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Islamaj, Ergys and Kose, Ayhan M. and De, Supriyo and Yousefi, S. Reza

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Supriyo De, Ergys Islamaj, M. Ayhan Kose, and S. Reza Yousefi*

Abstract: We examine the behavior of remittances over the business cycle and their potential to act as a "stabilizer" during periods of high business cycle volatility. Two main findings are reported. First, remittances are less volatile than other foreign currency flows and do not appear to systemically comove with business cycle fluctuations. Second, remittances are relatively stable even during episodes of sharp business cycle volatility, such as those associated with sudden stops and financial crises. We also provide an overview of the theoretical literature on the implications of different motives to remit for the cyclical behavior of remittances.

Keywords: remittances, business cycles, acyclical, sudden stops.
JEL classification: F24, F32, F45, G01

* De (World Bank; sde@worldbank.org); Islamaj: (World Bank; eislamaj@worldbank.org; *Corresponding Author*); Kose: (World Bank, Brookings Institution, CAMA and CEPR; akose@worldbank.org); and Yousefi (International Monetary Fund s.reza.y@gmail.com). We would like to thank two referees for their valuable comments. Pablo Acosta, Poonam Gupta, Andrea Presbitero, Sanket Mohapatra, Dilip Ratha, Sergio Schmukler, Nikola Spatafora, Dana Vorisek, Sherrie Brown and participants at the GCER May 2015 Conference, the 8th International Conference on Migration and Development, and KNOMAD Brown Bag Seminar also provided useful suggestions. Any remaining errors are our own. The findings, interpretations and conclusions expressed in this paper are entirely those of the authors and should not be attributed to the World Bank, International Monetary Fund, their Executive Directors, or the countries they represent.

1. Introduction

Remittances to developing countries since 2000 have been significant both as a share of GDP and compared with foreign direct investment (FDI) and official development assistance (ODA) (Figures 1 and 2). Some studies report that remittances support household consumption following natural disasters or other economic shocks.[1] Given their size and the fact that they are used to fund consumption needs of the recipients, remittances have the potential to counterbalance adverse output effects during economic downturns and sudden stops in capital flows.

However, the potential of remittances to help mitigate the adverse effects of shocks is directly related to their behavior over the business cycle. If remittances are procyclical, meaning that they increase during expansions and decline during downturns, they will likely exacerbate the cycle. If, on the other hand, remittances are acyclical or countercyclical, then they have the potential to help moderate economic fluctuations.

In theory, the behavior of remittances over the cycle is related to the motives to remit. In the broadest categorization, remittances can be driven by either altruism or self-interest (Lucas and Stark, 1985; Amuedo-Dorantes and Pozo, 2006). In the former case, remittances are believed to be unrequited transfers without expectations of personal gain sent to relatives during large shocks and tend to be countercyclical. In the latter case, remittances are usually used for investment in the home country and are likely to be procyclical with respect to the business cycle of the recipient economy.

The empirical literature on the cyclical behavior of remittances has been inconclusive. Some studies find that remittances are largely altruistic and countercyclical with respect to the recipient economy (Frankel, 2011; Bettin et al., 2015). Other studies challenge these results and report that the investment-driven, procyclical tendency may be more prevalent (Lueth and Ruiz-Arranz, 2008; Guiliano and Ruiz-Arranz, 2009). Whereas countercyclical remittances flows can mitigate macroeconomic volatility, procyclical flows have the potential to deepen it (Durdu and Sayan, 2010; Acosta et al., 2009).[2] The behavior of remittances during episodes of elevated macroeconomic volatility, such as current account reversals and financial crises, remains understudied in the literature.

Because of the limited research on the dynamic patterns of remittances, many important questions remain unanswered. This paper examines the behavior of remittances over the

[1] For example, following the 2010 earthquake in Haiti, remittance inflows grew by more than 6 percentage points compared to the previous year, and continued to grow in the subsequent years. Yang and Choi (2007) find that remittance inflows made up for about 60 percent of declines in household income in the Philippines following El Nino rainfall shocks (for other work on the topic, see Yang, 2008; Bettin and Zazzaro, 2018).

[2] A few studies have investigated the ability of remittances to help reduce macroeconomic volatility. These studies vary in country coverage and methodology. Amuedo-Dorantes and Pozo (2011); Craigwell et al. (2010); Bugamelli and Paterno (2011); and Chami et al. (2012) find that remittances are negatively correlated with output growth volatility.

business cycle and their potential to act as a "stabilizer" during periods of high business cycle volatility. Specifically, it addresses three main questions: First, what does theory imply about the behavior of remittances over the business cycle? Second, what is the behavior of remittances over the business cycle and how does that compare with the behavior of other types of inflows, such as FDI, portfolio equity, and ODA? Third, how do remittances fluctuate during sudden stops and financial crises?

Our analysis adds to the literature in several ways: First, it documents a number of stylized facts about the cyclical behavior of remittances. More specifically, it examines the cyclical features of remittances for a widely inclusive set of 109 countries for the period 1980–2015. It also provides a comparison of different methodologies used in the literature to analyze the cyclical features of remittances. Second, it investigates the behavior of remittances during episodes of sudden stops and financial crises. Finally, it provides a broad overview of the theoretical literature on the motives to remit and the implications that these motives have for the behavior of remittances over the business cycle.

The main empirical findings are the following: First, remittances are largely acyclical with respect to the recipient country. Second, remittances are less volatile than other types of inflows, including FDI and ODA. At the same time, remittances are *less* procyclical than financial flows, but more procyclical than ODA. Finally, remittances display resilience during sudden stops and financial crises. Whereas capital inflows decline sharply during these episodes, remittances stay stable. These results suggest that remittances can help counterbalance the effects of volatile financial flows.

The rest of the paper is organized as follows. Section 2 provides a broad overview of the theoretical underpinnings of the motives to remit. Section 3 describes the data. Section 4 documents the cyclicality and volatility of remittances. Section 5 analyzes the behavior of remittances during sudden stops and financial crises. Section 6 offers some concluding remarks and suggestions for future work.

2. Cyclical Behavior of Remittances in Theory

In theory, the cyclical properties of remittances are closely related to the motives that drive remittances. At the individual level, these motives have direct implications for the amount, timing, and frequency of remittances. At the aggregate level, they may affect the volume of flows and their variability over the business cycle, in both the remittance-recipient (home) and origin (host) countries. This section briefly discusses the drivers of remittances and their implications for the cyclical features of remittances with respect to the origin and recipient economies. Remittances are driven by either altruistic motives or self-interest. In the former case they usually tend to be countercyclical. In the latter case, they are largely procyclical.

Among motives that drive remittances, the most basic distinction is between altruistic motives and those driven by self-interest. Whereas altruistic motives are not linked to any past contracts or expectations related to personal gain, the self-interest motive implies an exchange in which remittances are a resource belonging to the remitter that is exchanged for goods and services that provide utility to the remitter. A more detailed classification of motives includes *altruism*, *insurance, strategic considerations*, *exchange*, *inheritance*, and *investment* (Rapoport and Docquier, 2006). The relationship between these motives and possible responses of remittances to changes in remittance-recipient (home) country GDP and origin (host) GDP are presented in Table 1. In theory, the first three motives are expected to lead to a countercyclical relationship between remittances and GDP fluctuations in the home country whereas the last three produce a procylical one.

Motives that lead to countercyclical remittances

Altruistic. If the motivations are altruistic, remittances would increase when the receiving economy is in a downturn and vice versa. This would imply a negative relationship between remittances and recipient economy GDP resulting in countercyclicality. Higher GDP in the origin country is likely to increase altruistic remittances.

Insurance. Because of the absence of means to cover risks arising from variability of income and employment in their home countries (such as unemployment insurance), members of a household migrate to another country whose business cycles are not correlated with those of the home country. The migrant and the family members left behind enter into an arrangement whereby the former sends remittances to cope with hard times while the latter pay for costs of migration.[3] The insurance motive leads to countercyclicality since remittances help moderate the impact of an adverse shock in the recipient country.

Strategic considerations. These arise from a view that prospective employers may not be able to initially ascertain the productivity of immigrant workers and consequently pay them according to the average productivity of their migrant community or country group. This circumstance induces higher-productivity migrants to send remittances as "bribes" to lower-productivity potential migrants to encourage them to stay in the home country. In this case, decreased income opportunities at home may increase the propensity of those left behind to migrate, so more remittances may have to be sent to compensate them. This would imply countercyclicality with respect to the recipient country's GDP.

[3] Amuedo-Dorantes and Pozo (2006) find evidence of the opposite arrangement whereby the family provides insurance to the remitter.

Motives that lead to procyclical remittances

Exchange. The exchange motive implies that remittances "purchase" certain services like taking care of property or relatives (elders or children). Improvements in the recipient country's economy could increase the price of services and the returns the recipients could get from activities other than that mandated by the sender. This would lead to procyclicality with regard to the recipient economy.

Inheritance. The migration process is viewed as an arrangement that involves an informal contract whereby the family finances the migrant with the understanding that a future stream of remittances will accrue to them. Potential inheritances act as an enforcement device to ensure that migrants do not renege on their promise or encourage them to send higher amounts in the hope of receiving a favorable share of the bequest (Hoddinot, 1994). In this case higher GDP in the recipient country increases the value of the bequest and prompts more remittances. This would again lead to procyclicality.

Investment. The investment motive implies that families send migrants to increase the family's income. In this case, remittances are a return on the deployment of human capital. The family members then act as agents managing the funds on behalf of the remitter and this becomes similar to the exchange model. If investment is the motive, improved economic circumstances in the recipient country would increase remittances, leading to procyclicality.

The cyclical response to changes in sending-country GDP may be indeterminate in the case of insurance- or investment-driven remittances. If migrants retain income opportunities in a downturn, remittances under both motives may increase. This outcome is more likely if returns on assets in the origin country are lower than in the recipient economy. This would lead to countercyclicality with respect to the sending country's GDP.[4] However, if the migrant loses income opportunities in the origin country because of the downturn, remittances would be procyclical with respect to its GDP.

3. Data

The sample comprises observations primarily from the World Bank's World Development Indicators.[5] The data are unbalanced and cover the period 1980–2015 for 109 countries. Table A1 in Appendix provides a list of all variables used, together with the source for each variable. The dataset includes 27 advanced economies, 28 emerging market

[4] There can also be mixed motives. More complex theoretical formulations encompass merit goods whereby the remittances recipient renders nonmarket services.

[5] For details on the remittances data, including issues related to measurement and underreporting, see Clemens and Mckenzie (2014), Alvarez et al. (2015), and Plaza and Ratha (2017).

economies, and 54 other developing economies. Remittances include personal transfers and compensation of employees, which are both items in the balance of payments framework. A large number of emerging market and developing economies have received substantial inflows of capital as well as remittances during the 2006-2015 period. We examine these countries in a separate country group, namely the Remittance and Capital Flow Intensive countries (RCI group). The RCI group includes countries that have, on average, experienced ratios of remittances to GDP higher than 1 percent during 2006-2015 period *and* either FDI inflows greater than 3.5 percent or equity inflows greater than 1 percent of GDP, on average, during the same period (the cutoffs correspond to median values for the full sample).

Remittances as a share of GDP are comparable to FDI flows and higher than portfolio equity inflows. For developing economies and RCI countries, remittances surpass FDI and ODA flows (Figure 2). Summary statistics are provided in Table 2. In developing economies, remittances, on average, amount to close to 80 percent of reserves, and, in a large number of countries, remittances constitute the single largest source of foreign exchange.[6]

4. Cyclical Features of Remittances

This section examines the question of how remittances behave during business cycle fluctuations and other large macroeconomic shocks. The analysis is carried out in several steps. First, the comovement of remittance inflows with GDP is analyzed using unconditional correlations. Second, remittances' comovement with other types of foreign currency flows is examined, along with how they differ in volatility. Third, the behavior of remittances during sudden stops and financial crises is studied.

When analyzing the time-series properties of variables in macroeconomics, it is common practice to detrend the series by using different types of filters. These filters basically eliminate both the long-term trend and any rapidly varying or irregular movements, leaving behind only the relevant cyclical variation in the time-series under consideration. Cyclicality is defined here as the correlation between the detrended series of GDP and the relevant flow. Each series is decomposed into trend and cyclical components using the Hodrick-Prescott filter for the period 1980–2015. Following Ravn and Uhlig (2002), a smoothing parameter of 6.25 is used for annual data. The robustness of the main findings is checked with the Baxter-King filter, which yields similar results.

[6] For example, remittances as a percentage of GDP are high for Tajikistan (32 percent), the Kyrgyz Republic (33 percent), Nepal (28 percent), Moldova (20 percent), Haiti (29 percent), Honduras (19), El Salvador (20), and many other countries. They are large as a percentage of exports for Tajikistan (467 percent), Nepal (418 percent), and Haiti (229 percent), among others. Remittances as a percentage of reserves are high for Tajikistan (542 percent), Pakistan (191 percent), El Salvador (144 percent), Egypt (108 percent), Honduras (104 percent), and the Kyrgyz Republic (102 percent), among others.

Foreign currency inflows are classified as (1) *procyclical* if the correlation between output and the cyclical component of flows is positive and statistically different from zero; (2) *countercyclical* if it is negative and statistically different from zero; and (3) *acyclical* if the correlation is not statistically different from zero.[7] Remittances are acyclical in approximately 80 percent of countries (Figure 3). Remittances appear to be more procyclical for high-remittances countries and RCI countries (28.6 and 39.7, respectively), suggesting that in several countries in those groups, remittances are more prone to exacerbate business cycle movements in the recipient economy. At the same time, on average, remittances are not correlated with capital inflows.[8]

The median correlation coefficient of remittances with GDP is 0.06, ranging from -0.03 for the group of emerging market economies, to 0.18 for the RCI countries group (Table 3). How do these results compare with other studies that use cross-country data? As mentioned in the introduction, some studies find that remittances are negatively correlated with output fluctuations in the recipient economies (Frankel, 2011; Bettin et al., 2015).[9] In contrast, other studies find that remittances are positively correlated with income in the recipient countries (Giuliano and Ruiz-Arranz, 2009; Sayan, 2006; Cooray and Mallick, 2013). Ruiz and Vargas-Silva (2014) argue that cyclicality of remittances with respect to the receiving economy can be country or corridor specific.

Our findings suggest that remittances are mostly acyclical, with variations across countries.[10] Remittances are not strongly correlated with capital flows either, with the median correlation equal to 0.08. These flows have been found to behave procyclically in emerging markets and developing countries (Kaminsky et al., 2005). Across different groups, remittances are weakly correlated with portfolio equity flows, total inflows, ODA, and net exports. Overall, remittances appear to be a more stable (less volatile) source of external resources than financial inflows, including ODA.[11]

[7] This approach is quite standard in the business cycle literature (Kydland and Prescott, 1990; Pallage and Robe, 2001).
[8] Refer to Table A2 for further details about the cyclicality of remittances and other flow for each country group.
[9] Singh et al. (2011), Combes et al. (2014), Bugamelli and Paterno (2011), and Chami et al., (2012) analyze this issue. These studies differ significantly in the data and methodology they employ. Some focus on single countries or regions. For example, Bettin et al. (2015) study remittances from Italian provinces to developing countries. Studies focusing on earlier time periods are more susceptible to measurement issues in remittances data (Clemens and McKenzie, 2014). With respect to migrants' host countries, Bettin et al. (2012) find that positive shocks to host-country GDP are likely to translate into larger remittances.
[10] This heterogeneity strengthens the argument that the effects of remittances on the macroeconomy should be evaluated in a general equilibrium framework that takes into account country-specific conditions, as in Durdu and Sayan (2010).
[11] The results are broadly similar when volatility is defined as the coefficient of variation (standard deviation of the series over the sample period normalized by the mean of the corresponding flow). These findings are also in line with previous studies in the literature (Constantinescu and Schiff, 2014).

As a further robustness check, the cyclicality of remittances is calculated following different methodologies used in previous work that studies business cycle properties of foreign currency flows. The results are shown in Table 4. Broner et al. (2013) look at the correlations between growth of real GDP and the de-meaned financial flow that is normalized by dividing by trend GDP. The results from this method are similar in magnitude to the previous results of this analysis, confirming the main findings.[12] Another important study, Kaminsky et al. (2005), uses the cyclical component of real GDP and the *nominal* value of capital flows to establish the cyclicality of financial flows. The present paper finds higher correlations for each country group (and a higher percentage of procyclical countries). This outcome is not unexpected, because inherently prices may be correlated with GDP and this method would produce higher correlations.[13]

Chami et al. (2012) calculate the correlations between the cyclical component of real GDP and remittances *divided by GDP*. By construction, the two variables are expected to be negatively correlated. The present exercise finds, on average, low negative correlations, similar to those reported by Chami et al. (2012). This correlation would be interesting if it suggested procyclicality or acyclicality and should be of no surprise if the result is negative (Column 4 of Table 4). A similar argument can be made when using the Pallage and Robe (2001) methodology, in which the authors divide the flow (of aid) by the import price deflator. Our calculations show that import prices are positively correlated with GDP, and by construction, the results would be biased toward negative correlations.

To sum up, capital flows, such as FDI and debt flows, are often procyclical. As such, they can exacerbate output fluctuations and contribute to the volatility of consumption in emerging market and developing economies.[14] Although remittances are not necessarily countercyclical, their acyclicality suggests that they have the potential to at least provide some stability for the balance of payments, and hence for the economy more generally, when capital inflows decline. The next section examines whether these broad trends about the relative stability of remittances are preserved during periods of sharp macroeconomic volatility.

[12] This method is more suitable if the series were to be used in cross-country regressions, which is what Broner et al. (2013) do.

[13] Despite the inherent bias toward a positive correlation, only 38.5 percent of the countries exhibit procyclical behavior of remittances, and in about 55 percent of the sample remittances appear to be acyclical (Column 3 of Table 4).

[14] Kaminsky et al. (2005) also show that capital flows are highly procyclical. Contessi et al. (2013) document that the components of inward capital flows are also procyclical for the group of G7 economies. Islamaj (2014) shows that capital flows may increase the volatility of output by increasing specialization.

5. Behavior of Remittances during Periods of Large Macroeconomic Shocks

The resilience of remittances over the business cycle is one argument for supporting the stabilizing role that they may bring to emerging market and developing economies. However, the cycles in emerging market and developing economies are often exacerbated by sharp capital flow reversals and financial crises. How do remittances behave during these major episodes of macroeconomic and financial volatility?

To answer this question, the behavior of remittances during sudden stops and financial crises is analyzed. A sudden stop, defined as a sharp decline in gross capital inflows, is often associated with increased risk of macroeconomic volatility and financial crises in emerging market and developing economies. The timing of sudden stops can be identified using a variety of methodologies. This exercise follows the methodology of Forbes and Warnock (2012) and identifies a large number of sudden stops over during the period 1990–2015. Table A3 in the Appendix provides a complete list of sudden-stop episodes.

The global financial crisis starting in 2008 saw a plethora of sudden stops in capital inflows. In contrast, remittances showed slight above-trend growth during the financial crisis (Figure 4). The same pattern is observed during previous, less severe and less synchronized crisis episodes, with remittances generally displaying resilience, while capital inflows gyrate. The results are similar for other country groupings, including for emerging markets and RCI economies taken separately (Table 5).

Whereas capital flows, on average, decline about 14.8 percent during the initial year of a sudden stop episode and continue to fall by another 10 percent the following year, remittances tend to increase by 6.6 percent during the first year and another 5.7 percent in the subsequent year. Moreover, remittances are resilient in emerging markets and RCI economies taken separately, even though the decline in capital inflows for these country groups is often sharper than for other groups. During the first year of a sudden stop, capital inflows to emerging markets fall 25.2 percent, on average, whereas remittances increase by 6.8 percent (Table 6).

Remittances also show resilience during financial crises, including banking, currency, and sovereign debt crises. We use the dates of financial crises from the database of Laeven and Valencia (2013. We compare the behavior of remittances with that of other types of capital inflows during crises. Although capital inflows have been feeble, remittances are stable during crises. Compared with two years before a crisis starts, total capital inflows fall, on average, by as much as 65 percent two years after the onset of a currency crises, whereas remittances appear to be 15 percent higher. The difference is even starker for banking crises, with capital inflows falling as much as 83 percent, whereas remittances

increase by 24 percent. For any crisis, two years after the onset remittances increase, on average, by 18 percent compared with two years before the crisis, whereas total inflows fall by as much as 80 percent during the same period (see Tables A4-A5 for details). These results suggest that remittances are quite resilient even during periods of large macroeconomic shocks.

6. Conclusions

We analyze the behavior of remittances over the business cycle and during episodes of large macroeconomic shocks, such as sudden stops and financial crises. The analysis is carried out in three steps. First, the cyclical properties of remittances in theory are reviewed. Our brief review of theory suggests that these properties are closely related to the motives that drive remittances. Remittances are driven by either altruistic motives or self-interest. In the former case they usually tend to be countercyclical. In the latter case, they are largely procyclical.

Second, we analyze the cyclicality of remittances over the business cycle using a large sample of countries for the period 1980–2015. The findings suggest that remittances are relatively stable and acyclical. In contrast, debt flows and FDI are procyclical. Stability and acyclicality imply that remittances have the potential to support activity in the face of economic adversity. This finding is particularly important in emerging market and developing economies, where remittances are used to finance household consumption directly. Third, we study the behavior of remittances during episodes of elevated macroeconomic volatility. Remittances have been stable during these episodes, including sudden stops and financial crises. Remittances are quite resilient even in countries with large remittance inflows.

These results point to multiple avenues for future research. First, there is a considerable degree of heterogeneity in the cyclicality of remittances across countries. Future research could usefully investigate the sources of this heterogeneity and seek to identify the conditions under which remittances help lower macroeconomic volatility. For example, a more structural approach based on the estimation of a model of remittances that account for country-specific characteristics could offer further insights into cross-country variation in the extent of cyclicality. Second, it would be useful to employ a general equilibrium model to have a better grasp of the behavior of remittances and other capital flows in response to different types of shocks. Finally, it is known that macroeconomic stability promotes economic growth. In light of our findings, it would be a fruitful avenue to study the growth benefits of remittances through their positive impact on stability.

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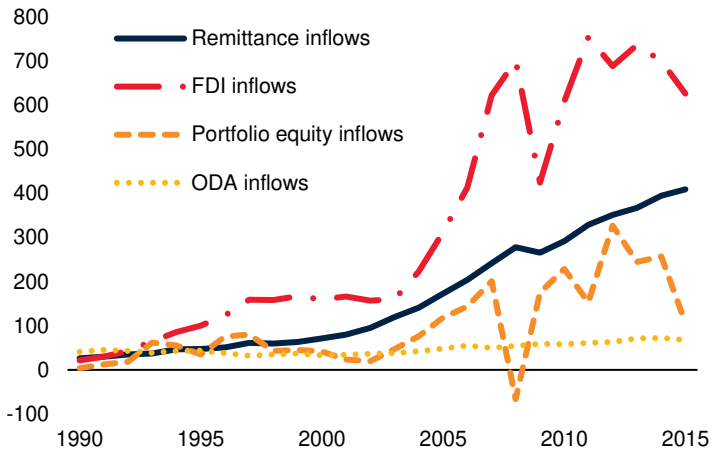
Figure 1. Remittances and Other Flows to Developing Countries

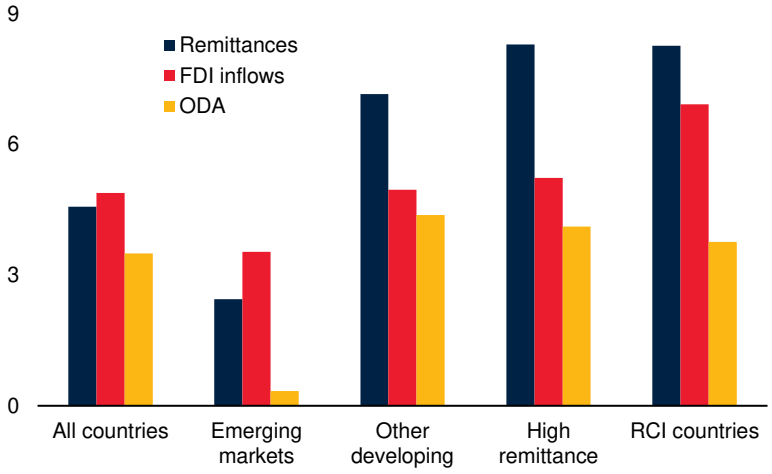
(Billions of current US$)



Sources: Data from World Bank World Development Indicators and IMF Balance of Payments. 1990-2015.
Notes: Remittances are based on IMF Balance of Payments Accounts; FDI = foreign direct investment, net inflows; Portfolio investment = private debt and portfolio equity; ODA = net official development assistance and official aid received.

Figure 2. Remittances and Other Flows across Country Groups

(percent of GDP)

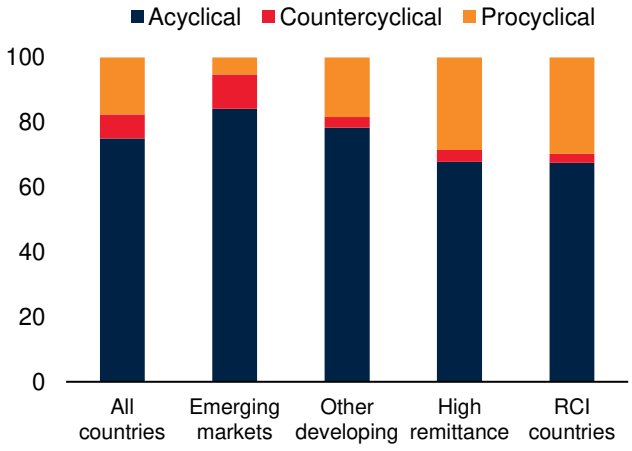


Sources: Data from World Bank World Development Indicators and IMF Balance of Payments.
Notes: "All countries" includes all countries in the sample. "High remittance" refers to a set of countries for which remittances as a percentage of GDP have been greater than the median of the sample (1.6 percent of GDP) during the 2006–15 period. "RCI [Remittance and Capital Flow Intensive] countries" refers to a set of countries for which remittances plus either FDI or equity flows have been greater than the median (1.6 percent of GDP, 3.0 percent of GDP, and 1 percent of GDP, respectively) during the 2006–15 period. FDI = foreign direct investment; ODA = official development assistance and aid. ODA includes data only for EMDE countries. The sample period is 2006–15.

Figure 3. Cyclical Properties of Remittances

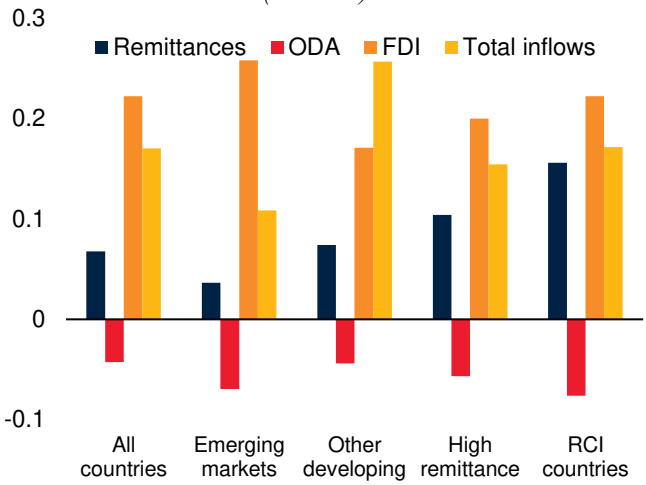
A. Remittances and Business Cycles[a,b]

(fraction of countries)



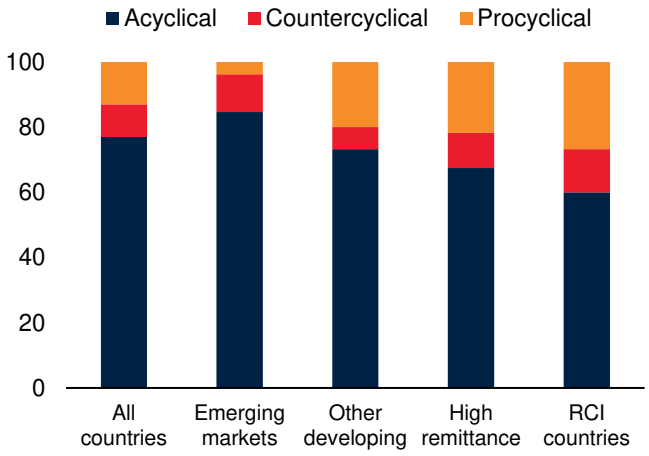
B. Correlation of Remittances with GDP[c]

(Median)



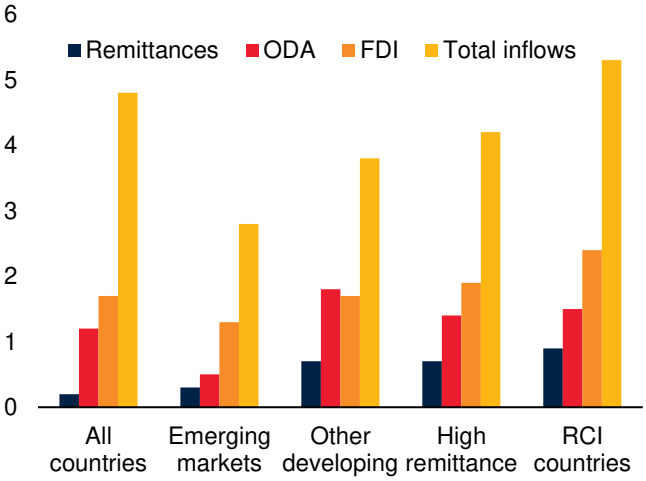
C. Remittances and Capital Inflows

(fraction of countries)



D. Volatility of Inflows

(Mean standard deviation)



Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes:

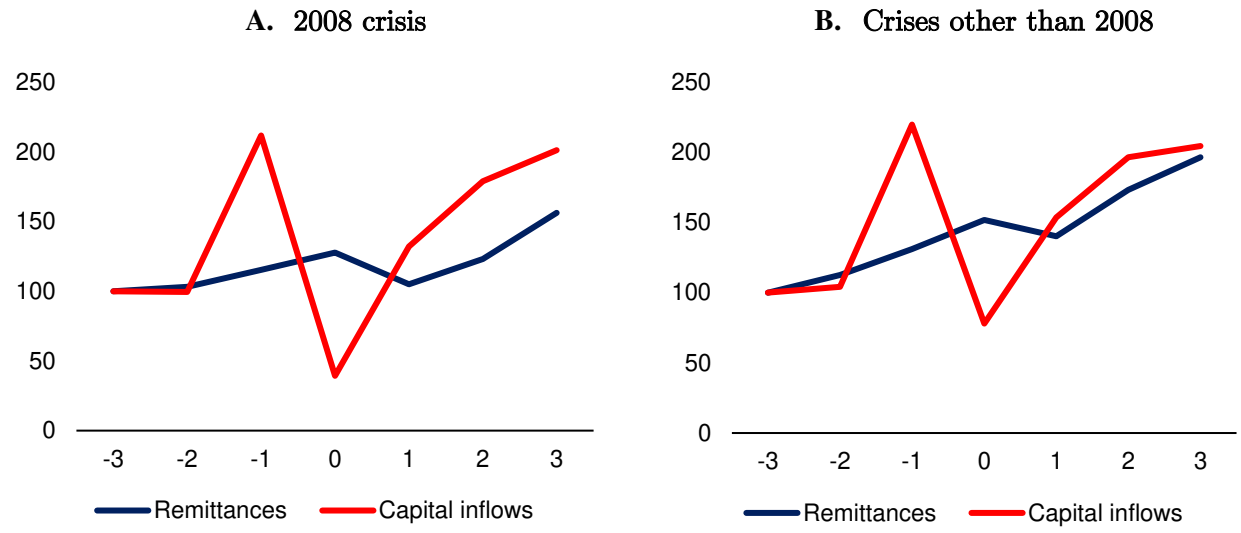
a. Cyclicality is defined as the correlation between the detrended real series of GDP and foreign direct investment (FDI), official development assistance (ODA), and total inflows (the sum of FDI, portfolio investment [including equity and debt], financial derivatives, and other investments). Each series is decomposed into trend and cyclical components using a Hodrick-Prescott (HP) filter and the sample period is 1980–2015. See the note to figure 2 for definitions of the country groupings.

b. Remittances are considered *procyclical* if the correlation between the cyclical components of remittances and output is positive and statistically different from zero, *countercyclical* if it is negative and statistically different from zero, and *acyclical* if the correlation is not statistically different from zero.

c. Volatility is defined as the standard deviation of the detrended ratio of the relevant inflow to GDP.

Figure 4. Remittances and Capital Inflows during Sudden Stops

(Index numbers)



Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: Values are averages of remittances and net capital inflows for emerging market and developing economies that have experienced sudden stop episodes. Index numbers are calculated with a base of 100 for the period three years before the sudden stop year (−3). Capital inflows are net, that is, the difference between the amounts brought in by nonresidents and the amounts sent out by residents. The horizontal axis denotes years. Zero (0) refers to the year of the sudden stop episode.

Table 1. Response of Remittances to GDP Fluctuations in Origin and Recipient Economies

	Altruistic	*Insurance*	*Strategic*	*Exchange*	*Inheritance*	*Investment*
Recipient	(−)	(−)	(−)	(+)	(+)	(+)
Origin	(+)	*Indeterminate*	(+)	(+)	(+)	*Indeterminate*

Note: (−) refers to countercyclical; (+) refers to procyclical. Recipient (Origin) refers to countries that receive (send) remittance flows.

Table 2. Summary Statistics: Remittances, Capital Flows, and Net Exports

A. Full Sample

	Remittances	FDI	Portfolio equity	Total inflows	ODA and aid	Net exports
Mean	3.09	2.93	1.20	7.38	4.68	-4.31
Standard deviation	5.44	5.85	2.17	9.07	6.58	11.93
Observations	3,226	3,453	627	2,021	627	2,668

B. By Country Group

	Remittances	FDI	Portfolio equity	Total inflows	ODA and aid	Net exports
Emerging markets	2.25	2.33	1.15	4.87	0.83	-0.31
Other developing	4.65	2.89	1.27	10.37	6.19	-8.02
High remittance	5.63	3.08	1.23	8.44	5.42	-9.81
RCI countries	5.94	4.24	1.43	9.72	5.50	-10.73

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: The table shows the summary statistics for the ratio of each flow to GDP during 1980–2015. Panel A provides summary statistics for the full sample and panel B reports averages across different country groups. FDI measures foreign direct investment. ODA covers official development assistance and aid, and Total inflows is the sum of FDI, portfolio investment (including equity and debt), financial derivatives, and other investments. See the note to figure 2 for definitions of the country groupings.

Table 3. Correlations with Output and Capital Flows

(Correlation coefficient)

	A. Correlation with output					
	Remittances	FDI	Portfolio equity	Total inflows	ODA and aid	Net exports
All countries	0.06	0.22	-0.03	0.20	-0.06	-0.22
Emerging markets	-0.03	0.28	-0.02	0.15	-0.06	-0.31
Other developing	0.10	0.16	-0.01	0.25	-0.07	-0.15
High remittance	0.15	0.21	-0.02	0.19	-0.06	-0.25
RCI countries	0.18	0.24	0.02	0.21	-0.08	-0.26

	B. Correlation with remittances				
	FDI	Portfolio equity	Total inflows	ODA and aid	Net exports
All countries	0.07	-0.02	0.08	0.07	-0.05
Emerging markets	0.07	-0.03	-0.04	0.11	0.07
Other developing	-0.04	0.18	0.05	-0.10	0.00
High remittance	-0.04	0.09	0.04	-0.14	0.00
RCI countries	0.10	-0.07	0.12	0.03	-0.15

Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: Cyclicality is defined as the correlation between the detrended real series of GDP and the relevant inflow. Panel A provides the median correlation of each flow with GDP for each country grouping while panel B reports their median correlations with remittances. FDI measures foreign direct investment. ODA covers official development assistance and aid, and Total inflows is the sum of FDI, portfolio investment (including equity and debt), financial derivatives, and other investments. Each time series is decomposed into trend and cyclical components using a Hodrick-Prescott (HP) filter and the sample period is 1980–2015. See the note to figure 2 for definitions of the country groupings.

Table 4. Cyclicality of Remittances by Different Methodologies

	This study	Broner et al. 2013	Kaminsky, Reinhart, and Végh. 2005	Chami et al. 2012	Pallage and Robe 2001
	A. Median Correlation of Remittances with GDP				
All Countries	0.06	0.05	0.17	-0.07	0.10
Emerging markets	-0.03	0.06	0.14	-0.12	0.29
Other developing	0.10	0.05	0.21	-0.04	0.12
High remittance	0.15	0.08	0.27	-0.01	0.04
RCI countries	0.18	0.10	0.33	0.02	0.02
	B. Fraction of countries with countercyclical remittances				
All countries	7.4	2.6	5.6	18.5	27.8
Emerging markets	10.5	1.4	10.5	21.1	10.5
Other developing	3.3	5.2	3.3	13.3	25.0
High remittance	3.6	4.0	5.4	14.3	35.7
RCI countries	2.7	3.7	2.7	10.8	40.5
	C. Fraction of countries with procyclical remittances				
All countries	17.6	3.7	31.5	6.5	38.9
Emerging markets	5.3	5.3	31.6	0.0	47.4
Other developing	18.3	3.3	35.0	8.3	41.7
High remittance	28.6	7.1	46.4	10.7	35.7
RCI countries	29.7	10.8	56.8	16.2	35.1

Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: Remittances are considered *procyclical* if the correlation between the cyclical components of remittances and output is positive and statistically different from zero, *countercyclical* if it is negative and statistically different from zero, and *acyclical* if the correlation is not statistically different from zero. Median correlation, percent countercyclical, and percent procyclical are provided for each country grouping in Panels A, B, and C, respectively. Each time series is decomposed into trend and cyclical components using a Hodrick-Prescott (HP) filter and the sample period is 1980–2015. Remittances and GDP are in U.S. dollars and deflated by home GDP deflator in column (1). Column (2) uses the normalization method by Broner et al. (2013). Remittances are first normalized by trend GDP and then standardized by de-meaning at the country level and division by its standard deviation. Column (3) reports the correlation between the cyclical components of real GDP and nominal remittances (Kaminsky, Reinhart, and Végh 2005). Columns (4) and (5) use the methodologies by Chami et al. (2012) and Pallage and Robe (2001), respectively. The correlations are between the cyclical components of real GDP and the ratio of remittances to GDP in the former and between GDP and remittances both divided by an import price deflator in the latter. See the note to Figure 2 for definitions of the country groupings. Panel A – Correlation coefficient; Panels B and C – fraction of countries.

Table 5. Remittances and Capital Inflows during Sudden Stops

(Index numbers)

Timeline	*All countries*		*Emerging markets*		*Other developing*		*RCI*		*High remittance*	
	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows
-2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
-1	111.7	135.4	118.0	219.3	117.2	201.6	119.6	175.2	116.0	168.1
0	120.9	90.3	131.7	56.6	125.8	128.0	133.7	106.9	125.4	108.8
1	126.2	84.3	136.5	165.3	117.0	66.2	127.2	70.2	123.1	71.5
2	142.7	126.6	160.0	207.1	129.9	99.1	135.9	108.9	136.4	108.6

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: The timeline is indicated in the first column: −2 indicates value two years before the sudden stop, −1 a year before, 0 is the year of the sudden stop, 1 is a year after the sudden stop, and 2 is two years after the sudden stop. Values are averages of remittances and net capital inflows for emerging markets and developing economies that have experienced sudden stop episodes. Index numbers are calculated with a base of 100 for the period two years before the sudden stop year (−2). Capital inflows are net, that is, the difference between amounts brought in by foreign entities and the amounts sent out by domestic entities. Data are for episodes after 1990. See the note to figure 2 for definitions of the country groupings.

Table 6. Growth Rates of Remittances and Capital Inflows during Sudden Stops

(percent growth)

Timeline	*All countries*		*Emerging markets*		*Other developing*		*RCI*		*High remittance*	
	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows
-2	11.4	7.8	11.7	−3.2	13.2	14.4	12.5	10.0	15.6	11.8
-1	11.7	11.9	17.0	26.0	12.6	16.2	11.2	20.7	14.4	17.6
0	6.6	−14.8	6.8	−25.2	10.6	−25.1	8.7	−25.9	8.5	−21.5
1	5.7	−10.0	7.5	−10.7	7.2	−16.3	2.2	−6.7	4.6	−12.4
2	7.6	−8.5	10.6	−2.0	−0.1	−2.5	5.4	6.0	9.1	−2.0

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: The timeline is indicated in the first column: −2 indicates value two years before the sudden stop, −1 a year before, 0 is the year of the sudden stop, 1 is a year after the sudden stop and 2 is two years after the sudden stop. Values are averages of growth rates of nominal remittances and net capital inflows across relevant country groups. Capital inflows are net, that is the difference between amounts brought in by foreign entities and the amounts sent out by domestic entities. Data are for episodes after 1990. See the note to figure 2 for definitions of the country groupings.

Appendix: Database, List of Sudden Stops and Additional Results

Table A1. Database

Variable	Source	Frequency
GDP (constant 2010 US$)	WDI	Annual
GDP (current US$)	WDI	Annual
GDP deflator	WDI	Annual
Official development assistance and aid (current US$)	WDI	Annual
Net exports (current US$)	WDI	Annual
Remittances* (current US$)	WDI	Annual
Total capital inflows** (current US$)	BPM6	Annual, Quarterly
Portfolio equity** (current US$)	BPM6	Annual, Quarterly

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: WDI is the World Bank's World Development Indicators data set. Variables in current U.S. dollars are divided by a home-GDP deflator to obtain them in real terms wherever needed.
* Remittances include the sum of personal transfers and compensation of employees.
** FDI measures foreign direct investment and total inflows is the sum of FDI, portfolio investment (including equity and debt), financial derivatives, and other investments. These measures are in net (new investment inflows less disinvestment) in the reporting economy from foreign investors.

Table A2. Cyclicality of Remittances, Capital Flows, and Net Exports

		Remittances	FDI	Portfolio equity	Total inflows	ODA and aid	Net exports
All countries	% Countercyclical	7.4	1.9	11.1	1.9	10.2	46.3
	% Procyclical	17.6	38.9	8.3	10.2	3.7	7.4
	Observations	109	84	65	83	89	109
Emerging markets	% Countercyclical	10.5	0.0	10.5	5.3	10.5	52.6
	% Procyclical	5.3	47.4	5.3	15.8	5.3	0.0
	Observations	28	27	24	26	28	28
Other developing	% Countercyclical	3.3	1.7	10.0	1.7	13.3	36.7
	% Procyclical	18.3	30.0	13.3	13.3	3.3	8.3
	Observations	54	30	14	30	54	54
High remittance	% Countercyclical	3.6	0.0	8.9	3.6	8.9	44.6
	% Procyclical	28.6	35.7	8.9	14.3	3.6	3.6
	Observations	60	47	31	46	58	60
RCI countries	% Countercyclical	2.7	0.0	2.7	2.7	8.1	43.2
	% Procyclical	29.7	35.1	10.8	16.2	0.0	2.7
	Observations	35	31	21	30	33	35

Sources: World Bank's World Development Indicators and IMF Balance of Payments.

Notes: Cyclicality is defined as the correlation between the detrended real series of GDP and the relevant inflow. A series is considered *procyclical* if the correlation between the cyclical components of the flow and output is positive and statistically different from zero, *countercyclical* if it is negative and statistically different from zero, and *acyclical* if the correlation is not statistically different from zero. Total number of countries, percent procyclical, and percent countercyclical are provided for each country grouping. FDI measures foreign direct investment. ODA covers official development assistance and aid, and Total inflows is the sum of FDI, portfolio investment (including equity and debt), financial derivatives, and other investments. Each time series is decomposed into trend and cyclical components using a Hodrick-Prescott (HP) filter and the sample period is 1980–2015. See the note to figure 2 for definitions of the country groupings.

Table A3. List of Sudden Stop Events

Country	Year	Country	Year
Albania*	1997, 2009, 2012	Lao P.D.R.	1997, 2008
Argentina	1998, 2001	Latvia*	1998, 2008
Armenia*	1996, 1999, 2001, 2010, 2012	Lebanon*	2004, 2010
Australia	1991, 1998, 2005, 2008	Lithuania	1999, 2000, 2008
Austria	1997, 1998, 2002, 2006, 2009	Macedonia, FYR*	2002, 2007, 2009, 2010
Bangladesh	1993, 2010	Malaysia	2005, 2008
Belarus	1998, 2003, 2008, 2012	Mexico*	1994, 2008, 2011
Belgium*	2004, 2006, 2008	Moldova*	1998, 2009
Bolivia*	1999, 2006	Mongolia*	2006, 2009, 2013
Bosnia and Herzegovina*	2003, 2008	Morocco	2009
Botswana	2007, 2010	Mozambique	2002, 2004, 2006
Brazil	1993, 1995, 1999, 2008	Nepal	1992, 1995, 1998, 2001
Bulgaria*	1994, 2008	Netherlands	1999, 2004, 2008, 2011
Cambodia*	1997, 2000, 2009	New Zealand	1997, 2005, 2008
Canada	1995, 2008	Nicaragua*	1995, 2004
Chile	1993, 1995, 2000, 2008	Norway	1997, 2001, 2005, 2007
China	2001, 2008, 2012	Pakistan	1995, 1997, 2008, 2009, 2010
Cyprus*	2009	Paraguay	2007, 2009
Croatia*	1998, 2004, 2010	Peru*	1992, 1998, 2005, 2008
Czech Republic	1996, 2003, 2006, 2008	Philippines*	1993, 1996, 2004
Denmark	1994, 2001, 2008, 2011	Poland*	2001, 2008
Ecuador	1996, 2008, 2009	Portugal	1992, 2002, 2004, 2008, 2011
El Salvador	2003, 2004, 2009, 2012	Romania	1995, 1998, 1999, 2008
Estonia*	1994, 1998, 2000, 2008	Russian Federation	1996, 1998, 2008
Ethiopia	1993, 2004, 2007, 2012	Slovak Republic*	1998, 1999, 2002, 2003, 2010
Finland	2001, 2003, 2009, 2012	Slovenia	1997, 2001, 2008
France	2001, 2008	South Africa	1998, 2000, 2008
Georgia*	1999, 2009	Spain	1992, 1994, 2001, 2008
Germany	1994, 2000, 2008	Sri Lanka	1994, 1995, 1998, 2008
Greece	1992, 1995, 1997, 2006, 2009, 2010	Sweden	1997, 2001, 2008
Guatemala	1995, 2008	Switzerland	2001, 2008
Haiti	2007, 2009	Tajikistan*	2008
Hungary*	1992, 1994, 1996, 2000, 2002, 2009	Thailand	1992, 1996, 2007, 2008, 2011
India*	1992, 2008	Tunisia*	2012
Indonesia	1997, 2006	Turkey	1994, 1999, 2001, 2007, 2008
Ireland	1994, 2001, 2008	Ukraine*	1998, 2008
Israel	1996, 1998, 2001, 2007, 2011	United Kingdom	2001, 2006, 2008
Italy	1992, 1999, 2000, 2007	United States	1998, 2001, 2008
Japan	1992, 1996, 1998, 2005, 2008	Uruguay	2002
Jordan*	1992, 2001, 2003, 2007	Venezuela, RB	2006, 2008, 2012
Kazakhstan	1998, 2000, 2007	Vietnam*	2008
Korea, Rep.	1997, 2008	Zimbabwe	1993
Kyrgyz Republic*	1997, 2008, 2010		

Sources: IMF Balance of Payments.

Notes: Sudden stops are defined following Forbes and Warnock (2012). See section 4 for details. RCI [Remittance and Capital Flow Intensive] countries are denoted by "*". In addition, RCI include Dominican Republic, Egypt, Ghana, Honduras, Madagascar, Mali, and Niger, which have not had a sudden stop episode during the sample period.

Table A4. Remittances and Capital Inflows during Currency Crises

(Index numbers)

Timeline	*All countries*		*Emerging markets*		*Other developing*		*RCI*		*High remittance*	
	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows
-2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
-1	103.2	95.5	110.5	112.3	104.2	96.7	116.4	182.0	117.4	132.9
0	115.8	43.1	163.3	41.3	101.6	85.8	120.6	57.9	125.1	67.2
1	105.7	32.4	140.4	32.3	100.9	52.9	104.5	17.5	116.3	42.1
2	114.6	34.4	159.0	44.6	109.9	15.0	89.1	14.6	109.4	27.3

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: Crises are based on Laeven and Valencia (2013). The timeline is indicated in the first column: −2 indicates value two years before the crisis, −1 a year before, 0 is the year of the crisis, 1 is a year after the crisis and 2 is two years after the crisis. Values are averages of remittances and net capital inflows for emerging markets and developing economies that have experienced sudden stop episodes. Index numbers are calculated with a base of 100 for the period two years before the sudden stop year (−2). Capital inflows are net, that is the difference between amounts brought in by foreign entities and the amounts sent out by domestic entities. Data are for episodes after 1990. See the note to figure 2 for definitions of the country groupings.

Table A5. Remittances and Capital Inflows during Banking Crises

(Index numbers)

Timeline	*All countries*		*Emerging markets*		*Other developing*		*RCI*		*High remittance*	
	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows	Remit	Inflows
-2	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
-1	116.0	128.0	118.8	236.0	141.7	190.1	115.4	104.9	114.7	105.6
0	120.1	72.5	114.6	−97.2	169.7	144.0	119.2	113.6	118.7	86.9
1	116.1	97.7	120.8	5.1	157.2	−1.6	106.4	41.1	112.3	35.0
2	123.9	16.7	132.1	−4.2	173.1	90.4	106.2	52.2	115.0	33.1

Sources: World Bank's World Development Indicators and IMF Balance of Payments.
Notes: Crises are based on Laeven and Valencia (2013). The timeline is indicated in the first column: −2 indicates value two years before the crisis, −1 a year before, 0 is the year of the crisis, 1 is a year after the crisis and 2 is two years after the crisis. Values are averages of remittances and net capital inflows for emerging markets and developing economies that have experienced sudden stop episodes. Index numbers are calculated with a base of 100 for the period two years before the sudden stop year (−2). Capital inflows are net, that is the difference between amounts brought in by foreign entities and the amounts sent out by domestic entities. Data are for episodes after 1990. See the note to figure 2 for definitions of the country groupings.