives the sources of data and describes the variables used in the study. Section 4 outlines the empirical methodologies used in the study. Section 5 discusses the empirical findings and finally, section 6 draws conclusions and policy implications.

\(^3\) 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. 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 \textit{et al}, 2004).
2. REMITTANCES TO LATIN AMERICA AND BRIEF LITERATURE REVIEW

2.1 Remittances to Latin America

In 1995, the share of remittances going to Latin America and the Caribbean accounted for 23.2% of the world total remittances. However by the year 2005 this volume had increased to 31% of world total remittances, making the region the main remittance recipient region in the world. In dollar terms, Latin America and the Caribbean 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 capital inflows such as FDI (see Table 1).

There are some key factors that could explain the tremendous growth seen in remittances inflows to Latin American countries over the last decade. One of the most important 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 country of origin. Out of these 25 million migrants, approximately 65% send money home on a regular basis. The amount of money they send is typically from $100 - $300 a month (Inter American Development Bank, 2006).

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4 Some studies support the claim that remittances are used for investment purposes in Latin American countries. Woodruff and Zenteno (2001) show that remittances are responsible for about 1/5 of the capital invested in micro enterprises in urban Mexico.
The main origin of remittances to Latin America is the U.S. as about 75% ($40 billion) of Latin American remittances are sent from the U.S. The next largest source of remittances is Western Europe with remittances from there accounting for almost 15% (about $7.5 billion) of Latin American remittances.

2.2 Literature Review

There is a wide range of important issues related to remittances. In this study, we focus on the determinants of remittances to Latin American countries. As mentioned above, the literature is divided into two broad categories. The first category deals with microeconomic determinants of remittances such as the social and demographic characteristics of migrants and their families. The second category of determinants, considers macroeconomic variables of the sending as well as receiving countries. Much of the remittances literature has focused on the first category which deals with microeconomic determinants of remittances (for example, see Lucas and Stark, 1985; Russell 1986; Djajic, 1989; Hoddinot, 1992; Durand et al. 1996; Ilahi and Jafarey, 1999; and Agarwal and Horowitz, 2002). In the literature, socio-demographic variables such as the impacts of household income, employment of the migrant, marital status and gender of the migrant, number of children at home, education level of the migrant, occupation level of migrant, and the number of years since migration, on remittances, among others have been investigated. The income level of the migrant, marital status, education level and the number of dependents have been found to be important determinants of remittances by a number of studies (see Lucas and Stark, 1985 and Durand et al., 1996). On the other hand, Hoddinot (1992) highlights the role of the gender of the migrant in affecting the amount of remittances sent.
The above mentioned demographic variables have also been used to test the motives to remit. It is widely thought that altruism is an important motivation for remitting. However, some studies have argued for other motives such as self-interest and risk-sharing. Lucas and Stark (1985), use micro level data from Botswana to test several hypotheses for motivations to remit. Their study shows that altruism alone is not a sufficient explanation of the motivations to remit to Botswana. On the other hand, Agarwal and Horowitz (2002) test the altruism versus risk-sharing motives to remit and found evidence supporting the altruistic motive.

However, in addition to the demographic variables mentioned above; macroeconomic variables of the sending and receiving countries would affect remittances flows. Therefore, some studies have recognized the importance of the macroeconomic determinants of remittances (see for example, 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.
Alternatively, 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.

Looking at the impact of exchange rates on remittances; most studies expect the depreciation of the real exchange rate to encourage the flow of remittances from the host to home country (Higgins et al., 2004). This expectation is supported by Chandavarkar (1980), Amuedo-Dorantes and Pozo (2004), and Higgins et al. (2004) who find exchange rates to be important in determining remittances inflows. In addition, Higgins et al. (2004) find that exchange rate volatility (a measure of risk) is an important determinant of remittances.

It is usually believed that higher inflation rates of the host country will increase the flow of remittances. On the contrary, high inflation rates in the home country decrease remittances inflows due to the relative increase in prices of goods and assets at home. In addition, a high inflation rate is a discouraging signal for investment and therefore leads to a decrease in remittances into the home country. Elabadawi and Rocha (1992) find results that are supportive of this hypothesis and show that high inflation rates in the home country decrease remittances inflows. However, El-Sakka and McNabb (1999) find that high rates of inflation in the home country may encourage remittances especially in low-income countries where a migrant’s family may depend significantly on remittances as source of income.

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 since downturns in the home economy prompt workers to increase the amount they remit. Alternatively, 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.

3. DATA DESCRIPTION

As mentioned above, our analysis covers 9 Latin American countries for the period 1985 through 2005. The variables used in this study are annual in frequency; however, the exchange rates used to generate the conditional variances are monthly. The data sources for our variables are the World Development Indicators (WDI), the International Financial Statistics (IFS) CD-ROM, U.S. Census data, 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, i.e. should only workers’ remittances be counted, or should compensation of

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5 The selection of the LAC was based on data availability.
6 We aggregate the monthly conditional variances into annual frequency to obtain our annual volatility measures.
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 formal remittances flows go unrecorded due to weakness in data collection (Jongwanich, 2007). For example, money flows through informal channels such as money transfers through family members are rarely computed. 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).

Moreover, the available data on remittance flows does not identify the source country of these flows. However, remittances literature identifies the sending as well as receiving country’s macroeconomic variables 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 small.

In order to investigate the determinants of remittances into Latin American countries, we use the following variables: remittances per immigrant\(^7\) (REM), remittances flows (REMF), stock of immigrants in the U.S. (for each Latin American country) (IMMI), per capita income of each of the 9 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).

\(^7\) 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.
The median Hispanic income in the U.S. (MHI) is used to measure economic well being of migrants in the host (sending) country.\textsuperscript{8} 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 to measure the economic well being of migrants in the sending country.

The per capita incomes (Y) of the 9 Latin American countries are used to measure the economic well-being of the home (receiving) countries. Previous studies suggest that the home country’s GDP per capita may affect remittances either positively or negatively, depending on different motives to remit. If the motive for remitting is to invest then there will be a positive relationship between per capita income in the receiving country and remittances inflows. However, if the motive is altruistic then a negative relationship is to be expected. Conversely, 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.

Host country inflation (INF) will increase the flow of remittances as immigrant workers seek to protect against the decrease in their purchasing power in the host country. Therefore, a negative relationship between host country inflation and remittances is to be expected. However, home country inflation (INFHOME) may affect remittances either positively or negatively. If investment is the main motive to remit, then

\textsuperscript{8} 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).
effect of the inflation of the home country on remittances would be negative. However, if altruism is the main motive to remit, opposite results could be obtained.

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.\(^9\) 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\(^{10}\) are used to proxy exchange rate uncertainty. Increases in exchange risk will decrease the level of

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\(^9\) For explanations of how to construct this variable see Asiedu (2002).

\(^{10}\) 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.
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 host 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 host 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.

4. ESTIMATION METHODOLOGY AND RESULTS

4.1. Exchange Rate Uncertainty Specification and Results

The ARCH/GARCH model has become a popular method to study volatility (Engle, 1982; Bollerslev, 1986). 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. It is often observed that this method captures volatility in each period more accurately. The ARCH model characterizes the distribution of the stochastic error $\epsilon_t$ conditional on the realized values of the set of variables that may include lagged values of the conditional variance. The generalized ARCH model, namely the GARCH (p, q) model is specified as follows:

$$ Y_t = f(x_t; \delta) + \epsilon_t e_{t\gamma} \sim D(0, h_t^2) \tag{4.1.1} $$
\[ h_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \delta_i h_{t-i}^2, \]  

(4.1.2)

where \( f(x_t; \delta) \) refers to the conditional mean, \( x_t \) consists of a vector of explanatory variables that may include lagged \( y_t \)'s, \( \delta \) is a Mx1 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. The conditional errors have zero mean and time varying variance, \( h_t^2 \). The conditional variance follows a GARCH process as in (5.1.2). 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 \( \varepsilon_{t-i}^2 \), and the GARCH term \( h_{t-i}^2 \).

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.

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11 The ARCH term is the lag of squared errors from the mean equation or news about volatility from the previous period.
12 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.
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.

4.2 Estimation Methodology and Results for the Determinants of Remittances

In this paper, given the fact that we analyze the net flow of remittances from the U.S. to the 9 home countries, we employ panel data techniques that take into account country-specific effects. Fixed or random effects panel data models take the country-specific heterogeneities of these countries into account. The fixed effect estimation includes the country-specific effects as regressors rather than assigning them to the error term, thereby reducing omitted variable bias. Fixed effects models always give consistent results but they may not be efficient. Random effects models give a more efficient estimator but might not be consistent if the true model is a fixed effect model. Therefore we use the Hausman (1978) test to determine whether a fixed effect model or a random effect model is more appropriate. In our case, the Hausman test confirmed the use of a fixed effects model.

In this study, we have two model specifications. The first model specification employs remittances per immigrant as the dependent variable. However, several studies argue for the importance of including the stock of immigrants as a determinant of remittances. Therefore, the second model specification uses remittances per GDP as the dependent variable and the stock of immigrants is included as one of the independent
variables. All the variables included are in real terms therefore we do not include the
home and host country inflation rates.\footnote{However, we would like to investigate the impacts of (both the home and host country’s) inflation rates on remittances. Therefore we conduct a third set of estimations where we use the nominal variables so that we can include the inflation rates of the home and host countries. The results are not reported here (but are available upon request). The inflation rate of the home country has a negative coefficient but is not significant. The negative coefficient is to be expected since if investment is the main motive to remit, the effect of the home country inflation on remittances would be negative. This is because an increase in inflation in the home country would increase the relative prices of goods and assets there. On the other hand, inflation in the host country will increase the flow of remittances as immigrant workers seek to protect against the erosion of purchasing power in the host country. Therefore, a positive relationship between host country inflation and remittances is to be expected. Our results show that there is no significant relationship between these variables even though the coefficient has the expected positive sign.}

**The fixed effects models are as follows:**

\[
REM_i = \beta_0 + \beta_1 MHI_i + \beta_2 Y_{it} + \beta_3 GARCH_{it} + \beta_4 RR_{it} + \beta_5 X_{it} + \beta_6 POLRISK_i + \epsilon_{it} \quad \cdots \quad (4.2.1)
\]

\[
REM_H = \beta_0 + \beta_1 MHI_i + \beta_2 Y_{it} + \beta_3 GARCH_{it} + \beta_4 RR_{it} + \beta_5 X_{it} + \beta_6 POLRISK_i + \beta_7 IMM_H + \epsilon_{it} \quad \cdots \quad (4.2.2)
\]

where, \( \beta_0 \) is the country specific fixed-effect.

Tables 3 and 4 show the fixed effects estimation results with robust standard
errors. Table 3 displays results for model specification 1 (i.e. using the remittances per
immigrant as the dependent variable). Table 4 presents results for model specification 2
(i.e. employing the remittances per GDP as the dependent variable).

The results presented in both tables 3 and 4 show that all of the variables have
their expected signs. From Table 3 it can be seen that the coefficient for the median
Hispanic income (MHI) is positive and significant implying that as the income of
migrants in the U.S. increase they are more likely to increase the remittances they send to
their home countries. This result 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 supportive of previous studies such as Higgins et al (2004) that show that a 1% rise in the US unemployment rate reduces remittances by 8%.

Conversely, the estimated coefficient of the GDP per capita (Y) of the home countries indicates that this variable is significantly and positively related to remittances. This result suggests that the decision to remit is driven more by investment motives rather than altruistic motives; supporting the self-interest and investment hypotheses (for similar results, see Higgins et al, 2004 and Lucas and Stark, 1985). Another result that points towards the self-interest (investment) motive to remit is the coefficient of the rate of return to investment (RR). As can be seen from tables 3 and 4, the rate of return to investment is found to positively and significantly affect remittances inflows into the selected Latin American countries. This result is to be expected if the motive to remit is investment. A high rate of return to investment would encourage more investment which in turn would increase remittances for investment purposes.

The coefficient for the real exchange rate (XR) is not significant but always negative, indicating that remittances tend to increase when the exchange rate depreciates (declines). This result shows that remitters choose to invest more in their home country when the currency of their home country depreciates (Amuedo-Dorantes and Pozo (2004) and Wahba, 1991).

One of the main variables of interest, namely, the exchange rate uncertainty (GARCH) is negative and significant. This result indicates that as exchange rate volatility increases, the level of remittances per immigrant decreases. The result supports the
hypothesis that more 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. Similarly, the political risk (POLRISK) is found to be negatively related to remittances inflows. This result is also to be expected because political risk creates an additional cost to investors and as a result one would expect a negative relationship with remittances sent for investment purposes.

Table 4 shows results from model specification 2, where we use the immigrant per GDP as the dependent variable. Results remain similar to results from model specification 1 in that all the significant variables have the expected signs. The new additional variable, namely the stock of immigrants (IMMI) in the host country has a positive relationship with remittances flows. This result is expected since an increase in the number of immigrants in the host country would increase the money sent back home.

5. CONCLUDING REMARKS

Latin America and the Caribbean (LAC) are the largest remittances destination in the world. By 2005, remittances inflows exceeded the combined flows of all net Foreign Direct Investment (FDI) and Official Development Assistance (ODA) 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 9 Latin American countries.
The empirical evidence from this paper shows that for the period of 1986-2005, 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 variables such as rate of return to investment, exchange rate uncertainty, and political risk are important determinants of remittances to Latin American countries. Based on the findings of this paper, we can say that governments of the home countries can influence the inflow of remittances by the stabilizing their currency and by improving their institutional and political environments.
REFERENCES


Inter American Development Bank, 2006.


Table 1-- Remittances (for 2005) Relative to Official Development Assistance, Foreign Direct Investment, and GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>Remi % ODA</th>
<th>Remi % FDI</th>
<th>Remi % GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>296%</td>
<td>15%</td>
<td>0.40%</td>
</tr>
<tr>
<td>Bolivia</td>
<td>55%</td>
<td>835%</td>
<td>8.50%</td>
</tr>
<tr>
<td>Brazil</td>
<td>1973%</td>
<td>46%</td>
<td>1.10%</td>
</tr>
<tr>
<td>Colombia</td>
<td>758%</td>
<td>111%</td>
<td>4.10%</td>
</tr>
<tr>
<td>Mexico</td>
<td>13722%</td>
<td>178%</td>
<td>28.00%</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>366%</td>
<td>270%</td>
<td>16.90%</td>
</tr>
<tr>
<td>Peru</td>
<td>279%</td>
<td>117%</td>
<td>3.20%</td>
</tr>
<tr>
<td>Venezuela</td>
<td>533%</td>
<td>18%</td>
<td>0.20%</td>
</tr>
</tbody>
</table>

Source: Inter American Development Bank (2006)
Figure 1 -- Conditional Variances of the Exchange Rates

- Argentina conditional variance
- Bolivia conditional variance
- Brazil conditional variance
- Chile conditional variance
- Colombia conditional variance
- Mexico conditional variance
Nicaragua conditional variances

Peru conditional variance

Venezuela conditional variances
<table>
<thead>
<tr>
<th>Countries</th>
<th>AR Process</th>
<th>MA Process</th>
<th>c</th>
<th>$\alpha_1$</th>
<th>$\alpha_2$</th>
<th>$\delta_1$</th>
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<tbody>
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<td>Argentina</td>
<td>AR(8)</td>
<td>MA(2)</td>
<td>0.0207</td>
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<td>(0.1806)**</td>
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<tr>
<td>Bolivia</td>
<td>AR(1)</td>
<td>MA(1)</td>
<td>0.0005</td>
<td>0.4171</td>
<td>0.3618</td>
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<td>(0.0010)***</td>
<td></td>
<td>(0.0805)**</td>
</tr>
<tr>
<td>Brazil</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0182</td>
<td>0.4123</td>
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<td></td>
<td>(0.0082)***</td>
<td></td>
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</tr>
<tr>
<td>Colombia</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0002</td>
<td>1.3555</td>
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<td>(0.0028)***</td>
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<tr>
<td>Chile</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0008</td>
<td>0.1863</td>
<td>0.0957</td>
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<td>(0.0008)***</td>
<td></td>
<td>(0.1449)**</td>
</tr>
<tr>
<td>Mexico</td>
<td>AR(3)</td>
<td>--</td>
<td>0.1900</td>
<td>0.2592</td>
<td>0.5799</td>
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<td>(0.0035)***</td>
<td></td>
<td>(0.0514)**</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0100</td>
<td>0.0939</td>
<td>0.9023</td>
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<td>(0.0016)***</td>
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<td>(0.0083)**</td>
</tr>
<tr>
<td>Peru</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0100</td>
<td>0.4452</td>
<td>0.7181</td>
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<td>(0.0005)***</td>
<td></td>
<td>(0.0119)**</td>
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<tr>
<td>Venezuela</td>
<td>AR(3)</td>
<td>--</td>
<td>0.0347</td>
<td>1.8067</td>
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<td>(0.0070)***</td>
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### Table 3 -- Fixed Effects Estimation Results Using Remittances per Immigrant

Dependent Variable: Remittances per Immigrant

<table>
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<tr>
<th>Variable</th>
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<tbody>
<tr>
<td>Median Hispanic Income (MHI)</td>
<td>0.00674</td>
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<tr>
<td></td>
<td>(0.0030)***</td>
</tr>
<tr>
<td>Exchange Rates (XR)</td>
<td>-0.0242</td>
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<tr>
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<td>(0.1543)</td>
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<td>GDP per capita (Y)</td>
<td>2.9449</td>
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<td>(1.5481)***</td>
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<tr>
<td>Rate of Return to Investment (RR)</td>
<td>-6.9687</td>
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<tr>
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<td>(1.5647)***</td>
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<tr>
<td>Uncertainty (GARCH)</td>
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<tr>
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<td>(3.4449)***</td>
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<tr>
<td>Political Risk (POLRISK)</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(0.0321)***</td>
</tr>
<tr>
<td>Immigrant Stock (IMMI)</td>
<td>--</td>
</tr>
<tr>
<td>Observations</td>
<td>180</td>
</tr>
<tr>
<td>Countries</td>
<td>9</td>
</tr>
<tr>
<td>R Squared within</td>
<td>0.5573</td>
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</tbody>
</table>

**Notes:**
Standard Errors are in parenthesis and ***,** and * denote significance at 0.01, 0.05, and 0.10 levels respectively.
Table 4 -- Fixed Effects Estimation Results Using Remittances per GDP

<table>
<thead>
<tr>
<th>Variable</th>
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<td>Median Hispanic Income (MHI)</td>
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<tr>
<td>Exchange Rates (XR)</td>
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<td>GDP per capita (Y)</td>
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<td>(1.9564)**</td>
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<td>Rate of Return to Investment (RR)</td>
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<tr>
<td>Uncertainty (GARCH)</td>
<td>-0.1136</td>
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<td>(0.3514)**</td>
</tr>
<tr>
<td>Political Risk (POLRISK)</td>
<td>6.3523</td>
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<tr>
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<td>(0.0304)**</td>
</tr>
<tr>
<td>Immigrant Stock (IMMI)</td>
<td>(3.1663)**</td>
</tr>
<tr>
<td>Observations</td>
<td>180</td>
</tr>
<tr>
<td>Countries</td>
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<tr>
<td>R Squared within</td>
<td>0.7470</td>
</tr>
</tbody>
</table>

Notes:
Standard Errors are in parenthesis and ***, ** and * denote significance at 0.01, 0.05, and 0.10 levels respectively.