

Do Workers' Remittances Promote Financial Development? *

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October 2005

Abstract

Workers' remittances, funds received from migrants working abroad, to developing countries have grown steadily in recent years, becoming the second largest source of external finance after foreign direct investment. This paper uses balance of payments data on remittance flows to 99 developing countries over the period 1970-2002 to study the impact of remittances on financial sector development. We specifically examine whether remittances help develop this sector by increasing the aggregate level of deposits and/or the credit intermediated by the local banking sector. This is an important question given the increasing interest on the part of banks to enter the remittance business and considering the extensive literature that has documented the growth-enhancing and poverty-reducing effects of financial development. Our findings provide strong support for the notion that remittances promote financial development measured by the ratio of deposits to GDP.

Keywords: Remittances, financial development

JEL Classification: F22, J61, 016

* The authors would like to thank Nicola Spatafora and Angela Cabugao for providing us data. We are grateful to Florencia Moisezowicz for excellent research assistance. The views expressed in this paper are those of the authors and do not represent the opinions of The World Bank, its Executive Directors, or the countries they represent. Corresponding author: Maria Soledad Martinez Peria, The World Bank, 1818 H St., N.W., MSN MC 3-300, Washington, D.C. 20433. mmartinezperia@worldbank.org

Do Workers' Remittances Promote Financial Development?

Remittances, funds received from migrants working abroad, to developing countries have grown dramatically in recent years from U.S.\$18 billion in 1980 to over U.S.\$126 billion in 2004. They have become the second largest source of external finance for developing countries after foreign direct investment (FDI), both in absolute terms and as a proportion of GDP (Figure 1 and 2). Furthermore, unlike other capital flows, remittances tend to be stable even during periods of economic downturns and crises.

The development potential of remittances is increasingly being recognized and therefore interest in these flows and their impact is growing among governments, international organizations, and the private sector. Yet, research on remittances is sparse and limited mainly to country-specific surveys that examine the effects of remittances on poverty, education, and health among other things.

The effect of remittances on financial development remains largely unexplored, despite the increasing interest on the part of financial institutions both in the remittance-source and destination countries to enter this business as a way to expand their customer base. For example, Salvadoran banks like Banco Agrícola and Banco Salvadoreño have expanded their remittance networks in the U.S. to take advantage of the growing volume of fund transfers between the two countries (*Business News America*, August, 16, 2005). Domestic banks in Vietnam are now teaming up with foreign banks and overseas remittance service providers to establish a network to facilitate transfer of funds from abroad (*Asia Pulse*, August, 4 2005). Similarly, Banco Industrial, a Guatemalan bank, has entered into an alliance with King Express, a U.S. money transfer company, so that Guatemalans living in the U.S. can send money through King Express,

and relatives in Guatemala can receive the money at a Banco Industrial branch and open a savings account in quetzals or in dollars (Orozco, 2004). Citibank's acquisition of Banamex in Mexico is also seen as an attempt by Citibank not only to capture the remittance fee business, but also to increase its penetration in the local Mexican market. The same is true for Spain's Banco Bilbao Viscaya's acquisition of Bancomer and HSBC's purchase of Banco Bital in Mexico (Kapur, 2003).

In this paper, we use balance of payments data on remittance flows received by 99 countries over the period 1970-2002 to study the impact of workers' remittances on financial development. Financial sector and, in particular, banking sector development is often measured by the ratio of private credit or deposits to GDP (e.g., King and Levine, 1993; Beck, Levine and Loayza, 2000a,b). We specifically examine whether remittances help to develop the financial sector by increasing the aggregate level of deposits and/or the amount of credit to the private sector extended by the local banking sector.¹ This is an important issue given the extensive literature documenting the growth-enhancing and poverty-reducing benefits of financial development (e.g., King and Levine, 1993; Beck, Levine and Loayza., 2000a,b; Beck, Demirguc-Kunt, and Levine, 2004).

Furthermore, this topic is empirically interesting because, a priori, the links between remittances and financial sector development are unclear. Remittances might have a direct positive impact on credit market development if, as individuals receive sizeable transfers from abroad that are shown to be stable, banks become more willing to extend loans to remittance recipients. On the other hand, because remittances might help relax individuals' financing

¹ A recent survey of central banks in 40 countries reveals that most countries (90 percent of the sample to be exact) collect remittance statistics from commercial banks, while less than 40 percent gather information from money transfer companies and post offices (De Luna Martinez, 2005). Therefore, balance of payment statistics tend to better reflect the portion of remittances that is transferred through banks.

constraints, they might directly lead to a lower demand for credit and have a dampening effect on credit market development. Also, a rise in remittances might not reflect itself in an increase in credit to the private sector if these flows are instead channeled to finance governments. At the same time, whether we observe a direct positive relationship between remittances and financial development measured in terms of deposits will depend on the extent to which households are able to save part of the remittances they receive and do so by depositing these funds with banks.²

An important complication in empirically studying the impact of remittances on financial development is the potential for endogeneity biases. There are several sources of endogeneity. Better financial development might lead to larger measured remittances either because financial development enables remittance flows or because a larger percentage of remittances are measured when those remittances flow through formal financial institutions. In addition, financial development might lower the cost of transmitting remittances, leading to an increase in such flows. At the same time, omitted factors can explain both the evolution of remittances and of financial development, also leading to biases in the estimated impact of remittances on financial development.

We examine the relationship between remittance flows and financial development using different empirical techniques that try to deal with unobserved country effects and with the potential endogeneity of remittances and other variables. We conduct fixed and random effects estimations to account for unobserved country effects. We perform both instrumental variables (IV) as well as GMM Arellano and Bond (1991) estimations to deal with the endogeneity of remittances. In the IV regressions we use economic conditions in the remittance-source countries (i.e., the countries where migrants sending remittances reside) to instrument for remittance flows

² Remittances might also indirectly affect deposits and credit even in the extreme case where remittances are entirely consumed, if those who supply the goods consumed deposit at least part of their revenue in banks that then increase

received by countries in our sample, while in the GMM estimations lagged values of the level of remittances are used to instrument for the change in remittances. Our empirical analysis provides support for a robust relationship between remittances and financial sector development measured in terms of deposits to GDP, even after controlling for other factors that affect financial development and after addressing potential endogeneity concerns. However, the impact of remittances on credit market development, while frequently positive, is found to be less robust.

The rest of the paper is organized as follows. Section II reviews the literature on the development impact of remittances and surveys some key studies on financial sector development. Section III discusses the data used and the methodology pursued to study the impact of remittances on financial development. Section IV presents the empirical results and section V concludes.

II. Literature Review

Though remittance flows are not a new phenomenon, the literature investigating their development impact is relatively recent and primarily uses household surveys for specific countries to assess the effects of remittances on issues such as poverty, education, entrepreneurial activity, and health. Research on the impact of remittances on poverty suggests that these transfers help reduce the level of poverty, but have an even greater influence on its severity, as measured by the poverty gap (e.g., Adams, 2003, on Guatemala; Lopez-Córdova, 2005, and Taylor, Mora, and Adams, 2005, on Mexico). In addition, Maimbo and Ratha (2005) find that in terms of poverty reduction, rural areas in developing countries tend to benefit the most because much of the world's migrants are drawn from these areas.

the amount of credit they supply.

Studies that analyze the impact of remittances on education such as Cox and Ureta (2003), for the case of El Salvador, Yang (2005), for the case of Philippines, and Hanson and Woodruff (2003) and López-Córdova (2005), for Mexico, find that by helping relax household constraints, remittances are associated with improved schooling outcomes for children. Remittances have also been shown to promote entrepreneurship (Massey and Parrado, 1998; Woodruff and Zenteno, 2001; Maimbo and Ratha, 2005; Yang, 2005). Finally, a number of studies on infant mortality and birth weight (Kanaiaupuni and Donato, 1999; Hildebrandt and McKenzie, 2005; Duryea et al., 2005; and López-Córdova, 2005) have documented that at least in the Mexican case, migration and remittances help lower infant mortality and are associated with higher birth weight among children in households that receive remittances.

Compared to the number of studies that use household survey data, few papers have examined the development impact of remittances using cross-country time-series data. Based on a dataset of 74 low and middle-income developing countries, Adams and Page (2003) find that remittances have a statistically significant impact on reducing poverty. This result is corroborated in a separate analysis for 101 countries over the period 1970-2003, reported in the IMF's World Economic Outlook (2005).

In contrast to the findings on poverty, panel studies of the effect of remittances on economic growth yield mixed results. Using a panel of 113 countries over almost three decades, Chami et al. (2003) find that remittances are negatively associated with economic growth. This result is consistent with their model in which remittances weaken recipients' incentives to work and therefore lead to poor economic performance. Solimano (2003), on the other hand, finds a positive association between remittances and growth for a panel of Andean countries, while the

World Economic Outlook (2005) highlights the lack of correlation between these variables, at least at the country level.

Finally, two recent studies by Giuliano and Ruiz-Arranz (2005) and Mundaca (2005) show that the impact of remittances on growth can depend on the level of financial development in a country. However, these studies reach very different conclusions. Using a panel of more than 100 countries for the period 1975-2003, Giuliano and Ruiz-Arranz (2005) show that remittances help promote growth in less financially developed countries. They argue that this is evidence that agents compensate for the lack of development of local financial markets using remittances to ease liquidity constraints and to channel resources towards productive uses that foster economic growth. Mundaca (2005) analyzes the effect of workers' remittances on growth in countries in Central America, Mexico, and the Dominican Republic using a panel data set over 1970 to 2003. She finds that controlling for financial development in the analysis strengthens the positive impact of remittances on growth and concludes that financial development potentially leads to better use of remittances, thus boosting growth. Neither study, however, investigates the impact of remittances on financial development. Our paper contributes to the literature by directly addressing this issue, exploring the impact of remittances on bank deposits and credit to the private sector.

While the literature on remittances is still fairly limited and nascent, the determinants of financial development and its effect on growth have been studied extensively. Among others, King and Levine (1993), Levine and Zervos (1998) and Beck, Levine and Loayza (2000a,b) document how financial development is associated with greater growth across countries. Similar evidence also exists at the firm and industry levels (Demirguc-Kunt and Maksimovic, 1998 and

Rajan and Zingales, 1998). More recently, Beck, Demirguc-Kunt and Levine (2004) have shown that financial development also leads to lower levels of poverty and inequality.

As for the determinants of financial development, studies have documented a link between financial development and historical factors such as legal institutions (La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998; Beck, Levine, and Loayza, 2000a), geography and natural endowments (Acemoglu, Johnson, and Robinson, 2001, 2002), ethnic diversity and religion (Easterly and Levine, 1997; Stulz and Williamson, 2003) and political power and systems (Acemoglu, 2003). Furthermore, financial development has been found to be affected by capital account openness (Chinn and Ito 2002), domestic financial liberalization (Demirguc-Kunt and Detragiache, 1998), and inflation (Boyd, Levine, and Smith 2001).

III. Empirical methodology and data

We empirically examine the relationship between financial development and remittances by estimating a number of variants of equation (1), depending on the assumptions made about the error term and the exogeneity of remittances.

$$FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{i,t} \quad (1)$$

where i refers to the country and t refers to the time period from 1970 to 2002. However, data for the complete time period are not available for all countries and countries are only included if at least five years of data are available. A complete list of countries and time periods is given in appendix table 1. Table 1 provides definitions and sources for each of the variables in our estimations, while Table 2 and 3 present descriptive statistics and correlations, respectively.

FD , financial development, refers either to the ratio of bank credit to the private sector to GDP or the share of bank deposits to GDP. These are the standard measures of financial depth

used in the literature. Data to construct these ratios come from the *International Financial Statistics* (IMF) and the *World Development Indicators* (World Bank).

Rem refers to the ratio of remittances to GDP. The data on remittances are obtained from the IMF's 2005 World Economic Outlook. With some exceptions, these data are constructed as the sum of three items in the *Balance of Payment Statistics Yearbook* (IMF): *workers' remittances* (current transfers made by migrants who are employed and resident in another economy); *compensation of employees* (wages, salaries and other benefits earned by nonresident workers for work performed for resident of other countries); and *migrant transfers* (financial items that arise from the migration or change of residence of individuals from one economy to another).³ Figures 3 and 4 show the top twenty remittance recipient countries in our sample for the period 1970-2002 measured in absolute terms (period averages in U.S. billion dollars) and relative to the size of each country's economy (period averages of shares to GDP). India (\$U.S. 4.26 billions), Mexico (\$U.S. 3.82 billions), Egypt (\$U.S. 3.28 billions), Philippines (\$U.S. 2.76 billions) and Turkey (\$U.S. 2.50 billions) are among the largest recipients of remittances in absolute terms as shown in Figure 3. Relative to the size of the economy, remittances are especially high among low-income, small economies such as Jordan (18.49%), Tonga (17.86%), St. Vincent (10.30%), Moldova (10.14%), and Grenada (9.61%) as shown in Figure 4.

The matrix X refers to a set of variables that the literature has found to affect financial development. *Inflation*, which we measure as the annual percentage change in the GDP deflator, is included as a determinant of financial development because it has been shown to distort economic agents' decision-making regarding nominal magnitudes, discouraging financial intermediation, and promoting saving in real assets (Boyd, Levine, and Smith, 2001).

³ Additions and adjustments to these data from national sources are required for some specific countries. Details are provided in a data appendix.

On the other hand, *capital account openness* has been found to have a positive effect on financial development (see Chinn and Ito, 2002). We measure capital account openness using the index developed by Chinn and Ito, which is the first principal component of four variables capturing the absence of (1) multiple exchange rate regimes, (2) restriction on current account transactions, (3) restrictions on capital account transactions, and (4) requirements of the surrender of exports proceeds. Higher values of this index indicate greater openness. We also include a separate dummy for *dual exchange rates* arrangements since data on this kind of restrictions are available for a longer period and larger set of countries than the capital account index. Furthermore, since recent studies (e.g., WEO 2005) have shown that such arrangements can affect remittances, we include this variable to isolate the independent effect of remittances on financial development.

Because the Chinn and Ito (2002) index is a *de jure* measure of capital controls, in some estimations, we replace this measure with the share of *other non-remittance flows* (including aid, FDI, and portfolio flows). *Domestic financial liberalization* has also been shown to have a positive effect on financial development. Following Demirguc-Kunt and Detragiache (1998), we capture periods of domestic financial liberalization with a dummy which equals one in cases when there are no controls on domestic interest rates. More details as to the sources used to identify such periods are provided in Table 1.

The importance of legal institutions for the development of the financial sector has been firmly established in the finance literature (e.g., La Porta, Lopes-de-Silanes, Shleifer, and Vishny 1997, 1998; Beck, Levine, and Loayza, 2000a; Beck, Demirguc-Kunt, and Levine 2003; and Schleifer Djankov, McLiesh, and Shleifer, 2005). To control for these factors we include an index of *Creditor Rights* (ranging from 0, weak, to 4, strong) developed by Djankov, McLiesh,

and Shleifer (2005) and a dummy to control for countries with *British Legal Origin* (i.e., dummy equals 1 if legal system is based on Common Law). An alternative view of the determinants of financial development, stresses the importance of endowments (Acemoglu, Johnson, and Robinson, 2001, 2002). To control for the latter, we include countries' absolute *latitude*, a frequently used proxy of endowments (Beck, Demirguc-Kunt, and Levine, 2003).⁴ Since our measures of legal institutions and endowments do not vary over time, these variables are not included in the fixed effect estimations.⁵

Finally, most estimations control for country *size*, defined as the log of GDP in constant dollars, and the level of economic development, as measured by *GDP per capita*. In addition, some regressions also include *GDP per Capita Growth* (measured in constant terms). The first two variables are included on the grounds that financial sector development requires paying fixed costs that become less important the larger the size of the economy and the richer the country. Also, GDP per capita can proxy for the quality of legal institutions in the country which have been shown to have a positive impact on financial development. The growth of GDP per capita is included to control for the fact that faster growing economies will have greater demand for financial services.

Abstracting from any potential endogeneity problems in equation (1), we first examine the relationship between financial development and remittances by running simple ordinary least squares (OLS), fixed effects (FE), and random effects (RE) regressions. These estimations make different assumptions about the error term in equation (1). OLS assumes $u_{i,t}$ to be independent

⁴ The original paper by Acemoglu et al. (2001) uses settlers' mortality data as a measure of endowments. However, this information is only available for a subset of former colonies. Using this data restricts our sample of countries, therefore we prefer to use absolute latitude as a proxy for endowments.

⁵ Beck, Demirguc-Kunt, and Levine (2003) show that the impact of other variables such as religion, ethnic diversity or political structure on financial development is neither significant nor very robust. Thus, we do not control for these factors when investigating the effect of remittances on financial development.

and identically distributed errors with zero mean and constant variance. In the FE model, $u_{i,t}$ is the sum of μ_i and $v_{i,t}$ where the former represent individual specific fixed parameters to be estimated and the latter are independent and identically distributed errors with zero mean and constant variance. In the RE regressions, both μ_i and $v_{i,t}$ are independently distributed and, furthermore, both are independent from the regressors in the equation. In conjunction with these estimations, we report F-tests for the joint significance of the fixed effects and a Hausman test comparing the efficiency of random vis-à-vis fixed effect estimates.

In the estimations described above, we are implicitly assuming that remittances are exogenous. This is a questionable assumption, especially considering that the statistics we use refer to remittances transferred through the formal financial system. Thus, it is conceivable that remittances may grow over time simply because financial development in the recipient countries allows banks to play a greater role in the remittance transfer process. Furthermore, biases might also occur because of common omitted variables driving the behavior of both remittances and financial development.⁶

In order to try to address the concern of endogeneity of remittances we perform Instrumental Variables (IV) and Arellano-Bond (1991) Generalized Method of Moments (GMM) estimations. The former approach requires the use of additional variables that are correlated with remittances, but not with financial development. GMM regressions use lags of the independent variables as instruments for the regressors.

In the IV estimations, we use economic conditions in the top remittance-source countries (i.e., the countries from which migrants send money) as instruments for the remittances flows received by the countries in our sample. Economic conditions in the remittance-source countries

⁶ We think that this second concern is in great part already addressed in our fixed effect estimations.

are likely to affect the volume of remittance flows that migrants are able to send, but are not expected to affect financial development in the remittance receiving countries in ways other than through its impact on remittances. Because bilateral remittance data are largely unavailable, we identify the top remittance-source countries for each recipient country in the following two alternative ways. First, we use bilateral migration data from the OECD's *Database on Immigrants and Expatriates*, which identifies the top five OECD countries that receive the most migrants from each remittance recipient country.⁷ Here we assume that these countries account for the majority of the remittance flows sent to the countries in our sample. We construct a weighted average of economic conditions in the source countries by multiplying the share of migration to each of these five OECD countries by the GDP per capita in each of these migration-destination/remittance-source countries.⁸ Second, because it is known that some non-OECD countries are also important destinations for migrants and sources of remittance flows (e.g., many migrants from south East Asia reside and send remittances from Saudi Arabia), we identify the ten countries worldwide with the largest stock of migrants (from UN data), and we use the inverse of each remittance recipient country's distance to these ten countries to weigh economic conditions (GDP per capita) in those ten countries (see Table 1 for formulas and details on data used). Distances have been used by others to instrument for remittances (Rajan and Subramanian, 2005).

In the Arellano-Bond (1991) GMM estimators, lags of the regressors are used as instruments. Specifically, starting from a dynamic fixed effect version of equation (1) – shown in equation (2) below-, the Arellano-Bond estimators are obtained by differencing both sides of

⁷ http://www.oecd.org/document/51/0,2340,en_2825_494553_34063091_1_1_1_1,00.html.

⁸ Note that the bilateral migration data is only available for 2000, so the weights we use to average GDP per capita across remittance-source countries are constant. The time variation arises from the GDP per capita series for migrant destination/remittance-source countries.

equation (2) and by instrumenting the lagged dependent variable and other regressors in the resulting equation (3) with lagged explanatory variables. This allows to correct for the endogeneity of the explanatory variables (most importantly in our case the remittances variable) and to deal with the problem that by construction the new error term is correlated with the lagged difference of the dependent variable.

$$FD_{i,t} = \alpha + \gamma FD_{i,t-1} + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + \mu_i + \varepsilon_{i,t} \quad (2)$$

$$FD_{i,t} - FD_{i,t-1} = \gamma FD_{i,t-1} - FD_{i,t-2} + \beta_1 (Rem_{i,t} - Rem_{i,t-1}) + \beta_2 (X_{i,t} - X_{i,t-1}) + \varepsilon_{i,t} - \varepsilon_{i,t-1} \quad (3)$$

Assuming that the error term ε is not serially correlated and that the independent variables are weakly exogenous (i.e., they are uncorrelated with future realizations of the error term), the GMM dynamic estimator uses the following moment conditions to obtain unbiased estimates of the coefficients.

$$E[FD_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (4)$$

$$E[Rem_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (5)$$

Given equation (3), if conditions (4) and (5) are satisfied, two or more lags of the level of the regressors can be used as instruments of weakly exogenous variables.

IV. Empirical Results

Table 4 reports OLS, RE and FE estimates of equation (2) measuring financial development as the ratio of deposits to GDP, assuming that remittances are exogenous. In all

regressions we control for country size (as measured by log of GDP), the level of GDP per capita, the inflation rate, the presence of dual exchange rates and for the extent of financial and capital account liberalization. Furthermore, in the OLS and RE regressions we are also able to control for country specific factors found in the literature to influence financial development, namely: latitude, legal origin, and creditor rights.

Across all models, we find that remittances have a positive impact on the share of deposits to GDP.⁹ A one percentage point increase in the share of remittances to GDP leads to an increase in the share of deposits to GDP of somewhere between 0.2 and 1.7 percentage points, depending on the specification. F-tests for the significance of the fixed effect estimates, as well as Hausman tests comparing FE and RE estimates, suggest that FE estimates are the most efficient.

Regarding the controls, we consistently find that financial development is fostered by country size, the level of economic development, and by improvements in creditor rights, while it is adversely influenced by inflation and the presence of multiple exchange rate arrangements. Finally, there is also some evidence that capital account and domestic liberalization promote financial development. These results largely confirm the findings of studies such as Boyd et al. (2001) on the impact of inflation, Djankov et al. (2005) on the role of creditor rights and country size, and Chinn and Ito (2002) and Demirguc-Kunt and Detragiache (1998) on the effect of capital account and domestic liberalization.

The evidence from OLS, RE, and FE regressions on the relationship between remittances and financial development measured in terms of private credit is weaker than that found for

⁹ In separate estimations for the sub period 1990-2003, we verified the robustness of this result. These estimations are available upon request.

deposits. In particular, Table 5 shows that while the simple OLS regressions yield a consistently positive impact of remittances on bank credit to GDP, remittances are positive and significant only in one of the RE estimations. Furthermore, remittances are significant only at 10 percent in the FE regressions. Once again, both F-tests and Hausman test indicate that FE estimates are more efficient than OLS and RE estimates.

In the credit to GDP estimations, a one percentage point increase in remittances can lead to anywhere between a 0.2 and a 0.8 percentage point increase in the ratio of credit to GDP, depending on the specific regression. As for the controls, the results are very similar to those described for bank deposits. Economic development, country size, and creditor rights are positively correlated with credit market development, while inflation and the presence of multiple exchange rate arrangements have the opposite effect.

Because of the real possibility that remittances are endogenous, for example if greater financial development enables the growth of formal remittances, it is important to verify the robustness of the results reported so far by trying to address the issue of endogeneity. We do this by conducting Instrumental Variable and GMM Arellano-Bond estimations. Table 6 reports the first stage of IV regressions, using as an instrument for remittances the GDP per capita in the five most important OECD migration-destination/remittance-source countries, weighted by the share of migration to these five countries. Table 7 reports the second stage IV estimations for the share of deposits to GDP, while Table 8 shows the corresponding results for the share of private credit to GDP. Similar IV estimations using GDP per capita in the ten countries with the largest stock of migrants worldwide weighted by the inverse distance from each of these countries to the remittance receiving countries are reported in appendix tables 2 and 3.

The results shown in Table 6 indicate that the variable GDP per capita in the remittance-source countries weighted by the share of migration is highly significant in explaining the behavior of remittances. The F-statistics for the null that this variable is zero, reported at the bottom of the table, are always larger than 10, the threshold recommended by Staiger and Stock (1997) to avoid the weak instrument problem. Furthermore, the second stage estimations for the share of deposits to GDP in Table 7 largely reinforce the results reported above. Across all estimations, we confirm the positive effect of remittances on the level of deposits to GDP. As before, we continue to find that GDP per capita, log of GDP, creditor rights and domestic and capital account liberalization have a positive impact on financial development, while inflation tends to have the opposite effect.

The IV estimations for financial development measured as private credit to GDP yield somewhat stronger results than those discussed above for loan market development (Table 8). In this case, across all estimations, we consistently find that remittances have a positive effect on credit to GDP ratios and the effect is larger than before. In this case, GDP per capita, log of GDP, and creditor rights have a consistently positive impact on credit market development, while inflation and the presence of dual exchange arrangements have pernicious effects.

GMM estimations for the share of deposits and private credit to GDP are reported in Table 9. In these estimations, we also include additional variables to control for cycles in financial development that we had excluded so far due to endogeneity concerns. In particular, we now control for GDP per capita growth and for the behavior of other capital flows, expressed as a share of GDP. We use lagged levels of these variables to instrument for their changes. Hansen tests for overidentification and tests for second order autocorrelation verify that these regressions are well specified. However, difference GMM regressions are known to have some drawbacks,

because they disregard the long-run information present in the levels of the variables and, if there is persistence in the regressors, yield poor instruments. Thus, perhaps it is not surprising that in these estimations the significance of most variables drops relative to earlier estimations. As before, we continue to find that remittances have a statistically significant and positive impact on the share of deposits to GDP, but in this case remittances do not affect the share of private credit to GDP significantly in any of the specifications, suggesting that the impact of remittances on bank credit is not robust.

V. Conclusions

Workers' remittances, flows received from migrant workers residing abroad, have become the second largest source of external finance for developing countries in recent years. In addition to their increasing size, the stability of these flows despite financial crises and economic downturns make them a reliable source of funds for developing countries. While the development potential of remittance flows is increasingly being recognized by researchers and policymakers, the effect of remittances on financial development remains largely unexplored. Better understanding the impact of remittances on financial development is important given the extensive literature on the growth enhancing and poverty reducing effects of financial development.

To fill this gap, in this paper we use balance of payments data on remittance flows to 99 countries for the period 1970-2002 and study the impact of remittances on financial development. Specifically, we investigate the impact of remittances on bank deposits, as well as on bank credit to the private sector. We find that remittances have a significant and positive

impact on bank deposits to GDP, suggesting that these flows do find their way into the formal financial system and get deposited in banks. This result is robust to using different estimation techniques and accounting for potential reverse causality. We also find a positive relationship between remittance flows and bank credit to GDP ratios, albeit this finding is much less robust to model specification. Perhaps this is not surprising because although an increase in bank deposits may be expected to lead to an increase in bank loans, this may not be the case if flows from abroad reduce loan demand, if there is already excess liquidity in the banking system, or if the additional flows channeled from remittances to the financial sector are lent to the government.

This paper is a first effort in understanding the impact of remittances on financial development. A number of qualifications must be emphasized. First, this paper examines cross-country regressions and therefore suffers from the shortcomings that plague all cross-country analysis. Specifically, (a) individual countries may have experiences that differ from the aggregate results we present here, (b) countries may be so different that they cannot be viewed as being drawn from the same population and included in the same regression. Our assessment is that we control for sufficient country characteristics and use methodologies that allow us to draw useful but not definitive lessons from these cross-country comparisons. Second, the data we use in the paper are from balance of payments statistics that are likely to underestimate remittances received by households, since they only capture remittances transferred through formal means, excluding those sent via friends, relatives, or informal means such as hawala operators. Data derived from household surveys are more likely to capture the full extent of remittances and may be better suited to estimate their impact on financial development. We leave this for future research.

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Table 1
Variables' definition and sources

Variable Name	Variable Definitions	Source
Remittances to GDP	Remittances +Migrant Transfers + Workers Compensation to GDP, depending on the country. See the data appendix for details.	Balance of Payments Statistics (IMF). Data reported in WEO (2005) provided to us by Nicola Spatafora.
Bank Credit to GDP	Bank Credit to GDP: $\{(0.5) * [F(t)/P_e(t) + F(t-1)/P_e(t-1)] / [GDP(t)/P_a(t)]\}$, where F is credit by deposit money banks to the private sector (lines 22d), GDP is line 99b, P_e is end-of period CPI (line 64) and P_a is the average CPI for the year.	International Financial Statistics (IMF)
Bank Deposit to GDP	Bank Deposit to GDP: $\{(0.5) * [F_t/P_{e,t} + F_{t-1}/P_{e,t-1}] / [GDP_t/P_{a,t}]\}$ where F is demand and time and saving deposits, P_e is end-of period CPI, and P_a is average annual CPI	International Financial Statistics (IMF)
GDP per Capita	GDP Per Capita in thousands of constant 1995 US\$	World Development Indicators (World Bank)
Log of GDP	Log of GDP in constant 1995 US\$	World Development Indicators (World Bank)
Inflation	GDP deflator (annual %)	World Development Indicators (World Bank)
Dual Exchange Rate	Dual Exchange Rate (1 indicates the presence of multiple exchange rates)	Annual Report on Exchange Arrangements and Exchange Restrictions (IMF)
Financial Liberalization Dummy	Financial Liberalization Dummy (1 indicates liberalization in deposit and loan interest rates)	Annual Report on Exchange Arrangements and Exchange Restrictions (IMF), Demirgüç-Kunt and Detragiache (1998); Abiad and Mody (2005), Bandiera et al (2000), Kaminsky and Schmukler (2004), Laeven (2003), Tornell, Westermann and Martinez (2004)
Capital Openness	This is an index to measure a country's degree of capital account openness and it is the first principal component of four binary dummy variables reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions which are: the presence of multiple exchange rates; restrictions on current account transactions; restrictions on capital account transactions; and the requirement of the surrender of export proceeds.	Chin and Ito (2002)
GDP per Capita Growth	GDP Per Capita Growth (constant 1995 US\$)	World Development Indicators (World Bank)
Latitude	Absolute value of the latitude of a country, scaled between zero and one	La Porta, López de Silanes, Shleifer and Vishny (1998)
British Legal Origin	This is a dummy equal to 1 for countries with Common Law legal origins	La Porta, López de Silanes, Shleifer and Vishny (1998)
Creditor Rights	The index measures the legal rights that shareholders and creditors have that enable them to extract a return on their investment from the insiders. The creditor rights index varies between 0 (poor creditor rights) and 4 (strong creditor rights).	Djankov, McLeish and Shleifer (2005)
Other Flows to GDP	Foreign Direct Investment + Non-FDI private inflows + Aid Comp to GDP	Balance of Payments Statistics (IMF)
GDP per capita in the remittance-source countries weighted by migration patterns	GDP per capita of the five principal OECD recipients of migration weighted by share of total migration to these countries. Focusing on remittance receiving country Z, and assuming that the top five OECD countries that receive migrants from Z are countries A, B, C, D, and E, the weighted GDP per capita is constructed as: $\sum \text{GDP per capita } i * (\text{migration of Z to } i) / (\text{sum of migration from Z received by A through E})$, where i=A to E.	Database on Immigrants and Expatriates (OECD) and World Development Indicators (World Bank)
GDP per capita in the remittance-source countries weighted by inverse bilateral distances	GDP per capita of the ten countries with the largest stock of migrants weighted by inverse bilateral distances to the remittance receiving country. Focusing on remittance receiving country Z, and assuming that the ten countries with the largest stock of migrants are countries A through J the weighted GDP per capita is constructed as: $\sum \text{GDP per capita } i * \text{inverse bilateral distance between } i \text{ and Z}$, where i=A to J.	UN and World Development Indicators (World Bank)

Table 2
Descriptive statistics

Variable Name	Number of observations	Mean	Standard Deviation	Minimum	Maximum
Remittances to GDP	1811	2.97	4.58	0.00	38.28
Bank Credit to GDP	1799	24.81	18.40	0.37	121.56
Bank Deposit to GDP	1811	29.47	20.72	1.74	161.40
GDP per Capita (in thousands)	1811	1.84	1.69	0.08	8.69
Log of GDP	1811	22.72	1.93	18.63	27.74
Inflation	1811	37.35	360.54	(23.48)	12,338.66
Dual Exchange Rate	1811	0.21	0.41	0.00	1.00
Financial Liberalization Dummy	1298	0.37	0.48	0.00	1.00
Capital Openness	1288	(0.37)	1.28	(1.84)	2.52
GDP per Capita Growth	1806	1.51	5.03	28.73	34.60
Latitude	1811	0.20	0.13	0.01	0.66
British Legal Origin	1811	0.38	0.48	0.00	1.00
Creditor Rights	1327	1.75	1.03	0.00	4.00
Other Flows to GDP	1545	6.14	13.59	(312.81)	169.27
GDP per capita in the remittance-source countries weighted by migration patterns	1692	21.81	3.93	7.49	31.27
GDP per capita in the remittance-source countries weighted by inverse bilateral distances	1526	23.90	12.45	11.09	84.16

Table 3
Correlation matrix

	Remittances to GDP	Bank Credit to GDP	Bank Deposit to GDP	GDP Per Capita	Log of GDP	Other Flows to GDP	Inflation	Dual Exchange Rate	Financial Liberalization Dummy	Capital Openness	GDP Per Capita Growth	Latitude	British Legal Origin
Bank Credit to GDP	0.06												
Bank Deposit to GDP	0.22***	0.78***											
GDP Per Capita	-0.13***	0.29***	0.29***										
Log of GDP	-0.27***	0.13***	0.01	0.28***									
Other Flows	0.29***	0.01	0.00	-0.07*	-0.26***								
Inflation	-0.03	-0.08***	-0.09***	-0.01	0.03	0.00							
Dual Exchange Rate	0.00	-0.11***	-0.11***	-0.04	0.21***	-0.07	0.09***						
Financial Liberalization Dummy	-0.12***	0.13***	0.13***	0.11***	0.28***	-0.07	0.06	0.04					
Capital Openness	0.03	0.21***	0.21***	0.34***	0.03	0.04	-0.08**	-0.43***	0.09**				
GDP Per Capita Growth	0.02	0.02	0.03	0.01	0.00	0.02	-0.05*	-0.03	-0.01	0.09**			
Latitude	0.11***	0.06	0.10***	0.16***	0.31***	0.03	0.06**	0.08***	-0.02	-0.12***	0.01		
British Legal Origin	0.14***	0.14***	0.24***	0.04	-0.23***	0.08**	-0.06**	-0.12***	-0.02	-0.06	0.04	-0.29***	
Creditor Rights	0.03	0.16***	0.17***	-0.05	-0.04	0.04	0.05	-0.10***	-0.08*	0.05	0.01	0.14***	0.29***

*, **, and *** denote significance at 10, 5, and 1 percent, respectively.

Table 4
The impact of remittances on the share of deposits to GDP:
OLS, fixed effects, and random effects estimates

The regression equation estimated is of the form $FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{it}$ where in this case FD refers to financial development measured as the ratio of deposits to GDP. Rem is the share of remittances to GDP. X is matrix of controls including: *GDP per capita*, measured in constant dollars; *Log of GDP*, stated in constant dollars; *Inflation*, defined as the percentage change in the GDP deflator; *Dual Exchange Rates*, which is a dummy capturing periods when multiple exchange rates were in effect; *Financial Liberalization*, which is a dummy identifying periods of liberalization in domestic interest rates, *Capital Openness*, refers to an index of capital account openness developed by Chinn and Ito (2002); *Latitude*, defined in absolute terms and scaled between 0 and 1; *British Legal Origin*, which is a dummy equal to 1 for countries with Common Law as their legal origin, and *Creditor Rights*, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS			Fixed effects		Random effects	
Remittances to GDP	1.221 [9.96]***	1.421 [9.20]***	1.701 [9.67]***	0.285 [3.72]***	0.216 [1.75]*	0.382 [4.91]***	0.317 [2.53]**
GDP Per Capita	4.129 [14.39]***	0.8041 [1.79]*	0.002 [0.00]	3.834 [5.15]***	4.64 [4.51]***	6.805 [11.84]***	5.291 [6.47]***
Log of GDP	-0.138 [0.39]	3.138 [7.54]***	3.775 [8.64]***	14.483 [13.65]***	14.04 [11.22]***	5.904 [8.53]***	7.468 [8.90]***
Inflation	-0.004 [2.21]**	-0.003 [2.22]**	-0.003 [2.44]**	-0.002 [3.23]***	-0.002 [3.29]***	-0.002 [3.25]***	-0.002 [3.31]***
Dual Exchange Rate	-4.136 [4.72]***	-1.575 [1.27]	0.189 [0.16]	-2.77 [3.89]***	-0.903 [1.07]	-3.636 [4.96]***	-1.668 [1.92]**
Financial Liberalization		1.235 [1.16]	2.023 [2.13]**		0.652 [1.03]		1.496 [2.32]**
Capital Openness		1.827 [3.69]***	2.4 [5.41]***		0.232 [0.73]		0.551 [1.69]*
Latitude			17.64 [3.23]***				
British Legal Origin			1.502 [1.34]				
Creditor Rights			4.075 [7.96]***				
Constant	22.427 [2.76]***	-50.892 [5.70]***	-76.794 [7.86]***	-306.775 [13.23]***	-307.279 [11.00]***	-118.433 [7.74]***	-155.984 [8.29]***
Observations	1811	1138	1034	1811	1138	1811	1138
Number of countries	99	58	53	99	58	99	58
Adjusted R-squared	0.18	0.23	0.37	0.23	0.28	0.04	0.11
F-Statistic for joint significance of fixed effects				66.93	56.11		
P-value				0.000	0.000		
Hausman test				163.83	102.75		
P-value				0.000	0.000		

Table 5
The impact of remittances on the share of private credit to GDP:
OLS, fixed effects, and random effects estimates

The regression equation estimated is of the form $FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{it}$ where in this case FD refers to financial development measured as the ratio of credit to GDP, Rem is the share of remittances to GDP, X is matrix of controls including: GDP per capita, measured in constant dollars; Log of GDP , stated in constant dollars; $Inflation$, defined as the percentage change in the GDP deflator; $Dual Exchange Rates$, which is a dummy capturing periods when multiple exchange rates were in effect; $Financial Liberalization$, which is a dummy identifying periods of liberalization in domestic interest rates, $Capital Openness$, refers to an index of capital account openness developed by Chinn and Ito (2002); $Latitude$, defined in absolute terms and scale between 0 and 1; $British Legal Origin$, which is a dummy equal to 1 for countries with Common Law as their legal origin, and $Creditor Rights$, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS			Fixed effects		Random effects		
Remittances to GDP	0.58 [6.25]***	0.52 [3.57]***	0.764 [4.58]***	0.017 [0.25]	0.204 [1.65]*	0.045 [0.67]	0.202 [1.62]	0.46 [3.19]***
GDP Per Capita	3.602 [12.47]***	0.954 [2.00]**	0.472 [0.74]	7.139 [10.90]***	10.226 [9.93]***	7.681 [15.20]***	8.65 [10.15]***	8.797 [9.00]***
Log of GDP	1.118 [3.38]***	3.495 [7.63]***	4.08 [8.36]***	9.199 [9.84]***	7.338 [5.86]***	4.994 [8.14]***	5.426 [5.99]***	6.257 [6.15]***
Inflation	-0.004 [2.00]**	-0.003 [1.98]**	-0.003 [2.26]**	-0.001 [2.13]**	-0.001 [1.68]*	-0.001 [2.30]**	-0.001 [1.85]*	-0.001 [1.69]*
Dual Exchange Rate	-6.357 [7.09]***	-4.414 [3.61]***	-4.394 [3.56]***	-2.683 [4.25]***	-0.412 [0.49]	-3.26 [5.09]***	-0.852 [0.99]	-1.549 [1.69]*
Financial Liberalization		-1.263 [1.15]	0.529 [0.52]	0.128 [0.20]	0.128 [0.20]	0.378 [0.59]	0.378 [0.59]	0.496 [0.74]
Capital Openness		2.114 [4.05]***	2.015 [4.14]***	0.377 [1.19]	0.377 [1.19]	0.616 [1.92]*	0.616 [1.92]*	0.541 [1.55]
Latitude			12.832 [1.86]*					-13.907 [0.68]
British Legal Origin			-4.744 [3.68]***					-6.107 [1.14]
Creditor Rights			5.082 [7.99]***					6.694 [2.69]***
Constant	-7.411 [1.02]	-57.11 [5.82]***	-81.028 [7.37]***	-196.668 [9.62]***	-162.125 [5.79]***	-103.514 [7.64]***	-114.414 [5.64]***	-141.029 [6.10]***
Observations	1800	1133	1029	1800	1133	1800	1133	1029
Number of countries	99	58	53	99	58	99	58	53
Adjusted R-squared	0.16	0.18	0.25	0.27	0.26	0.1	0.1	0.14
F-Statistic for joint significance of fixed effects				72.29	68.17	105.41	64.47	
P-Value				0.000	0.000	0.000	0.000	
Hausman test								
P-Value								

Table 6

First stage instrumental variables OLS, fixed effects, and random effects estimates
GDP per capita in the remittance-source countries weighted by migration patterns is used as instrument for remittances

Rem is the share of remittances to GDP. *X* is matrix of controls including: *GDP per capita*, measured in constant dollars; *Log of GDP*, stated in constant dollars; *Inflation*, defined as the percentage change in the GDP deflator; *Dual Exchange Rates*, which is a dummy capturing periods when multiple exchange rates were in effect; *Financial Liberalization*, which is a dummy identifying periods of liberalization in domestic interest rates, *Capital Openness*, refers to an index of capital account openness developed by Chinn and Ito (2002); *Latitude*, defined in absolute terms and scale between 0 and 1; *British Legal Origin*, which is a dummy equal to 1 for countries with Common Law as their legal origin, and *Creditor Rights*, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS		Fixed effects		Random effects	
GDP Per Capita	-0.286 [4.55]***	-0.260 [2.86]***	-0.630 [6.61]***	-0.776 [3.43]***	-0.090 [0.33]	-1.001 [6.13]***
Log of GDP	-0.549 [9.49]***	-0.232 [2.91]***	-0.301 [3.64]***	-3.211 [6.60]***	-3.672 [6.98]***	-1.194 [5.12]***
Inflation	0.000 [0.88]	0.000 [1.01]	0.000 [0.60]	0.000 [0.33]	0.000 [0.82]	0.000 [0.25]
Dual Exchange Rate	-0.067 [0.27]	-0.445 [1.41]	0.014 [0.05]	-0.497 [2.55]**	-0.228 [1.13]	-0.488 [2.32]**
Financial Liberalization		-0.753 [2.97]***	-0.655 [2.72]***	0.320 [2.98]***	-0.197 [1.28]	-0.306 [2.06]**
Capital Openness		0.016 [0.14]	0.320 [2.98]***	0.476 [6.32]***	0.502 [6.65]***	0.381 [5.09]***
Latitude		16.707 [14.42]***	1.109 [3.80]***	1.297 [4.14]***	19.710 [4.14]***	1.297 [4.14]***
British Legal Origin		-0.783 [5.93]***	0.2673 [7.71]***	0.427 [12.08]***	0.425 [10.37]***	0.293 [11.63]***
Creditor Rights		0.2194 [8.44]***	0.2816 [7.73]***	0.2673 [7.71]***	0.425 [10.37]***	0.247 [8.39]***
GDP per capita in the remittance-source countries weighted by migration patterns		11.154 [8.22]***	2.876 [1.53]	3.087 [1.60]	79.119 [7.07]***	21.383 [3.69]***
Constant	1692 94	1103 56	1000 51	1692 94	1103 56	1000 51
Observations	0.098	0.083	0.257	0.066	0.143	0.176
Number of countries	47.95	48.94	48.56	146.04	107.55	68.75
Adjusted R-squared	0.000	0.000	0.000	0.000	0.000	0.000
F-Statistic ¹ (Instrument=0)						
P-Value						

¹For Random effects regressions, we report Chi-Statistic.

Table 7
The impact of remittances on the share of deposits to GDP
Second stage instrumental variables OLS, fixed effects, and random effects estimates
GDP per capita in the remittance-source countries weighted by migration patterns is used as instrument for remittances

The regression equation estimated is of the form $FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{it}$ where in this case FD refers to financial development measured as the ratio of deposits to GDP. Rem is the share of remittances to GDP. X is matrix of controls including: *GDP per capita*, measured in constant dollars; *Log of GDP*, stated in constant dollars; *Inflation*, defined as the percentage change in the GDP deflator; *Dual Exchange Rates*, which is a dummy capturing periods when multiple exchange rates were in effect; *Financial Liberalization*, which is a dummy identifying periods of liberalization in domestic interest rates, *Capital Openness*, refers to an index of capital account openness developed by Chinn and Ito (2002); *Latitude*, defined in absolute terms and scale between 0 and 1; *British Legal Origin*, which is a dummy equal to 1 for countries with Common Law as their legal origin, and *Creditor Rights*, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS			Fixed effects		Random effects		
Remittances to GDP	3.095 [5.56]***	2.001 [4.11]***	3.025 [5.84]***	3.302 [8.31]***	2.369 [5.51]***	4.799 [9.40]***	4.706 [6.58]***	4.945 [6.77]***
GDP Per Capita	4.198 [13.16]***	1.500 [4.10]***	1.716 [3.35]***	9.748 [8.06]***	7.288 [5.92]***	11.027 [10.33]***	9.779 [7.00]***	9.05 [5.84]***
Log of GDP	0.785 [2.02]**	2.207 [7.01]***	2.984 [8.44]***	9.37 [5.97]***	11.886 [8.23]***	4.737 [3.99]***	6.136 [4.44]***	8.114 [5.33]***
Inflation	-0.003 [2.53]**	-0.003 [3.25]***	-0.003 [2.84]***	-0.002 [2.38]**	-0.002 [3.73]***	-0.002 [1.99]**	-0.002 [3.15]***	-0.002 [2.96]***
Dual Exchange Rate	-2.818 [2.42]**	0.311 [0.26]	1.593 [1.37]	0.722 [0.74]	1.218 [1.35]	1.143 [0.95]	1.142 [0.93]	0.207 [0.17]
Financial Liberalization		2.885 [2.99]***	3.12 [3.29]***		0.562 [0.83]		0.864 [0.95]	1.496 [1.67]*
Capital Openness		2.06 [4.89]***	1.973 [3.92]***		-0.995 [2.30]**		-2.172 [3.38]***	-1.686 [2.82]***
Latitude			-11.559 [1.16]					-88.353 [2.81]***
British Legal Origin			1.749 [1.42]					-2.659 [0.34]
Creditor Rights			4.441 [6.87]***					7.75 [2.18]**
Constant	-5.463 [0.54]	-33.511 [4.36]***	-61.011 [7.34]***	-212.641 [6.27]***	-268.392 [8.40]***	-113.734 [4.36]***	-145.24 [4.74]***	-186.186 [5.37]***
Observations	1692	1103	1000	1692	1103	1692	1103	1000
Number of countries	94	56	51	94	56	94	56	51
F-statistic for joint significance of regressors ¹	40.21	28.94	38.76	11122.93	11215.63	265.38	220.61	323.33
P-Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

¹For Fixed effects and Random effects regressions, we report the Chi-Statistic

Table 8
The impact of remittances on the share of private credit to GDP
Second stage instrumental variables OLS, fixed effects, and random effects estimates

GDP per capita in the remittance-source countries weighted by migration patterns is used as instrument for remittances

The regression equation estimated is of the form $FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{it}$ where in this case FD refers to financial development measured as the ratio of credit to GDP. Rem is the share of remittances to GDP. X is matrix of controls including: *GDP per capita*, measured in constant dollars; *Log of GDP*, stated in constant dollars; *Inflation*, defined as the percentage change in the GDP deflator; *Dual Exchange Rates*, which is a dummy capturing periods when multiple exchange rates were in effect; *Financial Liberalization*, which is a dummy identifying periods of liberalization in domestic interest rates, *Capital Openness*, refers to an index of capital account openness developed by Chinn and Ito (2002); *Latitude*, defined in absolute terms and scale between 0 and 1; *British Legal Origin*, which is a dummy equal to 1 for countries with Common Law as their legal origin, and *Creditor Rights*, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2004). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS			Fixed effects		Random effects	
Remittances to GDP	2.667 [5.45]***	0.305 [0.61]	0.477 [0.84]	1.335 [4.63]***	1.502 [3.52]***	2.663 [7.19]***	2.886 [4.86]***
GDP Per Capita	3.685 [12.96]***	1.833 [4.78]***	1.833 [3.25]***	9.734 [11.07]***	11.52 [9.41]***	9.444 [13.15]***	11.824 [9.88]***
Log of GDP	2.106 [6.05]***	1.907 [5.71]***	2.252 [5.71]***	6.765 [5.91]***	6.694 [4.66]***	3.867 [4.97]***	3.865 [3.21]***
Inflation	-0.003 [2.19]**	-0.003 [2.65]***	-0.003 [2.54]**	-0.001 [1.88]*	-0.001 [1.90]*	-0.001 [1.73]*	-0.001 [2.03]**
Dual Exchange Rate	-5.454 [5.20]***	-3.555 [2.84]***	-3.62 [2.79]***	-1.503 [2.11]**	0.058 [0.06]	-1.137 [1.31]	-0.082 [0.08]
Financial Liberalization		0.71 [0.70]	1.573 [1.49]		-0.158 [0.24]		0.275 [0.06]
Capital Openness		2.573 [5.77]***	2.481 [4.44]***		-0.44 [1.02]		-1.094 [2.03]**
Latitude			5.614 [0.52]				-75.827 [2.36]**
British Legal Origin			-2.041 [1.48]				-5.921 [0.73]
Creditor Rights			3.906 [5.47]***				7.393 [1.99]**
Constant	-37.769 [4.15]***	-22.622 [2.78]***	-38.375 [4.15]***	-151.971 [6.15]***	-153.785 [4.84]***	-90.169 [5.24]***	-91.816 [3.44]***
Observations	1680	1098	995	1680	1098	1680	1098
Number of countries	94	56	51	94	56	94	56
F-Statistic for joint significance of regressors ¹	50.4	31.65	27.76	14293.09	9559.83	376.02	293.44
P-Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00

¹ For fixed effects and random effects regressions, we report the Chi-Statistic

Table 9
Financial Development and Remittances:
Arellano-Bond GMM Regressions

	Bank Deposits to GDP		Bank Credit to GDP		All variables endogenous	Variables other than Remittances, GDP Per Capita, and Other Flows are strictly exogenous	Variables other than Remittances, GDP Per Capita, and Other Flows are strictly exogenous			
	All variables endogenous	Variables other than Remittances, GDP Per Capita, and Other Flows are predetermined	Variables other than Remittances, GDP Per Capita, and Other Flows are predetermined	Variables other than Remittances, GDP Per Capita, and Other Flows are strictly exogenous						
Remittances	0.222 [2.13]**	0.314 [1.79]*	0.227 [2.16]**	0.303 [1.95]*	0.021 [0.36]	0.121 [0.93]	0.029 [0.43]	0.082 [0.64]	0.018 [0.32]	0.147 [0.73]
Log of GDP	2.104 [1.07]	4.264 [1.70]*	1.326 [0.62]	3.493 [1.58]	2.673 [1.89]*	3.105 [1.45]	1.794 [1.33]	2.547 [1.33]	1.288 [0.86]	5.094 [1.37]
GDP Per Capita	-0.78 [0.47]	2.312 [1.31]	0.203 [0.15]	2.398 [1.46]	-1.124 [0.94]	2.219 [1.37]	2.819 [2.14]**	5.254 [2.50]**	1.478 [1.77]*	5.145 [3.13]***
Inflation	-0.001 [2.76]***	0.000 [4.08]***	0.000 [2.90]***	0.000 [4.43]***	0.000 [2.25]**	0.000 [3.71]***	0.000 [0.17]	0.000 [0.30]	0.000 [0.79]	0.000 [1.19]
Dual Exchange Rate	-2.272 [2.64]***	-1.877 [2.57]**	-1.643 [2.24]**	-1.309 [2.03]**	-0.712 [1.97]*	-1.008 [2.42]**	-0.829 [0.79]	-0.591 [0.80]	-0.399 [1.35]	-0.363 [1.20]
Financial Liberalization Dummy	0.107 [0.17]	0.107 [0.17]	0.137 [0.22]	0.137 [0.22]	-0.237 [0.47]	-0.237 [0.47]	-0.239 [0.36]	-0.227 [0.34]	-0.995 [2.15]**	-0.995 [2.15]**
GDP Per Capita Growth	-0.18 [3.51]***	-0.18 [3.51]***	-0.16 [3.25]***	-0.16 [3.25]***	0.005 [4.00]***	0.005 [4.00]***	0.001 [5.01]***	-0.001 [4.32]***	-0.22 [3.98]***	-0.22 [3.98]***
Other Flows to GDP	0.006 [1.00]	0.006 [1.00]	0.005 [0.89]	0.005 [0.89]	0.005 [1.08]	0.005 [1.08]	0.001 [0.32]	-0.001 [0.18]	0.001 [0.19]	0.001 [0.19]
1 st Lag of Bank Deposit to GDP	0.847 [13.07]***	0.699 [6.67]***	0.849 [12.79]***	0.729 [7.89]***	0.883 [16.29]***	0.735 [8.15]***				
1 st Lag of Bank Credit to GDP							1.076 [16.63]***	0.898 [11.39]***	1.127 [17.14]***	0.937 [14.76]***
2 nd Lag of Bank Credit to GDP							-0.338 [5.20]***	-0.291 [3.11]***	-0.374 [5.79]***	-0.289 [3.08]***
Observations	1575	1047	1575	1047	1575	1047	1493	1021	1493	1021
Number of countries	85	53	85	53	85	53	80	52	80	52
Hansen test of overidentifying restrictions	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts
2 nd order autocorrelation (null is no autocorrelation)	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts	Accepts

Figure 1:
Inflows to Developing Countries (in billions of USD)
1970-2002

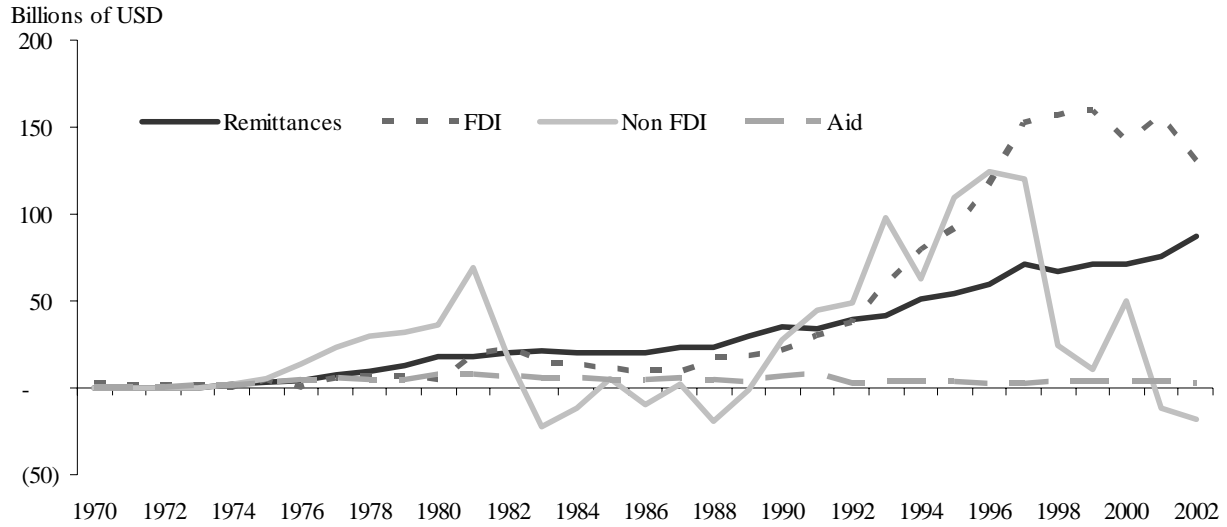
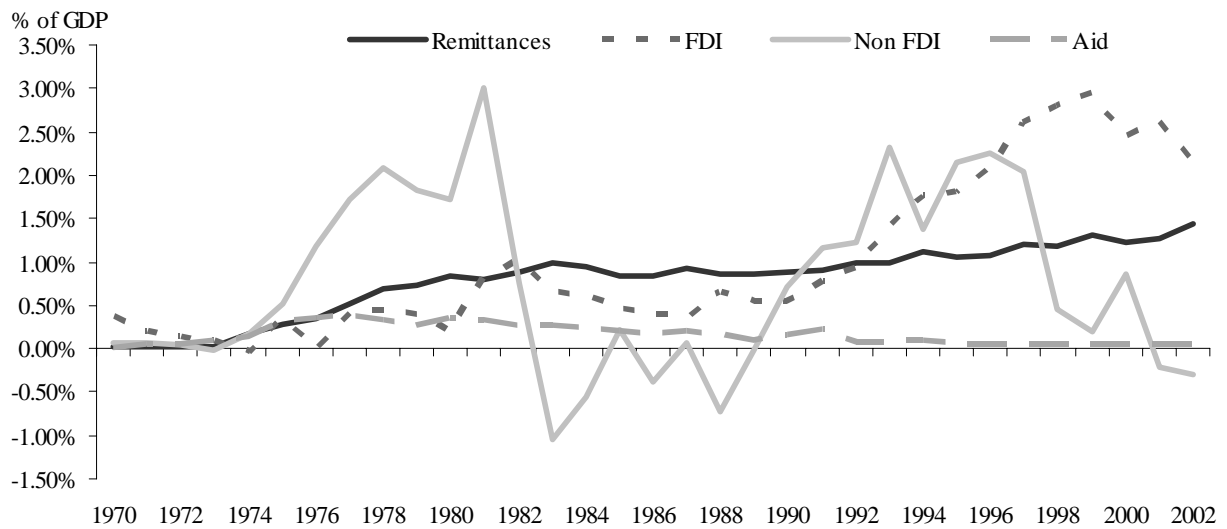
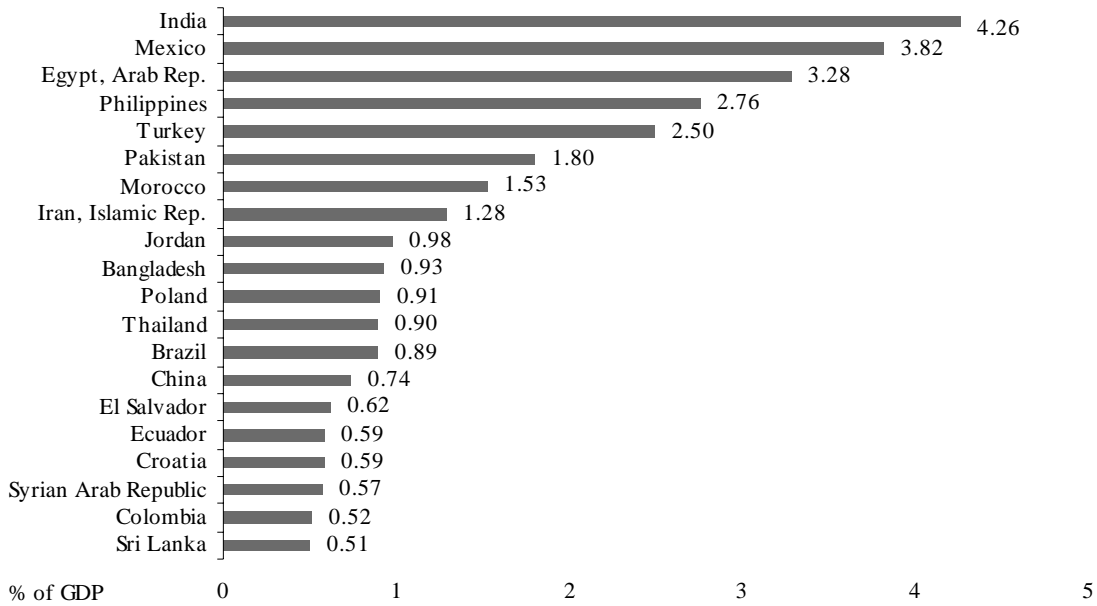


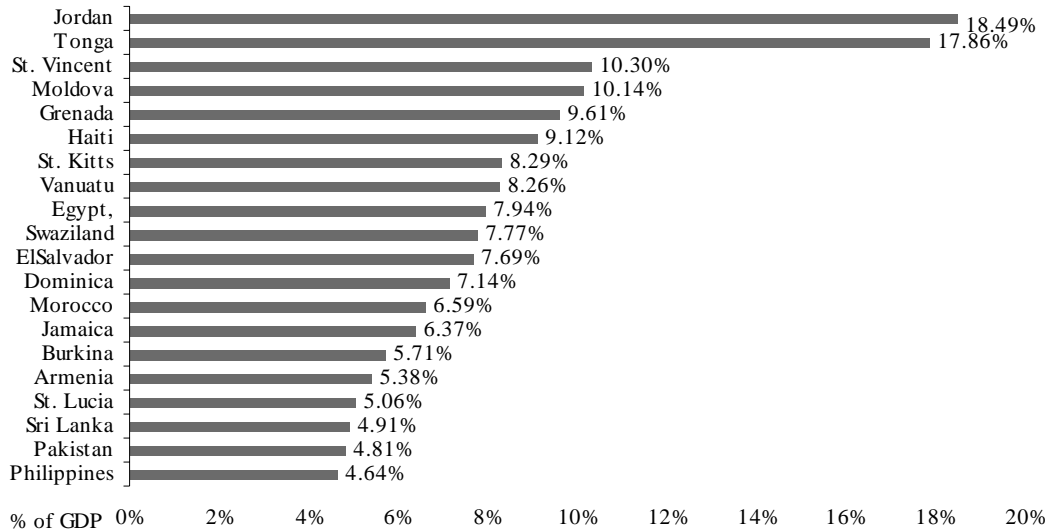
Figure 2:
Inflows to Developing Countries (in % of GDP)
1970-2002



**Figure 3:
20 Largest Recipients of Remittances (in billions of USD)
1970-2002 (Average)**



**Figure 4:
20 Largest Recipients of Remittances (in % of GDP)
1970-2002 (Average)**



Remittance Data Appendix

Unless otherwise indicated, total remittances are the sum of three components: compensation of employees (under income balance of current account), workers' remittances (under current transfers) and migrant transfers (under capital account). These data were primarily obtained from the International Monetary Fund (IMF) *Balance of Payments Statistics Yearbook*, reported in the IMF's 2005 *World Economic Outlook*.

Compensation of employees should not be part of total remittances for Argentina, Australia, Azerbaijan, Barbados, Belize, Benin, Bosnia-Herzegovina, Brazil, Cambodia, Cape Verde, China, Cote d'Ivoire, Dominican republic, Ecuador, El Salvador, Guyana, Italy, Panama, Rwanda, Senegal, Seychelles, Singapore, Turkey, and Venezuela

In general, "other current transfers" are NOT included in the definition of total remittances, except for Kenya, Malaysia, and Syria, where the Balance of Payment Yearbook specifies explicitly that migrants' remittances are recorded under "other current transfers".

For countries for which data were not available, IMF desk economists were contacted and the following data and/or information were provided:

1. Bulgaria: Other current transfers should be included in the remittances figure.
2. Haiti: Added remittances inflows data for 1991-2003.
3. Iran: Other current transfers should be used as the figure for total remittances.
4. Moldova: Added remittances data for 2000.
5. Niger: Added remittances inflows data for 1995-2003.
6. Romania: Added remittances data for 2000-2003.
7. Slovak Republic: Added remittances data for 1999-2003.
8. Ukraine: Added remittances data for 2000.
9. Venezuela: Added remittances inflows data for 1997-2003.

**Appendix Table 1
Countries and Periods Included**

Country	Years	Country	Years	Country	Years
Algeria	1977 - 1991	Grenada	1978 - 1999	Oman	1992 - 2002
Argentina	1976 - 2002	Guatemala	1977 - 2002	Pakistan	1976 - 2002
Armenia	1995 - 2002	Guinea-Bissau	1988 - 2002	Panama	1980 - 2002
Bangladesh	1994 - 2002	Haiti	1971 - 2002	Papua New Guinea	1976 - 2001
Barbados	1970 - 2002	Honduras	1974 - 2002	Paraguay	1975 - 2002
Belarus	1995 - 2002	Hungary	1995 - 2002	Peru	1990 - 2002
Belize	1984 - 2002	India	1975 - 2002	Philippines	1977 - 2002
Benin	1992 - 2002	Indonesia	1983 - 2002	Poland	1994 - 2002
Bolivia	1976 - 2002	Iran, Islamic Rep.	1989 - 2000	Romania	1997 - 2002
Botswana	1975 - 2002	Jamaica	1976 - 2002	Rwanda	1976 - 2002
Brazil	1980 - 2002	Jordan	1977 - 2002	Senegal	1974 - 2002
Bulgaria	1992 - 2002	Kazakhstan	1995 - 2002	Seychelles	1989 - 2002
Burkina Faso	1983 - 2002	Kenya	1975 - 2002	Sierra Leone	1980 - 2002
Cameroon	1979 - 1995	Kyrgyz Republic	1996 - 2002	Slovak Republic	1994 - 2002
Central African Republic	1982 - 1993	Lao PDR	1990 - 2001	South Africa	1970 - 2001
Chad	1985 - 1994	Latvia	1996 - 2002	Sri Lanka	1975 - 2002
Chile	1983 - 2002	Lithuania	1994 - 2002	St. Kitts and Nevis	1984 - 2002
China	1987 - 2002	Madagascar	1974 - 2002	St. Lucia	1981 - 2002
Colombia	1970 - 2002	Malawi	1994 - 2000	St. Vincent	1979 - 2002
Congo, Rep.	1995 - 2002	Malaysia	1974 - 2002	Sudan	1977 - 1997
Costa Rica	1977 - 2002	Maldives	1996 - 2002	Suriname	1978 - 2002
Cote d'Ivoire	1975 - 2002	Mali	1988 - 2002	Swaziland	1974 - 2002
Croatia	1994 - 2002	Mauritania	1986 - 1997	Syrian Arab Republic	1977 - 2002
Dominica	1978 - 2002	Mauritius	1981 - 2002	Thailand	1975 - 2002
Dominican Republic	1970 - 2002	Mexico	1979 - 2001	Togo	1974 - 2002
Ecuador	1976 - 2001	Moldova	1995 - 2001	Tonga	1985 - 1993
Egypt, Arab Rep.	1977 - 2002	Morocco	1975 - 2002	Trinidad and Tobago	1975 - 2002
El Salvador	1977 - 2002	Mozambique	1996 - 2002	Tunisia	1988 - 2002
Estonia	1994 - 2002	Namibia	1991 - 2001	Turkey	1987 - 2002
Ethiopia	1982 - 2001	Nepal	1993 - 2001	Ukraine	1996 - 2002
Fiji	1979 - 1999	Nicaragua	1977 - 2002	Vanuatu	1982 - 2002
Gabon	1978 - 1999	Niger	1974 - 2002	Venezuela, RB	1997 - 2002
Ghana	1979 - 1997	Nigeria	1977 - 1999	Zimbabwe	1980 - 1994

Appendix Table 2

The impact of remittances on the share of deposits to GDP

Second stage instrumental variables OLS, fixed effects, and random effects estimates

GDP per capita in the ten countries with the largest stock of migrants weighted by inverse bilateral distances is used as instrument for remittances

The regression equation estimated is of the form $FD_{i,t} = \alpha + \beta_1 Rem_{i,t} + \beta_2 X_{i,t} + u_{it}$ where in this case FD refers to financial development measured as the ratio of deposits to GDP. Rem is the share of remittances to GDP. X is matrix of controls including: *GDP per capita*, measured in constant dollars; *Log of GDP*, stated in constant dollars; *Inflation*, defined as the percentage change in the GDP deflator; *Dual Exchange Rates*, which is a dummy capturing periods when multiple exchange rates were in effect; *Financial Liberalization*, which is a dummy identifying periods of liberalization in domestic interest rates, *Capital Openness*, refers to an index of capital account openness developed by Chinn and Ito (2002); *Latitude*, defined in absolute terms and scale between 0 and 1; *British Legal Origin*, which is a dummy equal to 1 for countries with Common Law as their legal origin, and *Creditor Rights*, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS			Fixed effects		Random effects	
Remittances to GDP	-0.857 [0.95]	2.251 [7.50]***	4.481 [9.21]***	2.433 [6.60]***	1.949 [4.04]***	2.498 [6.78]***	3.554 [6.16]***
GDP Per Capita	3.769 [10.92]***	2.128 [5.62]***	3.149 [5.20]***	9.572 [8.08]***	8.198 [6.25]***	9.779 [8.67]***	9.088 [6.49]***
Log of GDP	-2.183 [3.54]***	1.561 [4.16]***	2.923 [6.13]***	7.355 [4.51]***	9.045 [5.81]***	6.74 [4.42]***	5.951 [4.09]***
Inflation	-0.004 [2.76]***	-0.003 [2.91]***	-0.002 [2.09]**	-0.002 [2.70]***	-0.002 [3.80]***	-0.002 [2.76]***	-0.002 [3.48]***
Dual Exchange Rate	-6.047 [4.38]***	-1.285 [0.99]	-0.539 [0.37]	0 [0.00]	0.491 [0.56]	-0.031 [0.04]	-0.84 [0.80]
Financial Liberalization		3.544 [3.50]***	3.249 [2.75]***		0.74 [1.11]	1.092 [1.39]	1.552 [2.01]**
Capital Openness		1.751 [4.06]***	0.665 [1.18]		-0.956 [1.90]*	-1.74 [2.99]***	-1.528 [2.75]***
Latitude			-38.676 [3.99]***				-61.146 [2.16]**
British Legal Origin			1.134 [0.74]				1.206 [0.17]
Creditor Rights			5.521 [7.53]***				6.492 [1.97]**
Constant	74.034 [4.49]***	-20.745 [2.45]**	-62.339 [5.75]***	-163.485 [4.69]***	-202.415 [6.00]***	-149.993 [4.46]***	-83.326 [3.27]***
Observations	1526	1036	933	1526	1036	1526	933
Number of countries	83	54	49	83	54	83	49
F-Statistic for joint significance of regressors ¹	39.49	34.8	32.54	11903.66	10638.87	400.36	245.53
P-Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00

¹For fixed effects and random effects regressions, we report the Chi-Statistic

Appendix Table 3 The impact of remittances on the share of private credit to GDP

Second stage instrumental variables OLS, fixed effects, and random effects estimates

GDP per capita in the ten countries with the largest stock of migrants weighted by inverse bilateral distances is used as instrument for remittances
The regression equation estimated is of the form $FD_{it} = \alpha + \beta_1 Rem_{it} + \beta_2 X_{it} + u_{it}$ where in this case FD refers to financial development measured as the ratio of credit to GDP. Rem is the share of remittances to GDP. X is matrix of controls including: GDP per capita, measured in constant dollars; Log of GDP , stated in constant dollars; $Inflation$, defined as the percentage change in the GDP deflator; $Dual Exchange Rates$, which is a dummy capturing periods when multiple exchange rates were in effect; $Financial Liberalization$, which is a dummy identifying periods of liberalization in domestic interest rates, $Capital Openness$, refers to an index of capital account openness developed by Chinn and Ito (2002); $Latitude$, defined in absolute terms and scale in degrees; $British Legal Origin$, which is a dummy equal to 1 for countries with Common Law as their legal origin, and $Creditor Rights$, which is an index of creditor rights as defined by Djankov, McLiesh and Shleifer (2005). Absolute value of t statistics in brackets. *, **, and *** denote significance at 10, 5, and 1 percent.

	OLS		Fixed effects		Random effects	
Remittances to GDP	-1.73 [2.02]**	1.761 [5.19]***	3.778 [6.83]***	0.776 [2.70]***	0.303 [0.63]	0.806 [2.83]***
GDP Per Capita	2.808 [8.65]***	1.947 [4.65]***	3.622 [5.31]***	9.107 [9.78]***	10.449 [7.92]***	9.168 [10.30]***
Log of GDP	-0.422 [0.71]	2.519 [6.00]***	3.372 [6.22]***	6.802 [5.30]***	6.7 [4.28]***	2.956 [5.38]***
Inflation	-0.004 [2.93]***	-0.002 [2.26]**	-0.002 [1.86]*	-0.001 [2.02]**	-0.001 [1.77]*	-0.001 [2.16]**
Dual Exchange Rate	-6.67 [5.13]***	-3.767 [2.61]***	-4.222 [2.54]**	-1.661 [2.32]**	-0.474 [0.53]	-1.022 [2.40]**
Financial Liberalization		0.856 [0.76]	2.042 [1.53]	0.412 [0.61]	0.412 [0.61]	0.541 [0.77]
Capital Openness		1.826 [3.80]***	0.256 [4.30]***	0.087 [0.17]	0.087 [0.17]	-0.738 [1.23]
Latitude			-46.932 [4.30]***			-53.489 [1.88]*
British Legal Origin			-5.07 [2.93]***			-4.667 [0.63]
Creditor Rights			6.518 [7.88]***			6.839 [2.04]**
Constant	34.381 [2.18]**	-40.853 [4.29]***	-69.858 [5.66]***	-149.162 [5.44]***	-148.605 [4.37]***	-143.759 [5.28]***
Observations	1518	1031	928	1518	1031	1518
Number of countries	83	54	49	83	54	83
F-statistic for joint significance of regressors ¹	34.58	31.47	24.44	13971.28	9396.84	581.22
P-Value	0.00	0.00	0.00	0.00	0.00	0.00

¹For fixed effects and random effects regressions, we report the Chi-Statistic