WP/16/44

IMF Working Paper

Institute for Capacity Development

What's Different about Monetary Policy Transmission in Remittance-Dependent Countries?

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March 2016

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Abstract

Despite welfare and poverty-reducing benefits for recipient households, remittance inflows have been shown to entail macroeconomic challenges; producing Dutch Disease-type effects through their upward (appreciation) pressure on real exchange rates, reducing the quality of institutions, delaying fiscal adjustment, and ultimately having an indeterminate effect on long-run growth. The paper explores an additional challenge, for monetary policy. Although they expand bank balance sheets, providing a stable flow of interest-insensitive funding, remittances tend to increase banks' holdings of liquid assets. This both reduces the need for an interbank market and severs the link between the policy rate and banks' marginal costs of funds, thus shutting down a major transmission channel. We develop a stylized model based on asymmetric information and a lack of transparent borrowers and undertake econometric analysis providing evidence that increased remittance inflows are associated with a weaker transmission. As independent monetary policy becomes impaired, this result is consistent with earlier findings that recipient countries tend to favor fixed exchange rate regimes.

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I. INTRODUCTION

International inflows of workers' remittances have become a permanent, stable, and increasingly influential feature of many developing and emerging economies. Worldwide, official measures of these flows have grown rapidly, from negligible amounts in 1980 to approximately US $583 billion in 2014 (World Bank Migration and Development Brief, 24, 2015). The average workers' remittances-GDP ratio for all developing countries over the period 1980-2012 is 1.29%, compared to 1.95% for foreign direct investment, 1.68% for other private capital flows, and 0.80 for official transfers. Workers' remittances exceeded 1% of GDP (on average) for over 74 countries during this period, and 7 of these countries had average workers' remittances-GDP ratios of 15% or higher. In fact, in some countries remittances dwarf other external flows. For example, Jordan was the fifth-largest recipient of remittances over 1980-2014. In 2000 these flows accounted for about 20 percent of GDP, more than double FDI inflows, about four times the amount of other private capital flows, and more than three times the official transfers received. At the global level, since the late 1990s remittances have surpassed official transfers, and in some years have been comparable to total non-FDI private capital entering developing countries (Figure 1). Furthermore, compared to private capital or official aid flows, they have also proved to be more stable year-to-year, and notably, they suffered a much milder contraction as a result of the Global Financial Crisis (see Table A1).

– Figure 1 –

Given their size and importance for recipient countries, an expanding literature has investigated various aspects of macroeconomic consequences of remittance inflows. As first surveyed in Chami et al. (2008), the literature has uncovered measurable impacts on exchange rates, fiscal policy, on institutions and governance, long-term economic growth and, on monetary policy. On exchange rates, Barajas et al. (2011), Hassan and Holmes (2013), Lartey et al. (2012), and Maklouhf and Mughal (2013) show how persistent inflows of remittances exert upward pressure on the long-run real exchange rate, resulting in Dutch Disease effects related to declining competitiveness of the recipient countries' tradable sectors. Regarding fiscal policy, Abdih et al. (2009) argue that conventional debt sustainability analysis should be modified for recipient countries, as remittances directly alter the tax base, and can indirectly increase seignorage and private savings through their effect on the domestic banking system. Abdih et al. (2012a) focus on the impact of remittances on government revenues, and estimate for several recipient countries the fiscal implications of the cutback in worldwide remittances in 2009 resulting from the global financial crisis. Abdih et al. (2012b) examine the adverse impact that remittances have on the quality of institutions, through two main channels: the expansion in the revenue base distorts government incentives, lowering the costs of appropriating resources for its own purposes, and the supplemental income provided to households increases their ability to purchase goods that are substitutes for government services.

Several studies have investigated whether remittances, by increasing the amount of funds available to the population of recipient countries, have contributed positively to long-run economic growth. Barajas et al. (2009) employ an instrumental variable approach to account for possible reverse causality—using the worldwide trend in remittances as an instrument for country-level remittances—and find no evidence of a positive effect for a sample of 67 countries over 1991-2005. Ahamada and Dramane (2013) focus on 20 countries of Sub-Saharan Africa

during 1980-2007, and also fail to find significant Granger-causality running from remittances to economic growth, partly due to a lack of effect on private investment. Clemens and McKenzie (2014) investigate the failure to detect a generalized positive contribution of remittances to growth in the literature, and attribute it to three main factors: measurement error, lack of power of conventional panel regressions, and the offsetting effect of outward migration, whereby an increase in remittances—which might have a positive growth impact on its own—is often linked to a migration outflow, which has a negative growth effect. On the positive side, Benmamoun and Lehnert (2013) apply a panel GMM methodology for a sample of low-income countries during 1990-2006 and find that remittances do contribute positively to growth in these countries, and more so than either FDI or ODA flows. Ramirez (2013) uses a Fully-Modified OLS technique on a sample of Latin American and Caribbean countries over 1990-2007, and finds a positive impact of remittances, greater for the lower-income countries in the region. Furthermore, by interacting remittances with institutional and financial sector variables, he finds a stronger growth impact in countries with higher-quality institutions and lower levels of financial sector development. This last result is consistent with an earlier finding by Giuliano and Ruiz-Arranz (2009) on a wider country sample, both studies implying that in financially underdeveloped countries remittances may serve to relax financing constraints.

Thus, one main theme that arises from this literature is that, notwithstanding the welfare benefits that might accrue to the individual recipient households, remittance inflows pose challenges for macroeconomic policymaking, exerting upward pressure on the real exchange rate, contributing to weakening the institutions surrounding fiscal policy, all the while having doubtful effects on long-term growth.

The monetary policy angle has been explored in some studies, but these have relied largely on certain assumptions that do not necessarily apply to most recipient countries. Chami et al (2007) use a DSGE framework to derive an optimal monetary policy rule for a recipient country; given that remittances tend to produce a more volatile business cycle and increase output and labor market risk. The optimal policy deviates from the Friedman rule, highlighting the need for independent government policy instruments. Vacaflores (2012) incorporates a negative effect of remittances on labor supply to show how remittances could offset the gains from a positive monetary policy impulse. Mandelman (2013) develops and estimates a general equilibrium model for a small open economy with volatile remittance inflows and considers the properties and welfare implications of different monetary and exchange rate regimes. However, these studies presume a well-functioning financial system and an operable transmission mechanism linking changes in the policy rate to lending behavior by financial intermediaries. This paper focuses on whether this assumption is likely to hold in a typical remittance-recipient country. To the extent that monetary transmission might be weakened by the presence of remittances, policymakers may also have an additional challenge at hand, namely the ability to conduct independent monetary policy via an interest rate instrument.

Indeed, there is growing evidence that monetary policy transmission is substantially weaker in low-income and emerging markets. Monetary transmission can work through several channels: the interest rate channel, exchange rate channel, asset price channel and two credit channels, namely the bank lending channel and the balance sheet channel. Mishra et al. (2012, 2013, 2014) argue that most of these channels should be weak or even nonexistent in low income countries

due to financial sector underdevelopment: lack of domestic securities markets weaken the interest rate channel; imperfect integration with international financial markets and highly managed exchange rates weakens the exchange rate channel; and underdeveloped assets markets weaken both the asset price and balance sheet channels. The conclusion therefore is that the bank lending channel should be the most important in transmitting monetary policy to changes in domestic activity in these countries.

However, even this channel may not be fully operable in many low income and emerging countries. Mishra et al (2012) and Agur (2015) go on to stress the importance of factors such as lack of banking competition, low quality of institutions, underdevelopment of financial and specifically interbank markets, and asymmetric information as contributing to the ineffectiveness of the bank lending channel as well. This in turn has serious implications for the ability of these countries to maintain an effective and credible monetary policy.

Furthermore, many of the countries experiencing challenges to their monetary policy are also remittance-recipient countries. The natural question that then arises is whether these inflows also play a role, through a possible impact on factors identified above as weakening the transmission mechanism. We show that remittances have two main impacts on the banking system, each with opposing effects on monetary transmission. On the one hand, they expand bank balance sheets by providing a stable and largely interest-rate insensitive source of funds on the liability side. Thus, by enhancing financial intermediation, remittances would contribute to a strengthened monetary transmission. However, due to asymmetric information, weak institutional and regulatory environments, and a lack of transparent borrowers—characteristics common to low-income and emerging countries—the increase in liabilities is not matched one-for-one with an increase in private sector credit, and banks will tend to hold larger shares of liquid assets as well as government securities. As a result, the interbank market fails to develop and banks' marginal cost of funds becomes de-linked from movements in the policy rate, ultimately weakening monetary transmission. It is this second effect which dominates; our empirical analysis confirms that, as remittances increase, the transmission of changes in the policy rate to that on domestic credit becomes weaker.

This paper, to our knowledge, is a first such attempt at shedding light on this issue, first providing a theoretical framework and then compelling empirical evidence that remittance inflows contribute to weakening monetary policy transmission. As we discuss later in this paper, this finding has important implications for designing an appropriate macroeconomic policy framework for the remittance-recipient countries as they strive to better integrate into the global economy. In particular, our results provide an explanation for the Singer (2010) finding that remittance recipient countries tend to have a preference for fixed exchange rate regimes.

The rest of the paper is organized as follows. In Section II we show some stylized facts regarding remittances and bank balance sheets; in Section III we develop a model characterizing monetary policy in a typical remittance-recipient country; in Section IV we present our main results from panel fixed effects regressions; in Section V we describe our results from an alternative empirical approach, based on previously estimated impulse-responses; and in Section VI we conclude.

II. STYLIZED FACTS: BANK BALANCE SHEETS IN REMITTANCE-RECIPIENT COUNTRIES

In conducting its monetary policy, a central bank usually has an employment or price stability target. To affect this target, the central bank controls an intermediate target such as the interbank interest rate or the monetary base. In our analysis, we focus on the first step in the central banks' objective, namely how well monetary transmission works to influence financial market targets. We also focus on the bank lending channel, which is the most likely to be operable in low-income and emerging countries.

The bank lending channel focuses on the supply of bank loans and how this supply is affected by monetary policy (Bernanke and Gertler 1995). Bank assets, in particular bank credit to small firms and households, play an important role in financial markets because credit market frictions (e.g. due to asymmetric information and costly enforcement of contracts, see Mishkin (1995)) make small firms and households heavily dependent on banks for the financing of investment and working capital. For some banks, especially small ones, deposits represent the biggest source of loanable funds, while larger banks can rely on different forms of raising funds, but at a cost. Contractionary monetary policy which would reduce the availability or increase cost of funds would thus lead to a reduction in the supply of bank lending as banks pass on increases in their marginal costs to borrowers. An operable transmission mechanism via the bank lending channel would then imply that changes in the central bank's policy rate are transmitted to bank lending rates:

$$i_P \uparrow \rightarrow i_L \uparrow$$

with i_P the policy rate and i_L the bank lending rate. This transmission mechanism can be broken down into two steps: (i) policy rate changes affect banks' balance sheets and therefore their marginal cost of funds; and (ii) banks' marginal cost of funds are passed on to borrowers.

Mishra et al. (2012) argue that the strength of the bank lending channel depends critically on banking sector characteristics and the institutional environment: (i) competition in the banking sector such that banks will pass on changes in their cost of funds to borrowers; (ii) a strong institutional environment, which ensures e.g. the protection of loan contracts to allow financial intermediation to take place through formal financial markets; and (iii) the existence of a direct link between policy rates and banks' marginal cost of funds. Often, interbank markets play a key role in this regard. On the other hand, countries in which banks hold large amounts of liquid assets tend to lack active interbank markets, therefore efforts by the central bank to influence marginal cost of funds through the interbank market will not be effective.[2] To the extent that low-income countries face challenges in these three areas, Mishra et al. (2012) show that monetary transmission is therefore adversely affected.

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[2] This finding, however, merely implies that whatever characteristics induce banks to hold more liquid assets also tend to weaken the bank lending channel.

In this section, we show stylized facts illustrating how remittance inflows affect bank behavior and balance sheets, with implications for monetary transmission via the bank lending channel.[3] Remittances can affect the bank lending channel in different ways. First, they can influence the characteristics identified above as affecting the transmission mechanism: banking sector development and competitiveness, the institutional environment, and bank holdings of liquid assets. Regarding the latter, there are two opposing effects. On the one hand, severe asymmetric information problems and a weak institutional environment could cause reluctance in banks to expand credit beyond a small pool of highly transparent corporate clients. Thus, remittances would expand the liability side of the balance sheet, but banks would not expand credit to the same degree, and would therefore accumulate liquid assets. On the other hand, to the extent that remittances provide stable and longer-term funding, banks might be more willing to expand credit, as the maturity mismatch on their balance sheet is lessened. Finally, remittances might weaken monetary transmission by providing a substitute for bank loans on the demand side. Households and small firms receiving the inflows would be less financially constrained and therefore their spending decisions become de-linked from the supply of bank credit.

In this section we compare the size and composition of bank balance sheets and measures of competitiveness between remittance recipients and their emerging and developing non-recipient counterparts, as well as across different levels of remittance inflows. To minimize the impact of the 2008 global financial crisis on our comparisons, we consider the ten years before the crisis, i.e. the time period 1997-2007. We split up our country sample into groups of countries depending on their average remittances-to-GDP ratio during 1990-2013 if at least five years of data have been reported.

A. Bank Balance Sheets: Size

First, we consider different measures for the size of bank balance sheets as shown in Table 1. We find that banks in countries with higher remittances-to-GDP ratios have an on average higher ratio of total deposits to GDP than countries with lower ratios. On the asset side, banks in high remittances-to-GDP countries mostly have lower ratios of total credit to GDP than in countries with low or no remittances. The same holds for total assets to GDP. Overall, banks in remittance recipient countries seem to have more liabilities on their balance sheets, but relatively less assets compared non- and particularly low remittance recipient countries.

– Table 1 –

B. Bank Balance Sheets: Liabilities

We distinguish between short-term demand deposits and long-term time, saving and foreign currency deposits in Table 2. Across all countries, we find that about one-third of deposits are short-term and two-thirds are long-term, shares that are approximately the same for emerging and developing countries. We find that countries with higher remittances-to-GDP ratios tend to

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[3] Data only comprises official remittances inflows. However, informal remittances flows, particularly those that do not pass directly through the banking system, can also impact bank balance sheets as long as a portion of them requires the banking system for conducting transactions.

hold less short-term deposits, particularly for countries with an average remittances-to-GDP ratio of over 5 percent, where the share of short-term deposits falls to less than 25 percent. The means difference between "substantial remittance recipients" (remittances-GDP of at least 0.5 percent) and the rest of the world is statistically significant.

– Table 2 –

Given that remittance inflows are correlated with financial depth, it is possible that the cross-country differences described above are simply driven by financial development; that is, households in more financially developed countries would naturally hold a higher proportion of longer-term deposits. To address this issue, in Table 3 we also split up the sample into quartiles of financial development as measured by the average ratio of private credit to GDP.[4] While the ratio of short-term to long-term deposits certainly decreases with higher financial depth, the above findings still hold: banks in countries with higher remittances-to-GDP ratios have, on average, higher long-term deposit ratios, across all levels of financial development. Again, the difference between substantial remittance recipients and other countries is statistically significant. Thus, it seems that while part of remittances inflows – which are often sent in lumpy transfers due to transaction costs – may be consumed or invested right away, a considerable portion is deposited for a longer term or in foreign currency-denominated bank accounts.

– Table 3 –

C.   Bank Balance Sheets: Composition of Assets

We consider the composition of the asset side of bank balance sheets in Table 4. We find that, on average, banks in countries with higher remittances-to-GDP ratios have a higher ratio of liquid assets to total assets and a slightly higher ratio of credit to government to total assets. The same holds for reserves to total assets. The latter, however, could be due to different reserve ratio requirements among countries. To calculate excess reserves – i.e. those in excess of requirements – we provide a rough estimate of reserve requirements by relying on the average reserve ratios from the IMF survey of central banks and loosely following Saxegaard (2006). Thus, we measure excess reserves as the difference between actual and required reserves (total deposits times the required reserve ratio). Again, for excess reserves to total assets, we find higher ratios for banks in countries with higher remittances-to-GDP ratios. Most results turn out to be statistically significant. To summarize, banks in countries with higher remittances-to-GDP ratios have more liquid assets, more reserves—excess reserves in particular—and provide slightly more lending to government.

– Table 4 –

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[4] There are studies examining the effect of remittances on financial development. The positive effect of remittance inflows on financial deepening is confirmed by Aggarwal et al. (2011) using a large sample of developing countries. Gupta et al. (2009) find similar results for the case of African countries.

D. Bank Balance Sheets: Volatility

We also consider the volatility of different components of bank balance sheet, as shown in Table 5. On the liability side, both total deposits and short-term or long-term deposits are clearly less volatile the higher the remittances-to-GDP ratio in a country. The same holds for the asset side: both total assets and credit to the government reveal lower standard deviations, the higher the remittances-to-GDP ratio. All in all, bank balance sheets in countries that receive large remittances-to-GDP seem to be much more stable than in other countries.

In addition, in Table A2 we show regression results for the determinants of remittances, similar to those in Chami et al. (2008) and Chami et al. (2009). They show quite clearly that remittances are countercyclical (procyclical) with respect to recipient (sending) country income, and are insensitive to interest rate differentials. This helps to explain why bank deposits are more stable in recipient countries (this is another result found in e.g. Chami et al. 2008), and are less sensitive to interest rates compared to other type of private flows (e.g. portfolio flows). Furthermore, the banking sector remains the main recipient of private sector deposits or savings (given the lack of existing alternatives and tepid financial widening given less developed asset markets), and a substantial portion of remittance inflows end up in the banking system.

As discussed earlier, it is also plausible that having relatively stable and long-term deposits could induce banks to *expand* lending to the private sector and to take *more* risks. However, many of the remittance-recipient countries share the same characteristics as those identified above by Prachi et al. (2012) and Agur (2015)—low quality of institutions, high credit risk and opaqueness of borrowers, and informational asymmetry problems—factors which would induce banks to hold more liquid and government securities, as we observed above data. Recall also that Abdih et al. (2012) show that remittance inflows can also lead to a deterioration of institutional quality. To the extent that this weakness is associated with a greater difficulty in enforcing loan contracts and seizing collateral, it would also reinforce banks' reluctance to expand credit. The stylized facts shown above therefore imply that this behavior is what dominates banks' response to remittance inflows, rather than the advantages afforded by having stable and longer-term funding.

– Table 5 –

E. Further Stylized Facts

Another characteristic associated with the strength of monetary transmission is the degree of competitiveness of the banking system. We consider three different measures of bank competitiveness in Table 6: one proxy is *bank concentration*, capturing the assets of the three largest banks in a country as a share of assets of all commercial banks. The second is the *H-statistic*, measuring the elasticity of bank revenues relative to input prices (and thus providing a measure of the degree of competition in the banking market), and the third is the *Lerner index* as a measure of market power defined as the difference between output prices and marginal costs relative to prices. All are drawn from the Global Financial Development Database (GFDD). For all three measures, no clear-cut conclusions can be drawn. There is a tendency for countries with no remittances to exhibit higher competition in their banking sector when we consider our bank

concentration measure, but we find the opposite for the H-statistic; for the Lerner index, we do not find clear differences between our country groups.

– Table 6 –

To complete this picture, we consider some further stylized facts in Table 7. Complementing our finding on higher government lending in remittances receiving countries, we compare the government-balance-to-GDP over our country groups. Both including and excluding oil exporting countries, we clearly find countries with higher remittances-to-GDP ratios tend to have larger government deficits. One potential explanation is that interest-insensitive remittance flows into the banking system make the financing of these deficits easier by banks that are reluctant to expand risky lending in an environment characterized by asymmetric information, low borrower credit worthiness, and low quality of institutions. Another explanation relies on the institutional weakening effect of remittances, whereby governments would be more likely to misbehave and run larger deficits, even as the tax base in expanded directly (Chami et al., 2008 and Abdih et al., 2012b).

Finally, we also consider banks' average net interest margins and net interest rate spreads. Results are not monotonic over different remittances-to-GDP country groups, but there is a tendency for banks in remittances-receiving countries to have higher margins and spreads than those in non-receiving countries. That is possibly the result of relatively low bank competition in remittance recipient countries and/or the result of interest-insensitive remittances which allow banks to profit from these characteristics.

– Table 7 –

F.   Remittances and Bank Balance Sheets

All in all, these stylized facts show that bank balance sheets in remittance-dependent countries are visibly different from those in other countries. Remittances provide stable and interest-insensitive funding for banks, as reflected in more long-term and more stable deposits. Banks hold more liquid assets and excess reserves and, as previous studies showed, they operate in a generally weaker institutional environment. These empirical regularities suggest that the interbank market is likely to be less developed and active, and therefore the lending channel will be impaired. On the other hand, bank competitiveness—another factor determining the strength of monetary transmission—does not seem to be affected in a systematic way by remittances.

Finally, as mentioned earlier, remittances could also weaken the lending channel by reducing credit demand, as a significant share of households find their financing needs satisfied by remittances and no longer need bank loans. However, at the aggregate level, it is very difficult to determine whether supply or demand for bank loans are the binding constraint. Our approach is to identify the supply side, which might be reinforced by demand-side factors as well. In the next section we develop a theoretical model which illustrates how the transmission of changes in the policy rate to the lending rate is weakened by the presence of remittances.

III.   BANKING MODEL WITH REMITTANCES

Mishra et al (2014) develop a simple model of a monopolistically competitive banking sector in an economy characterized by low financial market development and explore the impact of changes in the policy rate on bank's lending behavior. We use their model as a starting point, introduce remittances as *flows* into the banking sector's liabilities, and then trace the impact of the changes in the policy rate on the bank's deposit rate and ultimately on the lending rate.

Consider a bank that manages a portfolio consisting of loans to the private sector (L), government securities (B), and reserves (R), and finances it by issuing deposits (D). The bank's holding of government securities is therefore given by the accounting identity:

$$B = D - L - R \tag{1}$$

To capture the role of imperfect competition in the banking sector, assume that the bank has market power in both the loan and deposit markets, so it faces a downward demand for loans given by:

$$L = L(i_L) \tag{2}$$

and a supply curve for deposits:

$$D = D(i_D, Rem) \tag{3}$$

where i_L and i_D are, respectively, the loan and deposit rates set by the bank, *Rem*, represents remittance *flows* into the bank and are considered part of the bank's *stock* of deposits, D, such that $D = D(i_D, Rem)$ is a function that is continuous and twice differentiable, with $D_1 > 0$, $D_{11} > 0$, $D_2 > 0$, and $D_{12} < 0$. The latter assumption follows from the fact that remittances are interest-rate insensitive (see discussion in section I and II and Table A2), and implies that higher remittances reduce the sensitivity of deposits to changes in the deposit rate. The bank is a price taker in the market for government securities, thus the market interest rate i_B is given.

Markets in many low-income, developing, as well as emerging markets are characterized by acute asymmetric information, and governance and transparency issues which hinder the development of the financial sector, reduce the efficiency of the private sector, and make lending to the private sector a costly activity. This leads banks to prefer related lending and extending loans to well-capitalized enterprises with established reputations, at the expense of small and medium-sized enterprises, which are opaque and viewed as having a higher credit risk. These features are captured here by using a two-tiered cost of lending that is an increasing and convex function on the volume of loans intermediated by banks:

$$c = i_D D + \gamma_0 L \text{ for } L \leq L^*$$

$$= i_D D + \gamma_0 L + \left(\frac{\gamma_1}{2}\right)(L - L^*)^2 \text{ for } L > L^*, \tag{4}$$

where γ_0, $\gamma_1 > 0$ are indicators of the costs of intermediation, and L* denotes the volume of loans that can be extended to large and transparent firms that can offer good collateral, that is, are low credit risk. The idea is that the cost function is nonlinear, becoming progressively steeper as banks expand beyond their traditional and well-established customers. This effect is stronger in countries with weak institutional settings.[5] Finally, banks are subject to a fixed required reserve ratio,

$$R = \rho D. \tag{5}$$

Under these conditions, the individual bank's problem is to set its lending and deposit rates so as to maximize profits, subject to its balance sheet constraint (1) and the required reserve ratio (5):

$$\text{Max } \pi(i_L, i_D) = i_L L(i_L) + i_B B - c$$

$$= i_L L(i_L) + i_B[(1 - \rho)D(i_D, Rem) - L(i_L)] - c$$

subject to (2)-(4) and nonnegativity constraints on each of its balance sheet variables, which we assume not to be binding. The first-order conditions for this problem are given by:

$$L + (i_L - i_B)L' - c' = 0 \tag{6}$$

$$-D(i_D, Rem) + [i_B(1 - \rho)]D_1 - i_D D_1 = 0 \tag{7}$$

Now that the bank's maximization problem has been determined, we investigate the sensitivity of profit-maximizing deposit and lending rates to the rate on government securities, which we are taking as a proxy for the policy rate.

From (7), we have:

$$\frac{\partial i_D^*}{\partial i_B} = -\frac{(1 - \rho)D_1}{-D_1 + [i_B(1 - \rho)]D_{11} - D_1 - i_D D_{11}}$$

$$= -\frac{(1-\rho)D_1}{-2D_1 + [i_B(1-\rho) - i_D]D_{11}} > 0 \tag{8}$$

$$\frac{\partial^2 i_D^*}{\partial i_B \partial Rem} = \frac{-(1 - \rho)D_{12}[-2D_1 + [i_B(1 - \rho) - i_D]D_{11}] + (1 - \rho)D_1 \, \partial Den/\partial Rem}{[Den]^2}$$

Where $Den = -2D_1 + [i_B(1 - \rho) - i_D]D_{11} < 0$.

$$\frac{\partial Den}{\partial Rem} = -2D_{12} > 0.$$

Simplifying and regrouping terms, we have:

$$\frac{\partial^2 i_D^*}{\partial i_B \partial Rem} < 0 \; iff - D_{12}D_{11}[i_B(1-\rho) - i_D] < 0, \qquad (9)$$

which is true since $D_{12} < 0$.

Rewriting (7), we have:

$$i_B = \frac{i_D^* D_1 + D}{[(1-\rho)D_1]},$$

replacing this in (6) yields

$$L + i_L^* L' - \frac{i_D^* D_1 + D}{[(1-\rho)D_1]} L' - \gamma_0 L' - \gamma_1 L'L = 0,$$

which can be rewritten as:

$$i_L^* = -\frac{L}{L'} + \frac{i_D^* D_1 + D}{[(1-\rho)D_1]} + \gamma_0 + \gamma_1 L.$$

To simplify the analysis, assume $L = L_0 e^{-\theta i_L}$, then

$$i_L^* = \frac{1}{\theta} + \frac{i_D^* D_1 + D}{[(1-\rho)D_1]} + \gamma_0 + \gamma_1 L.$$

It is clear that the impact of remittances on the transmission of the policy rate to the lending rate runs through its impact on the bank's cost of funds, that is, the deposit rate, in this case. That is: $\frac{\partial i_L^*}{\partial i_B} = \frac{\partial i_L^*}{\partial i_D^*} \frac{\partial i_D^*}{\partial i_B}$. To see this, start by looking at the impact of deposit rate on the lending rate:

$$\frac{\partial i_L^*}{\partial i_D^*} = \frac{1}{(1-\rho)D_1^2} [2D_1^2 - DD_{11}] > 0,\text{[6]} \text{ then}$$

$$\frac{\partial i_L^*}{\partial i_B} = \frac{\partial i_L^*}{\partial i_D^*} \frac{\partial i_D^*}{\partial i_B} > 0.$$

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[6] This is easy to see if you assume $D = D_0 e^{\omega(i_D + Rem)}$, then $\frac{\partial i_L^*}{\partial i_D^*} = \frac{1}{(1-\rho)} > 0$.

It follows from (9) that
$$\frac{\partial^2 i_L^*}{\partial i_B \partial Rem} < 0.$$

The above result highlights the role of remittances in weakening the transmission of changes in the policy rate on the lending rate. This runs through the mitigating impact of remittance flows on the reaction of the deposit rate to changes in the central bank's policy rate. The next section provides empirical estimates of the magnitude of this effect.

IV. EMPIRICAL EVIDENCE: PANEL FIXED EFFECTS ESTIMATES

The above stylized facts showed that there is a clear association between migrant remittance inflows and the composition of banks' balance sheets in remittance-recipient countries. This association is critical to understanding the interaction between remittances and the effectiveness of monetary policy in these countries. This section empirically tests to what extent the magnitude of remittances affects the strength of the bank lending channel.

In particular, the following empirical analysis considers how well a change in the monetary short term policy rate translates into an intermediate target, here the bank lending rate. We specify a variety of empirical models to assess the robustness of the results. As we will show, the results provide evidence that remittance inflows do reduce the effectiveness of the lending channel.

A. Panel Fixed-effects Specifications

First we start by running panel regressions that try to explain the pass-through of changes in central bank's discount rates to changes in bank lending rates. Following Mishra et al. (2012) we include as interaction variables measures of competitiveness in the banking sector and institutional quality, to which add remittances-to-GDP as well. Also in Mishra et al. (2102), we are looking for "suggestive empirical regularities" rather than precise causalities.

The empirical specification takes the following form:

$$\Delta i_{it}^L = (\theta_1 + \theta_2 R_{it} + \theta_3 C_{it} + \theta_4 Q_{i.}) \Delta i_{it}^p + \theta_5 R_{it} + \theta_6 C_{it} + u_i + \varepsilon_{it} \qquad (10)$$

where Δi_{it}^L is the monthly change in lending rate and Δi_{it}^p the monthly change in the policy rate, all expressed in nominal terms. C_{it} is a dummy for low competitiveness and $Q_{it.}$ a dummy for low institutional quality (constant over time). R_{it} measures the annual remittances-to-GDP ratio, as cross-country monthly remittance-to-GDP data are not available.

One possible issue with this specification is that remittance inflows might be endogenous, responding to changes in domestic interest rates. However, as shown in the literature (cf. e.g. Chami et al. 2008, Chami et al. 2009) and in Table A2, remittances are essentially interest-

insensitive and are also very stable over time. To further ensure that reverse causality has been adequately dealt with, remittances-to-GDP enter as the logarithm of a five year moving average.[7]

B. Data

The first key variable is workers' remittance inflows. We use the category *workers' remittances* from the IMF's Balances of Payments Statistics (BOPS) to measure remittances. This category in the balance of payments comprises current transfers by migrants that are employed residents in their respective host country. Remittances flows therefore refer to regular and unrequited private transfers from residents in one country to another.[8]

Data on different interest rates comes from the IMF IFS.[9] We use the three measures for bank competitiveness discussed in Section II. We measure institutional quality using three different variables: the *corruption perception index* by Transparency International, the *CPIA transparency, accountability, and corruption in the public sector rating*, and *regulatory quality* as measured by the Worldwide Governance Indicators. In the first part of this empirical section, each of these variables is expressed by a dummy that equals one if bank competitiveness or institutional quality respectively are lower than their median and zero otherwise. These different measures yield similar results and below – based on data availability – we only report results based on the Lerner index for bank competitiveness and regulatory quality as an institutional variable.

C. Results

– Table 8 –

Results of the panel regressions are shown in Table 8. Specifications (1) to (5) consider the sample of emerging and developing countries to make these results comparable to the results in Mishra et al. (2012), while specifications (6) to (8) expand the sample to include high-income countries. The first specification shows that across all emerging and developing countries, there is generally an operable bank lending channel; a change in the discount rate by 1 percentage point is linked to a contemporaneous and statistically significant effect on the lending rate, with a point estimate of 0.3 percentage points. Starting with specification (2), remittances are included. Initially, they seem to enhance the lending channel, increasing the response of the lending rate to a change in the policy rate. This effect, however, is reversed once our dummy for low banking

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[7] The five year averages in analyses of monthly data should also reduce concerns that remittances proxy for other factors, such as business cycle swings. Robustness tests with the contemporaneous ratio of remittances-to-GDP and the lagged ratio of remittances-to-GDP provide similar results.

[8] For a discussion of how to correctly measure workers' remittances and which components to include in analyses of remittances, see Chami et al. (2008) and Chami et al. (2009).

[9] As in Mishra, et al (2012, 2014), we use the following sources for interest rates: Lending rate: IFS line 60p, Policy rate: IFS line 60a. The latter is generally defined as a short-term rate at which the central bank lends to commercial banks, and is labeled as a "discount rate".

competitiveness enters the specification. The coefficient on the discount rate drops to around 0.16 with an additional negative effect of remittances-to-GDP of -0.11. This result is relatively stable when adding our dummy for low institutional quality in column (4). In specification (5), we drop observation periods for which the lending rate does not change for at least one year. Again, the results resemble the previous specifications, but the coefficient on the discount rate change is slightly higher, and the interaction term with remittances is slightly lower.[10]

At the bottom of Table 8, we compute thresholds for which the point estimates yield a complete disappearance of the bank lending channel; that is, the level of remittances at which the overall reaction of lending rates to the discount rate is zero. Depending on the specification, we see that a ratio of remittances to GDP of 4-6 percent makes the correlation between discount and lending rates disappear.[11] Note that specification, (5) in which observations with unchanging lending rates are excluded, yields a threshold remittance ratio of 6.4 percent.

Our findings also hold when extending the sample to advanced countries in columns (6) to (8). In specification (7) we also add countries for which we do not have any data on remittances. A lack of data could either signify that these countries do not receive any remittances or that these flows are unrecorded. To approximate the non-recipients, we use data on migration to identify countries with very low emigration and thus little potential to generate remittance flows. Thus, using this criterion we add ten countries as non-recipients.[12] Finally, in specification (8), we again drop observation periods for which the lending rate does not change for at least one year. In both of these specifications, the direct pass-through from discount to lending rate increases slightly and the effect of remittances on that pass-through is smaller.

Furthermore, with the wider country sample the weakening effect of banking sector competitiveness on the bank lending channel becomes statistically significant. We also notice in the larger sample—with the additional non-recipients—that the level of remittances-to-GDP at which we reach the threshold of no sensitivity of lending rates to discount rates is noticeably higher (at 5-7 percent of GDP). Yet, the overall findings continue to hold: higher remittances lead to a weaker link between discount and lending rates, suggesting weaker transmission.[13]

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[10] We also dropped observations with unchanged lending rates for specifications (1) – (3) in Table 8. Results remain very similar.

[11] The thresholds in Table 8 measure the level of log of remittances-to-GDP at which the overall effect from discount rate to lending rate equals zero, given competitiveness and institutional quality. These thresholds in logarithms are converted into percentages of remittance-to-GDP by the natural exponential function.

[12] We use the average emigration rate over 1985, 1990, 1995 and 2000 from the "Panel Data on International Migration, 1975-2000" available through the World Bank. As low emigration we consider an average ratio less than 0.02.

[13] The small R^2 values in Table 8 could be due to the slowly changing nature of our dependent variable. For comparative purposes, Appendix Table A3 presents the results from columns (4) to (7) in Table 8 with the levels rather than changes of the lending and policy rates. Results are qualitatively similar but lead to higher R^2s. Yet as our main interest lies in how changes in one rate transmit to the other rate, our analysis focuses on the results in Table 8.

D. Robustness Checks

One possible criticism of the above analysis is that the estimated effect of remittances on the monetary transmission could merely be picking up the effect of income, given that remittances tend to flow to lower-income countries. Although we control for low competitiveness and institutional quality, factors common to LICs that have been shown to weaken monetary transmission, there may be other relevant characteristics of LICs that are not captured by these two. In order to address this issue, we run two additional sets of regressions, one including an explicit LIC dummy and another controlling for income level. These are shown in Table 9. In the first three columns, the LIC dummy is interacted with the change in the policy rate. The result is that, beyond the effects of poorer institutional quality and banking competitiveness, LICs generally have a weaker transmission mechanism. Focusing on specification (3), where we limit the sample to periods in which the policy rate changed, it appears that, all other factors equal, transmission from policy to lending rates is less than half as strong in LICs in comparison to non-LICs. Similarly, the last three columns of Table 9 show that per capita income is positively associated with the strength of monetary transmission. However, in all cases the findings regarding remittances are unaffected; even after controlling for income, remittance receipts continue to be negatively associated with strength of monetary transmission. Thus, it appears that remittances are not merely proxying for the low income of many recipient countries.

-    Table 9 -

Another possible criticism is that the chosen dependent variable, the lending rate, is particularly noisy and poorly measured in developing countries, which also tend to be remittance recipients. As an alternative, we also run regressions with the deposit rate as the dependent variable, as shown in Table 10.[14] Although it is further removed from the real-sector response expected from monetary policy, the deposit rate may suffer less from measurement and reporting issues in developing countries. We find that the estimated effects of remittances are robust to this specification; countries with higher remittance inflows will have a weaker transmission from policy to deposit rates.

-    Table 10 -

V. EVIDENCE FROM IMPULSES RESPONSES FROM STRUCTURAL PANEL VAR

A. Empirical Specification

As an alternative empirical test, we rely on panel structural VAR estimates by Mishra et al. (2014) of the effects of monetary policy shocks on bank lending rates for a large group of heterogeneous countries. The authors' approach, based on a methodology developed by Pedroni (2013), allows the dynamics of impulse responses to shocks to be different for each country. The methodology is able to identify policy innovations by using long-run restrictions, here, in particular, by relying on the long-run neutrality of money. This way, the authors are able to

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[14] For the deposit rate, we use IFS line 60L.

control for any shock affecting the lending rate other than the policy shocks they are interested in.

Mishra et al. (2014) therefore generate impulse response functions (IRs) for each country in their sample. These IRs measure the dynamic effects of a nominal monetary policy shock (as captured by a shock to the money base) on bank lending rates. In a second stage, they run regressions to explain cross-country variations in their estimated IRs as a function of several explanatory variables. We follow this approach, using as the dependent variable their original IRs estimated over the period 1978-2013 and, crucially, including remittances as an additional explanatory variable.

Effective transmission implies a strong negative reaction of the lending rate to changes in the monetary base. To make the results comparable to our findings in the panel regressions of the previous section, we switch the signs of the Mishra, et al (2014) estimated IRs such that a more effective bank lending channel is now reflected by a more positive impulse response coefficient. We estimate the following cross-sectional specification to account for the effect of remittances on the effectiveness of the monetary policy transmission channel estimated from structural panel VAR:

$$IR_i^j = \beta_1^j R_i + \beta_2^j Q_i + \beta_3^j FD_i + \beta_4^j CAP_i + \beta_5^j C_i + \beta_6^j FI_i + \varepsilon_i{}^j \qquad (11)$$

where IR are the estimated impulse responses for each country i, and for up to four quarters ahead ($j = 1, \dots 4$) or alternatively, $j = average, \ max$ over the following four quarters.

B. Data

The logarithm of the remittances to GDP ratio R_i is the average value for each country during the time period 1997-2007 if at least five years of data have been reported by the given country; otherwise, the country is dropped from our sample. Given the cross-sectional nature of the model (where only the country dimension is represented), we expand the list of control variables to reduce risks of omitted variable bias.

Other explanatory variables are defined as follows. The regulatory quality variable Q_i is the same measure used in the panel regressions of the previous section, averaged over the period 1996-2012, with higher values representing higher quality. The average values of deposit money bank assets to GDP (over 1980-2011),FD_i and stock market capitalization to GDP (over 1989-2011),CAP_i capture the development of the domestic financial system, and were obtained from an updated dataset of Beck, Demirgüç-Kunt and Levine (2000). As defined above, the average Lerner indexC_i captures competitiveness in the banking sector. International financial integrationFI_i comes from Lane and Milesi-Ferretti (2007) and is measured as a country's 1980-2012 average ratio of international assets plus liabilities to GDP. It enters as a control variable to measure how well domestic financial sectors are integrated into international financial markets, and is meant to pick up any additional effects relating to monetary policy independence.

C. Empirical Results

Regression results are shown in Table 11. We run separate regressions for each of the estimated IRs, from quarter 1 to 4 as well as the average and maximum response. Because we are estimating a cross-section regression with a limited number of observations and because the original parameters are fairly noisy, we follow Mishra et al. (2014) by concentrating on the signs of our coefficients rather than their precision or statistical significance.

Our main coefficient of interest, the remittance-to-GDP ratio, enters almost always with a negative coefficient. As above, this indicates that in countries with higher remittances-to-GDP ratios the transmission of monetary policy through bank lending rates seems to be weaker. The other coefficients, by and large, come out with the expected signs. Better institutional quality and higher financial development are associated with stronger monetary transmission in all but two specifications. A higher value in the Lerner index—lower banking sector competition—exhibits a negative coefficient, and higher international financial integration shows up with a negative and statistically significant coefficient. Overall, we estimate 36 coefficients, including average and maximum IRs for up to four lags, and find 32 of them to have the sign we expected.

– Table 11 –

D. Robustness Checks

One shortcoming of these estimations is the relatively small number of countries with high level of remittances for which IRs had been estimated. The Mishra et al. (2014) sample of 46 countries contains 19 advanced countries, and only 16 registering significant remittance inflows of on average 1 percent remittances to GDP. It is therefore possible that for developing and emerging countries the estimated IR coefficients are relatively noisy, and the correlates to the IRs could be biased regarding the remittance effect.

To obtain more observations for emerging and developing countries, and remittance recipients in particular, we estimate simple country-specific co-movement coefficients between discount and lending rates on an additional sample of 57 countries. We regress the monthly change in lending rate for each country on the change in its policy rate by simple OLS, with the corresponding estimated coefficients serving as proxies for the strength of monetary transmission. We then use these coefficients to supplement the IRs estimated from the panel SVARs. Due to an overlap in the two samples, we increase our sample size to 71 countries. As in the previous exercise, we re-run the regression equation as specified in Equation (11).

– Table 12 –

The results are shown in Table 12. For comparison purposes, in Column (1) we reproduce the previous results based on the average IRs, from Table 11, column (5). Column (2) shows the regression results for only the estimated co-movement coefficients. In column (3) and (4), we supplement the available IRs with co-movement coefficients for those countries that are not included in the sample of IRs. Column (4) also includes a dummy to control for the two different sources of data composing the dependent variable (IRs versus co-movement coefficients). In columns (5) and (6) we use IRs for advanced countries only (those coefficients supposedly

estimated more accurately) and co-movement coefficients for all other countries. Column (6) again includes the dummy to control for the two different sources of. Overall, the results yield similar findings as above. The remittances-to-GDP ratio always enters with a negative sign and turns out statistically significant in most cases. Most of the other explanatory variables enter the regression with their expected sign as well.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

A growing body of literature has highlighted the weakness of monetary policy transmission in developing, low income and frontier markets (see Mishra et al (2012, 2014), Agur et al. (2015), among others). A number of contributing factors endemic to these markets have been identified, such as underdeveloped and noncompetitive financial systems, low institutional quality, and severe asymmetric information problems. Many of the countries identified in this literature, however, are also remittance-recipient countries. For some countries, these income flows are sizeable and can dominate private or official capital flows, and even export receipts. This paper identifies remittance inflows as a potential contributor to the ineffectiveness of monetary transmission. These interest-insensitive private transfers across international borders expand bank balance sheets in the recipient countries directly. However, given the challenging institutional, informational, and high-risk environment prevailing in these countries, banks prefer to invest the additional funds in safe and liquid assets, including lending to government. As a result, liquidity in banks becomes ample and their marginal cost of loanable funds becomes de-linked from movements in the policy rate, thereby weakening a major channel through which changes in the policy rate are transmitted to the lending rate and lending behavior by banks. This finding has important policy implications for many of the countries that rely on remittances.

Namely, the ineffectiveness of monetary transmission in remittance-recipient countries would seem to weaken the case for pursuing an independent monetary policy. Success of any forward-looking monetary policy framework such as inflation targeting relies on an operable transmission of changes in the policy rate to the real economy. Our results suggest that, for many remittance recipient countries, the central bank will therefore not be able to commit credibly to achieving a given target. Moreover, the weak or ineffective monetary policy transmission would also seem to weaken the case for pursuing a flexible exchange rate, consistent with the Singer (2010) study, which shows that remittance inflows significantly increase the likelihood that a country will choose a fixed exchange rate regime.

It is also interesting to note that irrespective of the policy towards private capital mobility, remittances reduce the effectiveness of the monetary transmission. This has important implication for the debate regarding the "macroeconomic policy trilemma." In effect, whether or not restrictions are in place regarding private capital flows, remittance flows would seem to reduce the effectiveness of an independent monetary policy. This presents a "trilemma dilemma," in the sense that it would seem that the discussion of the appropriate choice of macroeconomic policies for remittance-recipient countries should perhaps be expanded to include remittances in addition to private capital flows. After all, the discussion around private capital flows is proxying for a measure of a country's international financial integration, and certainly private income flows such as remittances represent an important channel for transmitting spillovers and international business cycles from remittance-sending countries to remittance-recipient countries (see Barajas et al 2012, among others) and through which such

countries are linked to the rest of the world. It would then seem that for remittance-recipient countries, the trilemma framework for discussing the appropriate tradeoffs among macroeconomic policies should be expanded to include income flows along with capital flows, as this reflects better the degree of financial openness of such countries.

This is not to say, however, that the same policies geared to dealing with the impact of private capital flows on macroeconomic policy choices facing the remittance-recipient countries would directly apply to these income flows. There is now ample evidence that remittances are welfare enhancing, given their role in alleviating poverty and insuring recipients against income and consumption chocks, as well as contributing to fiscal buffers (see Abdih et al. (2012a) and Chami et al. (2012), Combes and Ebeke (2011) among others). Nevertheless, as we have discussed, there are macroeconomic challenges facing countries exposed to these flows (see Chami et al (2008a)), and thus there is a need for policies to balance these challenges with the beneficial effects.

Our theoretical framework suggests that the first-best solution would be ameliorating the distortion preventing banks from lending out the additional funds they receive as a result of remittance inflows. Thus, actions to reduce information asymmetries, improve property rights and contract enforcement, would help to lessen banks' reluctance to lend and reduce excess liquidity in the system. As these actions are likely to take time to materialize and bear fruit, in the short run policymakers could resort to other instruments—quantitative targets, for example—in place of the short-term policy rate. Alternatively, reserve requirements might be an effective instrument, provided they are initially raised to levels high enough to bind so that excess reserves are eliminated. Of course, the additional monetary policy effectiveness achieved would have to be weighed against an initial contraction of bank lending. Similarly, excess reserves could be taxed, thus encouraging banks to expand lending, although careful monitoring would be warranted to ensure that expanded credit does not result in excessive risk in the system. Finally, if the challenges in implementing an effective independent monetary policy prove too daunting in the medium term, it may be necessary to retain a more managed exchange rate regime.

Table 1: Bank Balance Sheets: Size

	Total Deposits to GDP		Total Credit to GDP		Total Assets to GDP	
		#		#		#
All Countries	39.86%	*162*	58.84%	*122*	81.21%	*123*
Advanced[a]	82.11%	*24*	123.14%	*17*	194.54%	*17*
Emerging & Developing	34.79%	*138*	53.65%	*105*	71.51%	*106*
Remittances-GDP ≥ 5%[b]	**39.17%**	*31*	58.29%	*23*	**60.67%**	*24*
Remittances-GDP ≥ 3%	36.18%	*45*	**58.15%**	*32*	**60.71%**	*33*
Remittances-GDP ≥ 0.5%	**37.75%**	*89*	**56.10%**	*65*	**73.17%**	*66*
All countries reporting remittances	35.79%	*139*	**59.51%**	*102*	75.70%	*103*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	35.45%	*70*	63.37%	*51*	79.64%	*51*
No remittances (proxied by low migration)	40.84%	*17*	55.33%	*14*	75.92%	*14*

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from IMF IFS. Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 2: Bank Balance Sheets: Liabilities

	demand deposits to total deposits		time, saving and foreign currency deposits to total deposits	
		#		#
All Countries	31.56%	*163*	68.44%	*163*
Advanced[a]	28.97%	*23*	71.03%	*23*
Emerging & Developing	31.98%	*140*	68.02%	*140*
Remittances-GDP $\geq$ 5%[b]	**24.31%**	*31*	**75.69%**	*31*
Remittances-GDP $\geq$ 3%	**28.79%**	*45*	**71.21%**	*45*
Remittances-GDP $\geq$ 0.5%	**28.67%**	*89*	**71.33%**	*89*
All countries reporting remittances	**31.68%**	*133*	**68.32%**	*133*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	37.17%	*64*	62.83%	*64*
No remittances (proxied by low migration)	34.27%	*18*	65.73%	*18*

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from IMF IFS. Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.
[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.
[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 3: Bank Balance Sheets: Liabilities based on quartiles of financial development

Demand deposits to total deposits	1st quartile	#	2nd quartile	#	3rd quartile	#	4th quartile	#
All Countries	40.94%	42	35.00%	42	27.60%	39	21.94%	40
Advanced[a]	58.68%	1	30.23%	1	18.08%	2	28.49%	19
Emerging & Developing	40.51%	41	35.12%	41	28.12%	37	16.02%	21
Remittances-GDP >= 5%[b]	**30.91%**	7	**26.43%**	10	23.50%	10	**9.51%**	4
Remittances-GDP >= 3%	37.89%	11	32.86%	15	23.64%	11	15.71%	8
Remittances-GDP >= 0.5%	35.90%	20	33.66%	30	25.29%	23	**15.13%**	16
All countries reporting remittances	39.48%	37	34.94%	41	27.50%	33	**18.79%**	22
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	45.53%	22	38.35%	12	30.78%	15	30.36%	15
No remittances (proxied by low migration)	51.77%	5	37.70%	1	27.12%	5	26.39%	7

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from IMF IFS. Quartiles refer to financial development quartiles (1st quartile indicating low development) as measured by the average ratio of private credit to GDP. Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 4: Bank Balance Sheets: Composition of Assets

	liquid assets to total assets		credit to government to total assets		reserves to total assets		excess reserves to total assets	
		#		#		#		#
All Countries	20.05	*123*	13.00%	*112*	9.76%	*113*	4.16%	*101*
Advanced[a]	2.43	*18*	5.24%	*8*	0.86%	*8*	-0.75%	*7*
Emerging & Developing	23.07	*105*	13.60%	*103*	10.44%	*105*	4.53%	*94*
Remittances-GDP >= 5%[b]	**28.67**	*23*	**13.81%**	*25*	**12.56%**	*25*	**5.94%**	*23*
Remittances-GDP >= 3%	**24.48**	*32*	**13.18%**	*34*	**11.34%**	*34*	**5.29%**	*31*
Remittances-GDP >= 0.5%	21.23	*64*	**13.36%**	*66*	10.00%	*67*	**4.67%**	*62*
All countries reporting remittances	**21.39**	*102*	**13.79%**	*94*	10.17%	*96*	**4.86%**	*86*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	20.81	*52*	13.09%	*42*	10.13%	*42*	3.74%	*35*
No remittances (proxied by low migration)	18.52	*14*	9.43%	*13*	9.13%	*13*	0.26%	*11*

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from IMF IFS and IMF survey of central banks. Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

Excess reserves are calculated based on the IMF survey of central banks, question 2.2.3 "What is the Reserve Ratio (in percent)?" For different ranges of reserves, we use the upper bound and take the average over 1998, 2001, 2004, 2008, 2010 and 2013. Excess reserves are calculated as [reserves - (deposits*reserve requirement ratio)].

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 5: Bank Balance Sheets: Volatility

	standard deviation of									
	log(total deposit)		log(demand deposits)		log(time, saving, foreign currency deposits)		log(total assets)		log(government credit)	
		#		#		#		#		#
All Countries	0.293	*169*	0.298	*173*	0.313	*169*	0.266	*126*	0.717	*164*
Advanced[a]	0.219	*29*	0.264	*29*	0.212	*29*	0.204	*17*	0.361	*24*
Emerging & Developing	0.276	*140*	0.288	*144*	0.302	*140*	0.251	*109*	0.738	*140*
Remittances-GDP >= 5%[b]	**0.221**	*31*	**0.263**	*32*	**0.235**	*31*	**0.174**	*25*	**0.541**	*31*
Remittances-GDP >= 3%	**0.215**	*45*	**0.236**	*46*	**0.253**	*45*	**0.207**	*34*	**0.625**	*45*
Remittances-GDP >= 0.5%	**0.241**	*89*	**0.244**	*90*	**0.273**	*89*	**0.252**	*67*	**0.695**	*86*
All countries reporting remittances	**0.269**	*139*	**0.267**	*141*	**0.303**	*139*	**0.253**	*106*	**0.731**	*133*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	0.351	*70*	0.358	*72*	0.358	*70*	0.285	*53*	0.766	*67*
No remittances (proxied by low migration)	0.433	*18*	0.448	*19*	0.386	*18*	0.335	*14*	0.732	*18*

Volatility defined as the standard deviation. Data from IMF IFS. Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 6: Bank Balance Sheets: Bank Competitiveness

	bank concentration		H-statistic		Lerner index	
		#		#		#
All Countries	73.29	*145*	0.62	*102*	0.24	*131*
Advanced[a]	73.39	*28*	0.66	*26*	0.19	*28*
Emerging & Developing	73.26	*117*	0.60	*76*	0.26	*103*
Remittances-GDP >= 5%[b]	72.16	*27*	0.62	*16*	0.24	*21*
Remittances-GDP >= 3%	73.23	*37*	0.61	*21*	0.26	*31*
Remittances-GDP >= 0.5%	72.73	*75*	0.61	*49*	0.25	*66*
All countries reporting remittances	73.18	*117*	0.64	*78*	0.24	*103*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	73.87	*59*	0.61	*42*	0.23	*54*
No remittances (proxied by low migration)	70.78	*15*	0.47	*12*	0.24	*15*

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from World Bank's Global Financial Development Database (GFDD). Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

Bank concentration (%): Assets of three largest banks as a share of assets of all commercial banks.

H-statistic: A measure of the degree of competition in the banking market. It measures the elasticity of banks revenues relative to input prices. (0 monopoly to 1 perfect competition).

Lerner index: A measure of market power in the banking market. It is defined as the difference between output prices and marginal costs (relative to prices). (Higher value indicate less bank competition).

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

Table 7: Bank Balance Sheets: Further stylized facts

	government balance to GDP		government balance to GDP excluding oil exporters[d]		net interest margin of banks		net interest spread of banks	
		#		#		#		#
All Countries	-1.12	*154*	-2.06	*132*	5.20%	*163*	8.66%	*153*
Advanced[a]	-0.18	*28*	-0.62	*27*	1.95%	*29*	3.69%	*27*
Emerging & Developing	-1.33	*126*	-2.43	*105*	5.90%	*134*	9.72%	*126*
Remittances-GDP >= 5%[b]	**-3.20**	*27*	**-3.44**	*26*	5.85%	*29*	9.04%	*31*
Remittances-GDP >= 3%	**-3.13**	*38*	**-3.29**	*37*	5.81%	*41*	9.11%	*39*
Remittances-GDP >= 0.5%	**-2.57**	*74*	**-2.74**	*70*	**5.90%**	*83*	9.37%	*77*
All countries reporting remittances	**-1.70**	*122*	**-2.24**	*109*	**5.58%**	*131*	9.11%	*124*
Remittances-GDP < 0.5% or no remittances (proxied by low migration)[c]	0.49	*68*	-1.29	*50*	4.82%	*67*	8.41%	*65*
No remittances (proxied by low migration)	2.01	*18*	-1.44	*10*	4.62%	*17*	8.37%	*16*

All values represent unweighted averages over the respective country averages. Countries are excluded if they report values for less than two years on the respective variable. Time frame: 1997-2007. Data from IMF IFS, IMF WEO and FinStats (World Bank). Bold values for different remittances-to-GDP groups show significantly different means between the respective group and the "remittances-GDP < 0.5% or no remittances" group at the 10% level based on t-tests.

[a] The country classification into advanced vs. emerging & developing countries is based on WEO classification of 2007.

[b] Countries are classified into remittances-to-GDP categories based on their average remittances-to-GDP ratio over 1990-2013, if they report remittances for at least 5 years out of the period 1990-2013.

[c] Countries with low levels of emigration are defined as those with a rate below two percent for the average over 1985, 1990, 1995 and 2000. Data from Defoort (2006).

[d] Countries classified as oil exporters are based on the WEO classification of "fuel exporting countries, emerging and developing economies" plus Norway.

Table 8: Bank Lending Channel and Remittances

Dependent variable: monthly changes in lending rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							all countries	
	emerging and developing countries						incl. low emigration	
					excl.			excl. identical
Change in policy rate	0.284***	0.766***	0.162***	0.152***	0.179***	0.153***	0.177**	0.195**
	(0.088)	(0.014)	(0.043)	(0.044)	(0.046)	(0.043)	(0.068)	(0.073)
Remittances to GDP x change in policy rate		0.719***	-0.110***	-0.114***	-0.097***	-0.113***	-0.107***	-0.096**
		(0.017)	(0.029)	(0.028)	(0.035)	(0.028)	(0.030)	(0.039)
Remittances to GDP		0.205	0.001	0.001	-0.069	-0.003	0.001	-0.046
		(0.157)	(0.016)	(0.016)	(0.077)	(0.014)	(0.012)	(0.059)
Low competitiveness x change in policy rate			0.009	-0.001	0.099	-0.001	-0.138**	-0.179**
			(0.099)	(0.093)	(0.133)	(0.093)	(0.068)	(0.068)
Low competitiveness			-0.016	-0.016	0.002	-0.000	-0.008	-0.066
			(0.055)	(0.055)	(0.095)	(0.049)	(0.043)	(0.088)
Low institutional quality x change in policy rate				0.051	-0.001	0.051	0.048	0.028
				(0.061)	(0.073)	(0.060)	(0.071)	(0.090)
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	17,707	11,294	5,737	5,737	2,381	6,582	8,434	4,065
Countries	92	76	45	45	39	55	65	58
R-squared	0.03	0.04	0.07	0.07	0.08	0.07	0.06	0.07
Threshold, $C_{it} = 0$ and in percent			1.47	1.33	1.85	1.35	1.65	2.03
			4.36%	3.79%	6.36%	3.87%	5.23%	7.62%
Threshold, $C_{it} = 1$ and in percent							0.36	0.17
							1.44%	1.18%

Frequency and time sample: monthly data for 1990-2013, but nor for the interactive variables (remittances, competitiveness or institutions which are based on annual figures).

Robust standard errors clustered by country in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Threshold calculations: level of remittances to GDP at which the overall effect from policy rate to lending rate equals zero, given competitiveness (C_{it}) and institutional quality (Q_{it}); we consider statistically significant coefficients only.

Column (6): "low emigration" with data for zero remittances proxied by low migration; Column (7): "identical periods" for periods of identical consecutive lending rates for at least 1 year.

Table 9: Bank Lending Channel and Remittances, Controlling for Income

Dependent variable: monthly changes in lending rate

	(1)	(2)	(3)	(4)	(5)	(6)
	Dummy for LICs			Per capita GDP		
		incl. low emigration			incl. low emigration	
			excl. identical			excl. identical
Change in policy rate	0.138***	0.167**	0.189**	-0.580	-0.105	-0.196*
	(0.043)	(0.069)	(0.074)	(0.376)	(0.211)	(0.111)
Remittances to GDP x change in policy rate	-0.129***	-0.122***	-0.104**	-0.126***	-0.114***	-0.108**
	(0.034)	(0.031)	(0.040)	(0.033)	(0.031)	(0.040)
Remittances to GDP	-0.005	-0.001	-0.045	-0.022	0.001	-0.053
	(0.014)	(0.012)	(0.059)	(0.014)	(0.012)	(0.063)
Low competitiveness x change in policy rate	0.016	-0.130**	-0.170**	0.093	-0.121*	-0.170**
	(0.093)	(0.065)	(0.072)	(0.087)	(0.061)	(0.071)
Low competitiveness	0.001	-0.010	-0.067	-0.009	-0.006	-0.092
	(0.048)	(0.042)	(0.088)	(0.042)	(0.046)	(0.082)
Low institutional quality x change in policy rate	0.130*	0.138*	0.075	0.196**	0.105	0.126
	(0.066)	(0.069)	(0.092)	(0.083)	(0.064)	(0.088)
LIC dummy/per capita GDP x change in policy rate	-0.163	-0.157***	-0.078***	0.088*	0.034	0.046***
	(0.103)	(0.022)	(0.028)	(0.046)	(0.025)	(0.012)
Per capita GDP				0.138***	0.016	0.147**
				(0.039)	(0.095)	(0.072)
Country fixed effects	yes	yes	yes	yes	yes	yes
Observations	6,582	8,434	4,065	6,534	8,381	4,065
Countries	55	65	58	55	65	58
R-squared	0.07	0.07	0.08	0.07	0.06	0.08

Frequency and time sample: monthly data for 1990-2013, but nor for the interactive variables (remittances, competitiveness or institutions which are based on annual figures). Robust standard errors clustered by country in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Columns (2,3,5,6): "low emigration" with data for zero remittances proxied by low migration; Columns (3,6): "identical periods" for periods of identical consecutive lending rates for at least 1 year.

Table 10: Bank Lending Channel and Remittances – Robustness: deposit rates

Dependent variable: monthly changes in deposit rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						all countries		
	emerging market and developing economies						incl. low emigration	
					excl. idential			excl. idential
Change in policy rate	0.134***	0.227***	0.079	0.058	0.071*	0.058	0.090	0.109
	(0.018)	(0.002)	(0.051)	(0.047)	(0.041)	(0.047)	(0.067)	(0.074)
Remittances to GDP x Change in policy rate		0.140***	-0.090***	-0.098***	-0.081***	-0.098***	-0.085**	-0.066*
		(0.003)	(0.032)	(0.028)	(0.028)	(0.028)	(0.033)	(0.039)
Remittances to GDP		0.181	-0.007	-0.006	-0.105*	-0.010	-0.006	-0.067
		(0.156)	(0.014)	(0.012)	(0.059)	(0.012)	(0.011)	(0.050)
Low competitiveness x Change in policy rate			-0.063	-0.083	0.090	-0.083	-0.086*	-0.037
			(0.122)	(0.107)	(0.103)	(0.106)	(0.050)	(0.036)
Low competitiveness			-0.057	-0.056	-0.019	-0.040	-0.037	-0.068
			(0.065)	(0.066)	(0.087)	(0.057)	(0.048)	(0.078)
Low institutional quality x Change in policy rate				0.111**	0.057	0.111**	0.036	-0.044
				(0.051)	(0.049)	(0.051)	(0.072)	(0.076)
Country fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Observations	21,357	11,390	5,784	5,784	2,872	6,649	8,238	4,007
Countries	112	75	44	44	38	54	63	57
R-squared	0.017	0.019	0.036	0.038	0.076	0.038	0.032	0.062

Frequency and time sample: monthly data for 1990-2013, but nor for the interactive variables (remittances, competitiveness or institutions which are based on annual figures). Robust standard errors clustered by country in parentheses. Significance levels: * p<0.10, ** p<0.05, *** p<0.01.

Columns (7,8): "low emigration" with data for zero remittances proxied by low migration; Columns (5,8): "identical periods": periods of identical consecutive lending rates for at least 1 year.

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Table 11: Structural Panel VAR: Strength of Monetary Transmission and Country Characteristics

Dependent variable: Impulse response of log (lending rate) to nominal monetary shock

	(1)	(2)	(3)	(4)	(5)	(6)
	1st quarter	2nd quarter	3rd quarter	4th quarter	average	maximum
Remittances to GDP	-0.017	-0.006	-0.003	0.003	-0.006	-0.072^^
	(0.062)	(0.048)	(0.044)	(0.034)	(0.044)	(0.044)
Regulatory quality	0.006	0.000	0.001	0.000	0.002	-0.001
	(0.007)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
Deposit money bank assets to GDP	-0.003	0.001	0.000	0.002	0.000	0.000
	(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
Stock market capitalization to GDP	0.007	0.005	0.001	0.000	0.003	0.006
	(0.009)	(0.007)	(0.005)	(0.003)	(0.006)	(0.008)
Bank competitiveness (Lerner index)	-0.021	-0.038	-0.044	-0.057^	-0.040	-0.008
	(0.038)	(0.043)	(0.045)	(0.040)	(0.040)	(0.025)
International financial integration	-0.002**	-0.001^	-0.001	0.000	-0.001^	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	46	46	46	46	46	46
R-squared	0.14	0.10	0.12	0.16	0.13	0.11

The impulse responses (the dependent variable) have a change of sign such that a positive coefficient signals better monetary transmission.
Significance levels: ^ $p<0.20$ ^^ $p<0.15$ * $p<0.10$ ** $p<0.05$.

Table 12: Impulse responses and co-movement coefficients: Strength of Monetary Transmission and Country Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable					
	average IR from panel SVAR	co-movement coefficients	IR supplemented with co-movement coefficients		IR for advanced countries, co-movement coefficients for all other countries	
Remittances to GDP	-0.006	-0.023**	-0.017	-0.016	-0.024**	-0.028**
	(0.044)	(0.007)	(0.027)	(0.030)	(0.009)	(0.010)
Regulatory quality	0.002	0.000	0.001	-0.000	-0.000	0.001^
	(0.005)	(0.001)	(0.003)	(0.008)	(0.001)	(0.001)
Deposit money bank assets to GDP	0.000	-0.001	0.001	0.003	0.004**	0.005**
	(0.006)	(0.001)	(0.004)	(0.005)	(0.002)	(0.002)
Stock market capitalization to GDP	0.003	0.001	0.002	0.004	-0.002	-0.003*
	(0.006)	(0.002)	(0.005)	(0.007)	(0.002)	(0.002)
Bank concentration (Lerner index)	-0.040	-0.002	-0.023	-0.021	0.001	0.001
	(0.040)	(0.003)	(0.019)	(0.019)	(0.004)	(0.004)
International financial integration	-0.001^	0.001**	-0.001*	-0.001	-0.000	-0.000
	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)
Dummy for IR data				-0.029		-0.383^^
				(1.109)		(0.239)
Constant	0.602	0.309	0.478	0.683	0.349	-0.078
	(1.735)	(0.246)	(0.836)	(1.666)	(0.289)	(0.296)
Observations	46	57	71	71	62	62
R-squared	0.13	0.20	0.09	0.04	0.09	0.13

"Dummy for IR data" equals 1 for all countries with IR coefficient (all advanced countries) and equals zero for all countries that have been merged to this data with their co-movement coefficient.
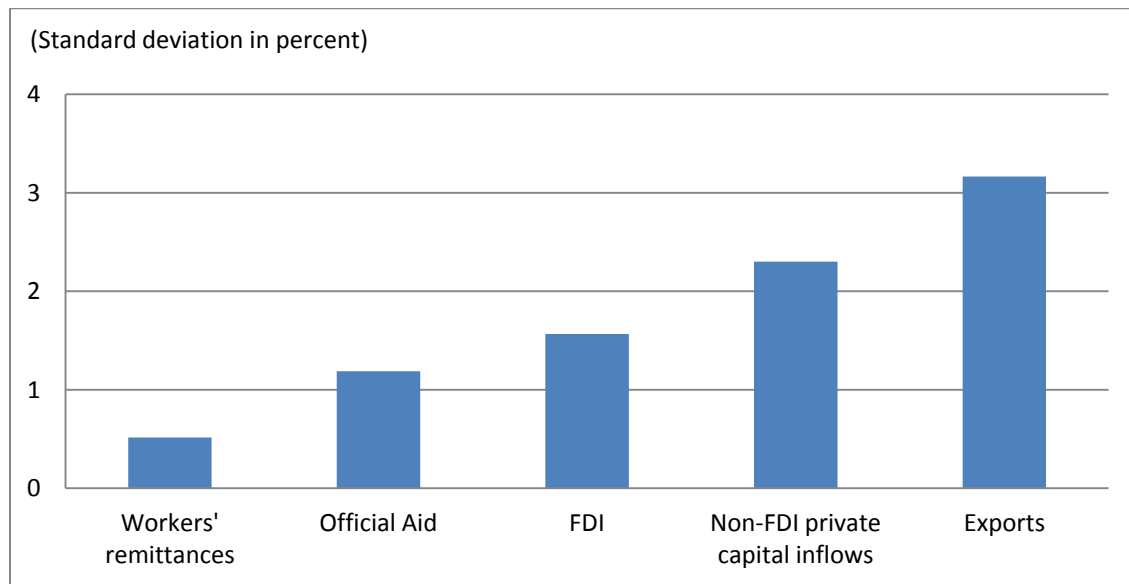Significance levels: ^ $p<0.20$ ^^ $p<0.15$ * $p<0.10$ ** $p<0.05$.

Figure 1: Workers' Remittances and other Inflows
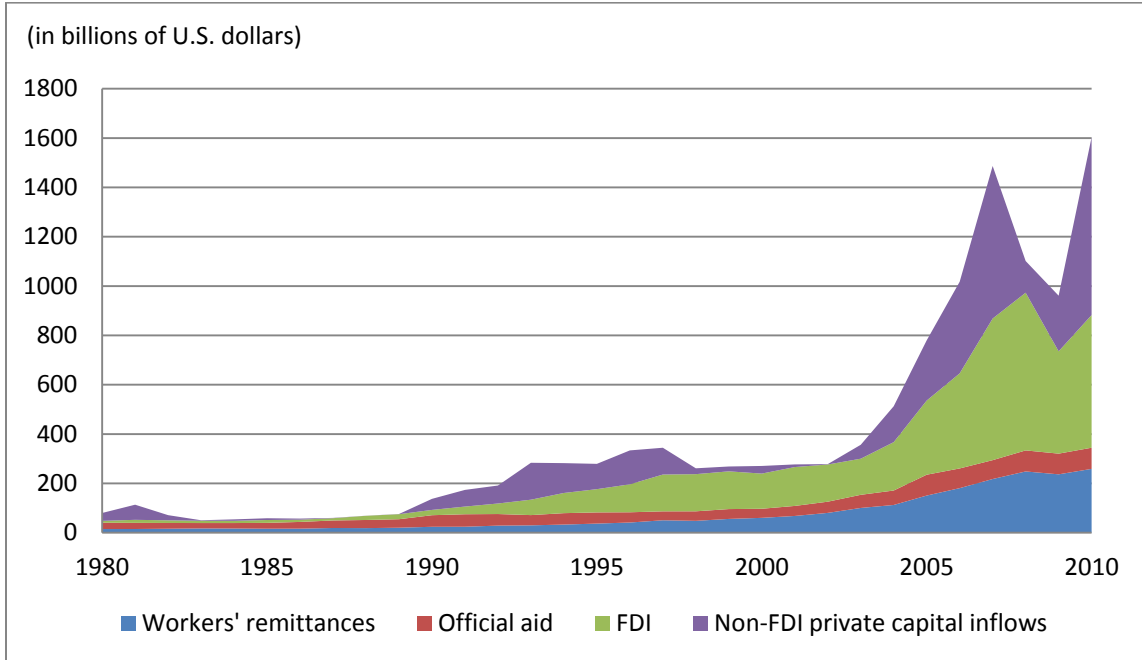
Source: IMF Balance of Payments Statistics
Note: reflects aggregate flows to receiving countries

Figure 2: Volatility of Inflows to Developing Countries, 1980-2012

Source: IMF Balance of Payments Statistics
Note: Volatility is defined as the standard deviation of the detrended ratio of each variable to GDP, with detrending accomplished using the Hodrick-Prescott filter.

APPENDIX

Table A1: Volatility of Workers' Remittances in Comparison to Selected Balance of Payments Inflows

	Official Transfers	Official Capital Flows	Private Capital Flows	Workers' Remittances
Sample periods				
1980-2012	2.4	4.4	6.4	1.7
1990-2012	2.1	4.3	6.1	1.6
2000-2012	1.3	3.8	6.5	1.3
1980-2005	2.3	3.4	4.3	1.5
1995-2005	1.3	2.7	3.6	1.2
Country with average ratio of workers' remittances to GDP	2.9	10.9	19.0	2.7

Source: IMF Balance of Payments Statistics, World Economic Outlook
Note: Standard deviation in ratio to GDP, average across countries

Table A2: Determinants of Remittances

Dependent Variable: log of workers' remittances to GDP		
	Fixed Effects	Random Effects
Constant	-1.04108***	-1.37969***
	(14.232)	(7.329)
Interest rate differential	-0.00000	-0.00000
	(1.140)	(1.082)
Income differential	-0.00009***	-0.00008***
	(12.794)	(12.733)
Change in nominal exchange rate	-0.00000**	-0.00000**
	(2.274)	(2.295)
Observations	2130	2130
R-sq. within	0.0802	0.0802
R-sq. between	0.0000	0.0000
R-sq. overall	0.0130	0.0131

Notes: The interest rate differential is the difference between real deposit or money market rates in country i and the US, while the income differential is the income differential between country i and the US adjusted for purchasing power parity. The absolute value for the test statistic is given in parentheses. Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$. Time period: 1985-2013.

Table A3: Bank Lending Channel and Remittances

Dependent variable: level of lending rate

	(1)	(2)	(3)	(4)
		all countries		
	emerging and developing countries		incl. low emigration	
				excl. identical periods
Level of policy rate	0.471***	0.465***	0.506***	0.442***
	(0.070)	(0.073)	(0.048)	(0.073)
Remittances to GDP x Policy rate	-0.098**	-0.109**	-0.075	-0.080*
	(0.047)	(0.046)	(0.046)	(0.046)
Remittances to GDP	-0.523	-0.138	0.256	-0.362
	(1.124)	(0.903)	(0.774)	(1.112)
Low competitiveness x Policy rate	-0.040	-0.031	-0.033	-0.080*
	(0.052)	(0.048)	(0.037)	(0.046)
Low competitiveness	-1.005	-1.224**	-1.491***	-2.458**
	(0.689)	(0.602)	(0.502)	(1.107)
Low institutional quality x Policy rate	0.195*	0.206*	0.180***	0.249**
	(0.103)	(0.112)	(0.061)	(0.094)
Country fixed effects	yes	yes	yes	yes
Observations	5755	6601	8474	4082
Countries	45	55	65	58
R-squared	0.68	0.67	0.72	0.61

Frequency and time sample: monthly data for 1990-2013. Robust standard errors clustered by country in parentheses.
Significance levels: * $p<0.10$, ** $p<0.05$, *** $p<0.01$.
Column (3): "low emigration" with data for zero remittances proxied by low migration; Column (4): "identical periods" for periods of identical lending rates for at least 1 year.

Table A4: Country Sample

Rem/GDP > 5%	Rem/GDP > 3%	Rem/GDP > 0.5%	Rem/GDP < 0.5% or no remittances	No remittances
Albania	Belize	Antigua and Barbuda.	Afghanistan, I.R. of	Angola
Bangladesh	Benin	Armenia	Algeria	Australia*
Bosnia & Herzegovina	Dominica	Azerbaijan, Rep. of	Argentina	Bahrain, Kingdom of
Cape Verde	Ecuador	Barbados	Austria*	Central African Rep.
Comoros	Grenada	Bolivia	Belarus	Chad
Dominican Republic	Guinea-Bissau	Bulgaria	Belgium*	Chile
Egypt	Mali	Burkina Faso	Bhutan	Congo, Dem. Rep. of
El Salvador	Mongolia	Burundi	Botswana	Equatorial Guinea
Gambia, The	Pakistan	Cambodia	Brazil	Finland*
Guatemala	St. Vincent & Grens.	Colombia	Cameroon	Iran, I.R. of
Guyana	Sudan	Costa Rica	China,P.R.: Mainland	Kuwait
Haiti	Togo	Croatia	Congo, Republic of	Malaysia
Honduras	Tunisia	Cyprus*	Czech Republic	Maldives
Jamaica	Uganda	Ethiopia	Côte d'Ivoire	Qatar
Jordan		Fiji	Djibouti	Saudi Arabia
Kyrgyz Republic		Georgia	Estonia	Slovak Republic
Lebanon		Greece*	France*	South Africa
Liberia		Guinea	Gabon	United Arab Emirates
Moldova		India	Ghana	United States*
Morocco		Indonesia	Hungary	
Nepal		Kenya	Iraq	
Nicaragua		Lithuania	Ireland*	
Nigeria		Macedonia, FYR	Italy*	
Philippines		Mauritania	Japan*	
Samoa		Mexico	Kazakhstan	
Senegal		Montenegro	Korea, Rep.*	
Serbia		Niger	Lao People's Dem.Rep	
Sri Lanka		Panama	Latvia	
St. Kitts and Nevis		Paraguay	Lesotho	
Tajikistan		Peru	Libya	
Tonga		Poland	Luxembourg*	
Yemen, Republic of		Portugal*	Madagascar	
		Romania	Malawi	
		Rwanda	Malta	
		Seychelles	Mozambique	
		Sierra Leone	Namibia	
		St. Lucia	Netherlands*	
		Syrian Arab Republic	Oman	
		São Tomé & Príncipe	Papua New Guinea	
		Thailand	Russian Federation	
		Trinidad and Tobago	Slovenia*	
		Turkey	Solomon Islands	
		Ukraine	Spain*	
		Vanuatu	Suriname	
			Swaziland	
			Sweden*	
			Switzerland*	
			Tanzania	
			Timor-Leste	
			Uruguay	
			Venezuela, Rep. Bol.	

* advanced countries according to IMF WEO 2007.

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