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Coon, Michael and Neumann, Rebecca

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Michael Coon[a]

Rebecca Neumann[b]

Abstract

This paper explores the relationship between foreign direct investment and remittance flows. Using a panel of 79 countries, we estimate a random effects model and find a positive and significant relationship between the two capital flows. We account for the potential endogeneity of FDI to remittances by utilize a two-stage Instrumental Variables approach. These findings are indicative of a desire among the emigrant community to invest their income earned abroad in their home countries. We also explore regional characteristics to examine whether this relationship differs across regions. Consequently, we find this effect to be particularly important for Sub-Saharan African (SSA) and Latin American and Caribbean (LAC) countries.

[a] Department of Economics and Business Administration, Hood College. 401 Rosemont Avenue, Frederick, MD 21701; email: coon@hood.edu; tel: (301) 696-3368; fax: (301) 696-3771
[b] Department of Economics, University of Wisconsin - Milwaukee, PO Box 413, UWM, Milwaukee WI 53201-0413, email: rneumann@uwm.edu; tel: (414) 229-4347; fax: (414) 229-3860

1. Introduction

Remittances to developing countries in 2013 totaled an estimated $404 billion (World Bank, 2014). This amount is equivalent to roughly three times the amount dispersed in official development assistance (ODA) and in some countries remittances represent the largest single source of foreign exchange. Remittances have been widely regarded as a potential source for development financing due to the fact that they tend to be less volatile than other capital flows and because they are direct transfers to households. Despite a growing literature into the causes and effects of remittances, relatively little research has examined the relationship between remittances and other capital flows. Given the relative size and importance of remittances vis-à-vis other capital flows, we contribute to this literature by examining how foreign direct investment (FDI) flows impact remittances into a country.

Understanding the relationship between remittances and other capital flows is important for several reasons. First, it provides further evidence into the literature on motivations to remit. If remittances and FDI move in the same direction, it would suggest that remittances are being channeled toward investment activities. If, on the other hand, remittances are negatively related to FDI flows, then it may indicate that remittances are more compensatory in nature, or possibly that FDI is crowding out migrant investment. Further, if remittances and FDI are related, then policies directed toward attracting FDI may indirectly affect remittances, and vice-versa. In particular, if FDI and remittances are complements, then policies designed to attract FDI will benefit both foreign investors and emigrants. From a development perspective, channeling remittances toward investment may represent the best path for remittances to have a positive impact on the receiving economy. However, if FDI and remittances are substitutes, then increases in FDI may adversely impact emigrants, as they may crowd out remittances. We

explore this relationship on a panel of 79 countries over 1980-2010 using a random effects Instrumental Variable (IV) model, where we focus on how FDI inflows as a percentage of GDP impacts the amount of remittance inflows as a percentage of GDP. We control for a range of variables that others have found to be important for the flow of remittances across borders. Our findings indicate a positive relationship between remittance flows and FDI flows, perhaps suggesting a desire by emigrants to invest in their home countries as opportunities arise.

2. Literature Review

Three strands of the remittance literature are of particular importance to this study. The first is the literature related to the motivation to remit, specifically whether remittances are used for investment purposes. The second is the literature on the macroeconomic determinants of remittances flows. The third is the literature on the relationship between remittances and other capital flows. We provide a brief overview of this literature below.

2.1 Remittances for Investment

In their seminal paper, Lucas and Stark (1985) outline three potential motivations for sending remittances: pure altruism, pure self-interest, and tempered altruism or enlightened self-interest. Subsequent empirical research has found evidence of all three motivations under varying circumstances. [1] Remitting for altruistic reasons has been shown to have poverty reducing effects, primarily by increasing consumption levels of recipient households. For our purposes, however, self-interest may be more important for the potential for remittances to lead to domestic investment.

Numerous studies have explored the extent to which remittances are invested by receiving households. Microeconomic studies have found that remittances are used to increase

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[1] Hagen-Zanker and Siegel (2007) provide a comprehensive review.

land holdings, purchase livestock, and invest in small businesses (Adams, 1998; Wouterse and Taylor, 2008; Yang, 2008; Woodruff and Zenteno, 2001). Macroeconomic studies exploring the relationship between remittances and economic growth have found remittances to be pro-cyclical in countries with low levels of financial development (Giuliano and Ruiz-Arranz, 2009; Mundaca, 2010). That remittance inflows increase during periods of economic growth may indicate that remittances are being channeled toward investment in the absence of formal credit markets, thus overcoming liquidity constraints. Microeconomic evidence also supports this claim. Coon (2014) matches household survey data with community-level financial development indicators and finds that Mexican households in communities without banks are significantly more likely to use remittances for asset accumulation and to invest in productive activities.

Not all researchers are convinced that remittances are being used to overcome liquidity constraints. Clemens and Ogden (2014) argue that it is unlikely that migration occurs *because* of credit constraints, since migration is itself a costly investment. They argue instead that migration is more likely to arise due to a lack of investment opportunities in the home community. While it is indeed true that households may choose to migrate because migration yields the highest return on investment, it is also true that households are limited in their ability to continue to invest in migration by the number of household members who are able to migrate. Thus, given that migration has occurred, as investment opportunities arise in the home community, remittances may be a more attractive method of financing these investments, even if the return on these investments is lower than the potential return to migration.

To the extent that emigrants have a desire to invest in their home country, policy briefs by Terrazas (2010) and Rodriguez-Montemayor (2012) explore why "Diaspora Direct Investment" (DDI) may be more desirable than other investment inflows. Emigrants investing in

their home countries may have country-specific knowledge relating to culture and business climate that may make their ventures more successful than similar projects led by foreign investors. Also, since they have a sentimental attachment to their home countries, they may be less inclined to disinvest during economic downturns, which can help reduce economic instability. Although DDI differs from remittances in the sense that DDI refers to investments by firms owned and/or operated by emigrants in their host country, similar arguments may apply equally to invested remittance income by households. Terrazas (2010) and Rodriquez-Montemayor (2012) provide examples of the types of DDI that occur but specific DDI data are not available to the extent that remittance flows are available.

2.2 Determinants of Remittance Flows

Several studies have explored the macroeconomic determinants of remittance flows, primarily to explore the extent to which domestic macroeconomic policy can increase the inward flow of remittance income. A primary determinant in these studies is the level of economic activity, measured as GDP per capita, in the home country. The core question of this line of research is whether remittances are used for consumption (altruistic motives) or investment (self-interested motives). If remittances fall as GDP increases, then, it is argued, remittances are compensatory in nature. Thus, as incomes increase, fewer remittances are needed to subsidize (or cushion) consumption. If, on the other hand, remittances increase with GDP, then that is an indicator that remittances are pursuing investment opportunities. Empirical evidence is somewhat mixed. Chami et al. (2005), using a sample of 113 countries over a 28 year period, show that remittances tend to decline with economic growth, which would indicate remittances are compensatory in nature. On the other hand, Giuliano and Ruiz-Arranz (2006) and Mundaca (2009) find that remittances tend to be pro-cyclical in countries with lower levels of financial

development, and are therefore likely pursuing investment opportunities. Freund and Spatafora (2008) find that after controlling for transaction costs of sending remittances, remittances tend to increase with home country income, thus providing further evidence that remittances are pro-cyclical in nature. Adenutsi (2014), using a sample of 36 Sub-Saharan African countries over 29 years, finds that rising income in the home country leads to an increase in remittances from permanent migrants, but decreases remittances from temporary migrants. These findings seem to indicate that permanent migrants remit for self-interested (investment) purposes, while temporary migrants tend to be more altruistic.

The effect of domestic financial development on remittance flows is also uncertain in the empirical literature. On one hand, remittances can be used to overcome liquidity constraints in the home country, which would cause remittances to decline with financial development (Giuliano and Ruiz-Arranz, 2006; Mundaca, 2009; Ramirez and Sharma, 2009). On the other hand, increased financial development can reduce the transaction costs of sending remittances, thereby increasing remittance flows (Freund and Spatafora, 2008; Ezeoha, 2013). Adenutsi (2014) again finds different effects for temporary and permanent migrants.

We use this literature to help us choose the baseline determinants of remittances. We then consider the role that FDI inflows may play in addition to these baseline determinants. The main set of determinants of remittance flows include the stock of migrants (Freund and Spatafora, 2008), host country income (Freund and Spatafora, 2008; Adenutsi, 2014), and exchange rates (Alleyne et al., 2008; Adenutsi, 2014). Others have also considered money supply (Vargas-Silva and Huang, 2006) and interest rate differentials (El-Sakka and McNabb, 1999; Aydas et al., 2005).

2.3 Remittances and Other Capital Flows

The relationship between remittances and other capital flows is arguably one of the most understudied topics in the remittance literature. While it is widely noted that remittance flows are more stable than other capital flows (Ratha, 2003), very little research has looked into how these flows are related. The bulk of empirical research that studies remittances and other capital flows usually explores the flows' impact on some other variable. For instance, Hossain (2014) examines the extent to which FDI and remittances impact domestic savings rates. Wang and Wong (2011) examine how inward FDI and remittances affect out-migration. While they find that FDI reduces out-migration among the more educated population, their study stops short of exploring how that might affect future remittance streams.

In one of the few studies to test the relationship between remittances and other capital flows, Buch and Kuckulenz (2010) find no significant relationship between remittances and private capital inflows for 87 developing countries between 1970 and 2000. They do find, however, a positive correlation between remittances and official capital inflows. They empirically examine the determinants of these three individual capital flows: remittances, private capital flows, and official development assistance. However, they exclude the alternative flows in the set of possible determinants for each. Thus, it is unclear whether and how one flow is affecting the others. Our paper fills this gap by considering explicitly the interaction between remittances and private capital flows in the form of FDI inflows. We also examine how official capital flows may affect this relationship.

Basnet and Upadhyaya (2014) explore the possibility that remittances may help attract FDI. Their hypothesis is that remittances lead to increases in human capital, which in turn attracts FDI. Their results, however, are mixed, and appear to be driven by regional differences.

On their full sample of 35 middle-income countries between 1980 and 2010, they find no significant effect of lagged remittances on FDI. When divided by regions, they find no significant effect for Latin America. However, they find a negative effect of remittances on FDI for Asian and Pacific countries and a positive effect for African countries. Given this evidence, we explore further the relationship between FDI and remittances by explicitly modeling the impact of FDI flows on remittance flows. To account for the potential endogeneity of FDI to remittances, we utilize a two-stage Instrumental Variables approach. We also explore regional characteristics to examine whether this relationship differs across regions.

3. Model and Data

We examine the broad question of whether aggregate inward FDI flows and inward remittance flows are related for country i. To get at this question, we employ an unbalanced panel of 79 countries for the years 1980-2010 to estimate the following model

$$R_{it} = \beta_0 + \beta_1 FDI_{it} + \Gamma\Psi_{it-1} + \Phi X_{it} + \epsilon_{it} + u_i$$

where R_{it} is the log of remittances received by country i as a percentage of GDP in year t. FDI is the log of net FDI inflows to country i in year t. Ψ_{it-1} includes lagged measures of capital account and trade openness. X_{it} is a vector of control variables that have been found to be the primary determinants of remittances. These controls include the log of GDP per capita in the home (remittance receiving) country and the log of GDP per capita in the main destination country for each remittance-recipient country's emigrants. We also consider a squared GDP per capita term to capture any nonlinearities and the first difference in GDP per capita to capture changes in GDP. Other controls include the real effective exchange rate index (2005=100) and the emigrant stock as a share of the population. As a measure of domestic financial development,

we also include domestic credit to the private sector by banks, measured as a percentage of GDP. The natural log is taken for all measures of GDP and the real exchange rate.

We estimate the model first using a random effect GLS model as a baseline. There may be a concern that remittances attract FDI flows (as in the Basnet and Upadhyaya (2014) paper) so that FDI may be endogenous. To control for the potential endogeneity of FDI we estimate a two-stage IV model using lagged FDI inflows as instruments. The two-stage random effect GLS model with lagged FDI flows as instruments provides our main estimation results.

Data for remittances and emigrant stock come from the World Bank's Migration and Remittances Fact Book (2011), and are measured as aggregates for each country. Aggregate remittance inflows to each country i over each year are reported in dollars by the World Bank. The accumulated emigrant stock is measured as number of people at the end of the year. For our analysis we normalize remittance flows and emigrant stock by converting them to shares of GDP and population, respectively. Capital account openness is the KAOPEN measure as calculated by Chinn and Ito (2006) while trade openness is calculated as exports plus imports relative to GDP from the World Bank's World Development Indicators (2011). Both capital account openness and trade openness are expected to be positively related to remittances as the flow of funds are less restricted under higher openness measures. The remaining variables come from the World Bank's World Development Indicators (2011), including the real exchange rate, domestic credit to the banking sector, and measures of GDP per capita. GDP measures in the home and host countries are measured in Purchasing Power Parity (PPP) terms.

Table 1 provides a list of the countries by region included in the estimation. Summary statistics for key variables of interest are reported in Table 2 as averages over countries and years. Remittances as a percentage of GDP range from nearly zero (0.00003% for Uruguay in

1983) to as much as 106% (Lesotho in 1982). However, 90 percent of the observations range from 0.03% to 9.5% of GDP. Similarly, net inflows of FDI range from -16% to 145% of GDP with 90 percent of the observations between 0.002% and 12% of GDP. Note that net inflows of FDI are calculated as FDI inflows to country i (i.e., net inward direct investment from the rest of the world to country i). Any negative values for FDI inflows can be described as the reversal of previous flows. We do not account for FDI outflows (i.e., outward direct investment from country i). To account for negative values of FDI we estimate two models. The first model uses only the log of positive values of net FDI inflows, denoted FDI_1 below. In the second model we take the log of the absolute value of net FDI inflows and use the negative of this value for any observations with FDI<0. We denote this second measure as FDI_2. We show results using both FDI_1 and FDI_2 to examine whether the relationship with remittance flows is sensitive to these negative values.

Since emigrant stock data is only available on a decennial basis, our measure of emigrant stock as a share of the population is taken at the beginning of each decade, i.e. $M_{i,1980} = M_{i,1981} = \cdots = M_{i,1989}$, where M_i is the emigrant stock of country i as a share of the population. GDP of the home country is measured on a per capita (PPP) basis each year. GDP of the main host country is the GDP per capita (PPP) of the country with the largest emigrant population at the beginning of the decade. We also include a squared GDP term to consider any nonlinearities. Remittances may follow an inverted U pattern with respect to home country income. This is consistent with the theory of the "migration hump" (de Haas 2010). That is, extremely poor countries may lack the ability to send migrants abroad, and may lack the necessary infrastructure (postal service, banking systems, wire transfer agencies, etc.) to receive remittances. As incomes

rise, these constraints are relaxed and remittances increase. Eventually incomes become large enough that migration and remittances are no longer necessary, and remittances decline.

4. Results

4.1 Baseline Results

Results of our estimation are presented in Table 3. Columns 1 and 2 report the results of the random effects estimation. The coefficients for both measures of FDI are positive, but only significant in Column 1, which includes only non-negative values of net FDI inflows. This indicates that remittances and FDI tend to follow similar flow patterns and that diasporas may be seeking to capitalize on investment opportunities in their home countries. Columns 3 and 4 present estimates of the IV model, which controls for the potential endogeneity of FDI, and is thus our preferred specification. The coefficient estimates on both FDI measures are statistically significant and positive. The coefficient estimates are also larger than in columns 1 and 2, indicating that potential endogeneity may bias the result downward.

Columns 5 and 6 include regional dummies and use the random effects IV model to examine whether the results differ across geographical regions. The regions considered are Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA), the Middle East and North Africa (MENA), East Asia and the Pacific (EAP), and all other countries. The results are robust to the inclusion of such dummies with somewhat higher coefficients on the FDI measures. The dummies for LAC and SSA are significant and negative, indicating that these regions receive less remittances overall. Thus, while Africa has a higher mean remittance to GDP ratio in the summary statistics, the negative dummy coefficient says that there are other regional

characteristics that lower the average remittances, relative to the other regional groups.[2] Based on these results, we subdivide our sample and run the regressions separately below on each region.

Taken together, the coefficient estimates in Table 3 indicate that the relationship between FDI and remittance flows is positive and in the range of 0.065 to 0.176. Given the log-log nature of the regressions, these estimates can be interpreted as elasticities. Consequently, a 10% rise in FDI flows to country i is associated with a 0.65% to 1.76% increase in remittances. Based on mean remittance flows of 3.3% of GDP across all years and countries, this coefficient indicates an increase in remittance flows relative to GDP of 0.021% to 0.058%. There are three possible explanations for what appear to be relatively small magnitudes. The first is a resource constraint. While emigrants may be able to recognize investment opportunities and have a desire to invest in their home countries, they may not have the ability to mobilize the necessary resources. Second, relative to the pool of potential foreign investors, a particular country's emigrant population is likely to be quite small. Given the size of the emigrant population, where the emigrant stock on average is 10% of the population, increasing remittances by around ½ percent of GDP might represent a significant share of their income and savings, thus indicating a larger mobilization of diaspora funds. The third possible explanation is related to the dual nature of remittances themselves. While remittances may be used for investment purposes, they are also widely used for consumption smoothing. Since FDI tends to be pro-cyclical, increases in FDI will correspond to increases in income in the receiving country, thereby reducing the need for sending remittances to supplement consumption. Thus, it is possible that remittances may be reallocated

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[2] Dropping Lesotho (which has the largest single observation for remittance flows of 106% and pulls up the average in the summary statistics) from the baseline regression provides even stronger results on the FDI variable with a coefficient of 0.204 (significant at 5%).

toward investment, which would not necessarily change the quantity of remittances being sent. While this subtlety cannot be tested with the available data, our results are suggestive that further research focusing on the specific uses of remittance funds may warrant consideration of interactions between remittances and other international financial flows.

Based on previous literature on the determinants of remittance flows across countries, the coefficients on the other control variables generally show the expected signs. Countries that are more open to trade and capital have higher remittances relative to GDP. Remittances are negatively related to the real effective exchange rate. As the home country faces real currency appreciation, emigrants send less since their remittances lose value in the home country. The domestic financial development variable, domestic credit to the banking sector, is negative, small, and borderline significant, consistent with mixed results in prior literature. The emigrant stock (relative to the population) indicates that countries with higher rates of emigration also have higher remittance rates.

We also find that remittances are positively related to the level of GDP per capita in the home country as well as changes in home country GDP per capita, indicating that remittances tend to be more pro-cyclical in nature (as in Freund and Spatafora, 2008). Thus, remittances may be more likely to be used for investment than to be compensatory in nature. The squared GDP per capita term indicates that remittances follow an inverted U pattern with respect to home country income. Interestingly, GDP per capita and changes in GDP per capita in the main host country seem to have little impact on aggregate remittance flows. We have explored different combinations of these control variables (in particular leaving out the squared GDP per capita term and the first-differenced GDP per capita term). The results for the FDI variables are robust

to these different combinations of these control variables, indicating that the relationship between remittances and FDI flows are not sensitive to these inclusions.

4.2 Regional Variation

Table 4 provides evidence of regional variations in the relationship between remittances and FDI. Using the second FDI measure, which includes negative net flows (i.e., the reversal of past FDI flows), we estimate the IV model separately for Latin America and the Caribbean (LAC), Sub-Saharan Africa (SSA), the Middle East and North Africa (MENA), East Asia and the Pacific (EAP), and all remaining countries (rest-of-the-world or ROW). The coefficient estimates are positive and significant for all regions, with the exception of the Middle East and North Africa. The coefficient is larger in magnitude for Sub-Saharan Africa, and moderately higher for Latin America and the Caribbean, and for East Asia and the Pacific, relative to the rest of the world. Thus, FDI flows positively impact remittance flows to Latin America, East Asia, and Sub-Saharan Africa in particular. In the baseline regression (columns 5 and 6 of Table 3), both the LAC and SSA regional dummies take a negative value, highlighting that these regions receive fewer remittances on average. Yet, these are also the two regions that show consistently significantly positive impacts of FDI flows on remittance flows.

Similar to the magnitudes calculated for the overall sample, consider the coefficient for the SSA countries of 0.516. As an elasticity, this indicates that a 10% increase in FDI increases remittances by 5.16%, which corresponds to an increase in remittance flows relative to GDP of 0.40%. This larger response in Africa is suggestive that the positive co-movement of FDI and remittances may be particularly important where there is less access to formal credit markets. On average, the SSA countries receive a larger amount of remittances relative to GDP and also have a smaller average value for domestic credit.

4.3 Official Development Assistance

We now explore the inclusion of Official Development Assistance capital flows, which are gifts of aid or assistance to the governments of country i, and may include strict guidelines on their use or disbursement. Our focus is not directly on how ODA may impact remittances since remittances are flowing directly to households, but in how they may impact the relationship between FDI and remittances. We might imagine, however, that ODA flows would affect remittances if both are predominantly flowing to poorer countries. In general, the results in Table 5 show that the ODA flows are not significant as a determinant of remittance flows, indicating that households are not responding directly to the ODA flows in each of the regions. Only for the other ODA-recipient sample in the last column of Table 5 are the ODA flows significant and positive for remittances.

By including ODA we lose a number of countries from our analysis since they do not receive ODA flows. In particular, we lose observations from the EAP and the rest-of-the-world samples (e.g., OECD countries). For those that remain, the impact of FDI flows on remittances are robust for the LAC and SSA regions with the addition of ODA flows, as shown in Table 5. We report results using FDI_2 (which accounts for the negative FDI flows into a country), where the coefficient on FDI for remittances for the LAC is 0.296 and 0.433 for the SSA countries (compared to 0.299 and 0.516 without ODA included).[3] The FDI coefficient is not significant for the MENA countries in either Table 4 or 5.

The coefficient on FDI for the EAP countries is insignificant in Table 5 with ODA included compared to a significant positive value in Table 4, but the sample size falls from 7 countries to 5 countries when the ODA variable is included. We have also explored this same

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[3] The results are similar using the FDI_1 variable.

smaller sample for the EAP and other ODA-recipient countries without the ODA variable included in the regression. The coefficient estimates are similar to those reported in Table 5, thus indicating that the lack of significance and change in value is due to the smaller sample rather than to the inclusion of the ODA variable. Overall, then, the inclusion of ODA does not change our main conclusion that FDI inflows positively impact remittance inflows.

5. Conclusion

The results presented above indicate a positive relationship between FDI and remittance flows. We interpret this relationship to indicate the desire among migrants to invest in their home countries. While there is a clear positive relationship between these two flows, the estimated coefficients show that remittance flows are inelastic with respect to FDI flows. That is, the change in remittance flows is small relative to the change in FDI flows. As mentioned above, this may be due to the inability of emigrants to mobilize capital as quickly as other investors, in which case effective policy can help increase emigrant investment in their home countries. It also may be the case that remittances are simply being reallocated from consumption to investment, and our results are underestimating the true willingness of emigrants to invest in their home countries.

Further research could focus on the individual uses of remittances and how these choices are affected by not only the access to domestic credit but also to international capital flows, such as FDI. Our aggregate data cannot show the individual choices of emigrants but are suggestive that the different types of capital flows are related. In particular, the remittance flows here are positively related to FDI flows and to measures of openness in both trade and financial flows. Thus, from a policy prescription standpoint, increases in remittance flows may accompany continued openness and policies that attract FDI. We do not find any evidence that FDI flows

substitute directly for remittance flows, but instead show that these two types of capital flow together. Given prior evidence that remittance flows tend to be less volatile than other capital flows (Ratha, 2003), they may provide a more stable form of capital that may remain in a country when other types of capital are withdrawn. Better policies to help direct these flows into domestic investment may prove fruitful from a development perspective.

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Tables

Table 1: List of Countries by Region

Middle East and North Africa	Sub-Saharan Africa	Latin America and Caribbean	East Asia and Pacific	Rest of World	
Algeria	Burundi	Antigua and Barbuda	Australia	Armenia	Italy
Oman	Cameroon	Belize	China	Austria	Macedonia
Sudan	Central African Republic	Bolivia	Fiji	Belgium	Malta
Syria	Cote d'Ivoire	Chile	Japan	Bulgaria	Moldova
Tunisia	Equatorial Guinea	Colombia	Malaysia	Croatia	New Zealand
	Gabon	Costa Rica	Tonga	Cyprus	Norway
	Gambia, The	Dominica	Vietnam	Czech Republic	Poland
	Ghana	Dominican Republic		Denmark	Portugal
	Lesotho	Ecuador		Finland	Russia
	Mozambique	Guyana		France	Slovak Rep
	Niger	Mexico		Georgia	Slovenia
	Rwanda	Nicaragua		Germany	Spain
	Senegal	Panama		Greece	Sri Lanka
		Paraguay		Hungary	Switzerland
		Peru		Iceland	Turkey
		St. Lucia		Iran	Ukraine
		St. Vincent and the Grenadines		Ireland	United States
		Trinidad and Tobago		Israel	
		Uruguay			

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
All Countries					
Remittances (% of GDP)	1769	3.261564	8.855925	2.89E-05	106.4789
FDI (% of GDP)	1769	3.709297	6.313829	-16.0607	145.202
KAOPEN	1769	0.290422	1.54228	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	1769	79.62227	41.95674	6.320343	280.361
Real Exchange Rate (2005=100)	1769	3170.619	104082.8	19.5275	4342879
Domestic Credit to Banking Sector (% of GDP)	1769	68.64498	54.86691	-20.8737	328.9902
Emigrant Stock (% of population)	1769	10.08224	11.67044	0.393005	62.58882
GDP per capita (PPP)	1769	12569.65	10670.19	372.6397	48402.64
Main Host GDP per capita (PPP)	1769	25152.12	14055.86	560.5077	120037.7
Latin American and Caribbean					
Remittances (% of GDP)	450	2.978741	3.075511	2.89E-05	24.4022
FDI (% of GDP)	450	5.143263	5.33509	-12.2084	39.80923
KAOPEN	449	0.387468	1.49894	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	449	89.30288	46.40512	23.34449	280.361
Real Exchange Rate (2005=100)	450	114.7638	76.60498	61.14532	1018.028
Domestic Credit to Banking Sector (% of GDP)	450	54.47583	33.66471	-1.53483	269.5832
Emigrant Stock (% of population)	450	16.04699	17.48373	1.337955	62.58882
GDP per capita (PPP)	450	7556.253	4013.274	1644.422	24150.88
Main Host GDP per capita (PPP)	450	30494.00	11791.64	7458.294	43635.59
Sub-Saharan Africa					
Remittances (% of GDP)	255	8.265813	20.60266	0.000481	106.4789
FDI (% of GDP)	255	3.281467	11.19175	-8.58943	145.202
KAOPEN	255	-0.82935	0.795413	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	254	74.09383	40.88767	6.320343	237.9944
Real Exchange Rate (2005=100)	255	21326.27	273896.7	19.5275	4342879
Domestic Credit to Banking Sector (% of GDP)	255	20.40256	13.28139	-20.8737	65.70037
Emigrant Stock (% of population)	255	4.183324	4.486878	0.867312	20.56551
GDP per capita (PPP)	255	2311.209	3698.403	372.6397	17441.69
Main Host GDP per capita (PPP)	255	5904.37	7768.56	560.5077	29483.66
Middle East and North Africa					
Remittances (% of GDP)	139	2.330361	1.76093	0.064411	6.934043
FDI (% of GDP)	139	1.872339	2.52443	-0.25087	12.50425
KAOPEN	138	-0.57325	1.523041	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	138	63.08993	25.9187	11.08743	115.7047
Real Exchange Rate (2005=100)	139	123.2961	67.90489	86.39595	448.525
Domestic Credit to Banking Sector (% of GDP)	139	41.57308	27.04523	-12.623	106.867
Emigrant Stock (% of population)	139	6.041849	3.394034	1.659911	12.52331
GDP per capita (PPP)	139	7062.368	6041.784	879.3794	24646.04
Main Host GDP per capita (PPP)	139	33729.77	20942.11	5249.497	120037.7

East Asia and Pacific					
Remittances (% of GDP)	159	3.363304	7.21631	0.014367	36.49304
FDI (% of GDP)	159	2.871219	2.656274	-3.53528	11.9315
KAOPEN	159	0.306596	1.475463	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	159	82.07325	57.05117	15.92399	220.4068
Real Exchange Rate (2005=100)	159	109.5059	21.52785	72.2731	201.7008
Domestic Credit to Banking Sector (% of GDP)	159	115.7839	80.26091	26.48476	328.9902
Emigrant Stock (% of population)	159	6.861545	11.61905	0.393005	45.67485
GDP per capita (PPP)	159	12329.27	11232.23	814.0746	34601.75
Main Host GDP per capita (PPP)	159	31003.09	7829.837	17304.5	52169.96
Rest of World					
Remittances (% of GDP)	764	1.904425	3.61804	0.001912	34.67026
FDI (% of GDP)	764	3.520527	5.406539	-16.0607	51.89585
KAOPEN	764	0.8808	1.501085	-1.85564	2.45573
Trade Openness [(EX+IM)/GDP]	763	79.18675	36.50591	17.18601	188.9775
Real Exchange Rate (2005=100)	764	110.2099	84.71197	37.51198	1123.842
Domestic Credit to Banking Sector (% of GDP)	764	88.25956	53.89448	5.559478	315.7515
Emigrant Stock (% of population)	764	9.959029	7.817467	0.71348	33.10048
GDP per capita (PPP)	764	20020.78	10283.18	1619.869	48402.64
Main Host GDP per capita (PPP)	764	25627.94	10104.35	910.8402	43635.59

Years and number of countries included (averages over countries and years).

Table 3: Panel Estimates: Dep. Var. = Remittances (% of GDP)

	Random Effect GLS		2SGLS Random Effect IV		2SGLS Random Effect IV	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln[FDI$_1$ (% of GDP)]	0.065***		0.113***		0.127***	
	(0.019)		(0.036)		(0.036)	
Ln[FDI$_2$ (% of GDP)]		0.023		0.152**		0.176**
		(0.016)		(0.075)		(0.077)
KAOPEN$_{t-1}$	0.173***	0.192***	0.167***	0.174***	0.173***	0.178***
	(0.025)	(0.024)	(0.026)	(0.027)	(0.026)	(0.027)
Trade Openness$_{t-1}$	0.009***	0.009***	0.008***	0.008***	0.009***	0.008***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Ln[Real Exchange Rate]	-0.112***	-0.142***	-0.085*	-0.118***	-0.081*	-0.112***
	(0.040)	(0.037)	(0.047)	(0.040)	(0.048)	(0.041)
Domestic Credit to Banking Sector	-0.001*	-0.001*	-0.001*	-0.001*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Emigrant Stock	0.028***	0.029***	0.028***	0.028***	0.030***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Ln[GDP per capita]	5.081***	5.193***	5.067***	5.186***	4.849***	4.996***
	(0.809)	(0.801)	(0.811)	(0.805)	(0.841)	(0.843)
Ln[(GDP per capita)^2]	-0.304***	-0.309***	-0.307***	-0.316***	-0.302***	-0.313***
	(0.047)	(0.047)	(0.047)	(0.047)	(0.049)	(0.049)
Δ(GDP per capita)	1.621***	1.572***	1.451**	1.135*	1.394**	1.046*
	(0.577)	(0.556)	(0.600)	(0.619)	(0.604)	(0.628)
Ln[Main Host GDP per capita]	-0.123*	-0.098	-0.111	-0.096	-0.126*	-0.106
	(0.066)	(0.063)	(0.070)	(0.064)	(0.072)	(0.066)
Δ(Main Host GDP per capita)	0.219*	0.100	0.213*	0.111	0.228*	0.122
	(0.117)	(0.108)	(0.119)	(0.110)	(0.121)	(0.112)
East Asia and Pacific					-0.144	-0.211
					(0.503)	(0.495)
Latin America and Caribbean					-0.640*	-0.721**
					(0.359)	(0.362)
Sub-Saharan Africa					-0.921**	-0.935*
					(0.464)	(0.481)
Middle East and North Africa					0.700	0.608
					(0.576)	(0.566)
Constant	-20.280***	-20.946***	-20.119***	-20.435***	-18.280***	-18.677***
	(3.448)	(3.406)	(3.448)	(3.431)	(3.667)	(3.705)
N	1688	1767	1625	1759	1625	1759
χ^2	262.550	274.000	250.289	273.920	263.219	282.848
p(χ^2)	0.000	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses; Instrumented Variables = FDI in columns 3-6.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Regional Analysis - 2SGLS Random Effects IV Panel Estimates:
Dep. Var. = Remittances (% of GDP); Instrumented Variables = FDI

	LAC	SSA	MENA	EAP	ROW
	(1)	(2)	(3)	(4)	(5)
Ln[FDI$_2$ (% of GDP)]	0.299**	0.516*	0.015	0.239***	0.157*
	(0.150)	(0.292)	(0.125)	(0.087)	(0.086)
KAOPEN$_{t-1}$	0.413***	0.153	0.183	-0.024	0.033
	(0.049)	(0.148)	(0.145)	(0.080)	(0.032)
Trade Openness$_{t-1}$	0.004	0.015**	0.016*	-0.008***	0.007***
	(0.003)	(0.006)	(0.009)	(0.002)	(0.002)
Ln[Real Exchange Rate]	-0.108	-0.092	-0.397	1.010**	0.224**
	(0.223)	(0.068)	(0.266)	(0.396)	(0.092)
Domestic Credit to Banking Sector	-0.005**	0.001	0.004	-0.017***	-0.001
	(0.002)	(0.011)	(0.003)	(0.002)	(0.001)
Emigrant Stock	0.002	0.025	-0.084	0.069***	0.050***
	(0.008)	(0.046)	(0.063)	(0.006)	(0.011)
Ln[GDP per capita]	4.471	-1.999	8.962***	7.381***	2.474
	(4.513)	(5.099)	(1.513)	(1.541)	(1.659)
Ln[(GDP per capita)^2]	-0.299	0.036	-0.586***	-0.422***	-0.170*
	(0.253)	(0.324)	(0.093)	(0.088)	(0.093)
Δ(GDP per capita)	-0.400	0.489	0.855	-5.494***	0.967
	(1.433)	(1.870)	(1.215)	(1.901)	(0.873)
Ln[Main Host GDP per capita]	0.873***	-0.381***	-0.525	3.586***	0.031
	(0.296)	(0.125)	(0.416)	(0.414)	(0.131)
Δ(Main Host GDP per capita)	-0.449	0.305	0.857*	-2.544	-0.209
	(0.466)	(0.192)	(0.510)	(2.110)	(0.221)
Constant	-24.975	13.897	-26.273***	-71.678***	-10.697
	(20.443)	(20.057)	(9.386)	(8.961)	(7.123)
N	450	253	138	159	759
Countries	19	13	5	7	35
χ^2	193.803	60.231	583.771	1143.081	100.365
p(χ^2)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: 2SGLS Random Effects IV Panel Estimates by Region: Dep. Var. = Remittances (% of GDP); Instrumented Variables = FDI and ODA Inflows

	All ODA Recipients	LAC	SSA	MENA	EAP	Other ODA Recipients
	(1)	(2)	(3)	(4)	(5)	(6)
Ln[FDI_2 (% of GDP)]	0.080	0.296*	0.433**	0.021	-0.158	0.040
	(0.104)	(0.158)	(0.194)	(0.121)	(0.259)	(0.110)
Ln[ODA (% of GDP)]	0.082	0.009	0.042	0.033	0.096	0.249*
	(0.100)	(0.283)	(0.325)	(0.133)	(0.195)	(0.140)
$KAOPEN_{t-1}$	0.270***	0.414***	0.400**	0.169	-0.196	0.086
	(0.037)	(0.054)	(0.161)	(0.143)	(0.123)	(0.074)
Trade Openness$_{t-1}$	0.007***	0.004	0.016***	0.016*	0.005	0.003
	(0.002)	(0.003)	(0.005)	(0.008)	(0.004)	(0.003)
Ln[Real Exchange Rate]	-0.180***	-0.105	-0.118	-0.368	1.529***	0.495
	(0.047)	(0.276)	(0.080)	(0.269)	(0.410)	(0.344)
Domestic Credit to Banking Sector	-0.001	-0.005*	-0.006	0.004	-0.004	0.000
	(0.001)	(0.003)	(0.011)	(0.004)	(0.004)	(0.002)
Emigrant Stock	0.024***	0.002	0.147***	-0.084	0.084***	0.010
	(0.006)	(0.009)	(0.043)	(0.063)	(0.014)	(0.017)
Ln[GDP per capita]	6.646***	4.574	5.614**	9.024***	21.439***	11.049***
	(1.114)	(5.856)	(2.550)	(1.510)	(2.949)	(2.697)
Ln[(GDP per capita)^2]	-0.395***	-0.303	-0.427***	-0.586***	-1.329***	-0.665***
	(0.068)	(0.309)	(0.154)	(0.093)	(0.195)	(0.157)
Δ(GDP per capita)	1.037	-0.429	-1.887	0.870	-1.375	0.998
	(0.794)	(1.586)	(2.519)	(1.218)	(2.252)	(1.293)
Ln[Main Host GDP per capita]	-0.124*	0.863**	0.017	-0.547	3.165***	0.221
	(0.073)	(0.365)	(0.145)	(0.447)	(0.354)	(0.211)
Δ(Main Host GDP per capita)	0.159	-0.445	-0.078	0.916	3.534*	-0.178
	(0.125)	(0.504)	(0.250)	(0.610)	(1.942)	(0.352)
Constant	-26.408***	-25.495	-19.291*	-26.694***	-126.411***	-49.693***
	(4.673)	(29.857)	(10.878)	(9.202)	(12.636)	(11.010)
N	1235	450	253	138	105	289
chi2	248.908	193.450	345.703	580.988	1064.816	83.512
p	0.000	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$