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Macroeconomic Determinants of Workers' Remittances¹

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Abstract

Workers' remittances are the largest source of foreign financing for many developing economies. A better understanding of what determines remittances is warranted to help address challenges confronting policy makers in this area. These include identifying what policies may encourage remittances, their cyclical properties, and their potential role as both a shock-absorber and as part of an anti-poverty policy. Using a novel dataset of bilateral remittance flows, the study finds that a gravity model can explain remittance flows at least as well as trade transactions. The evidence on the motives to remit is mixed, but altruism may be less of a factor than commonly believed. The results suggest that remittances can play some role, but perhaps not a major one, in limiting vulnerability to shocks. In particular, remittances are positively correlated with oil prices, offering a hedge against oil shocks. However, remittances appear to be procyclical and tend to falter when exports weaken and GDP growth slows. They also decline when the home investment and political climate worsens and do not seem to respond to adverse shocks at home. Moreover, depreciation of the home country's currency tends to reduce remittances, suggesting they may provide only limited insurance against balance of payment crises. To encourage remittances and maximize their economic impact, policies should be directed at reducing transaction costs, promoting financial sector development, and improving the business climate.

¹ The views expressed in this paper are those of the authors and do not necessarily represent the views of the IMF or IMF policy. This paper combines the authors' following two papers: "A Gravity Model of Workers' Remittances," IMF Working Paper No. 06/290 and "Are Workers' Remittances a Hedge Against Macroeconomic Shocks: The Case of Sri Lanka," IMF Working Paper No. 07/22.

I. INTRODUCTION

Workers' remittances have recently attracted much attention in research and policy circles, owing to their scale and properties. As a global aggregate, workers' remittances are the largest source of foreign financing after FDI, exceeding both official development assistance and portfolio investment by a wide margin. In 2005, officially recorded remittances to India, China, Philippines, and Mexico alone amounted to \$81 billion, compared to \$107 billion in official development assistance worldwide. For a number of developing countries, remittances beat merchandise exports as the prime foreign exchange earner and some 20 countries reported remittances equivalent to 10 percent of GDP or more. Remittances are much more stable over time than private capital flows and exports, making them a very attractive source of foreign financing. In addition, they are unrequited transfers which, unlike other capital flows, do not create obligations in the future. While some of the recent surge in remittances may be due to better recording, the trend is underpinned by mounting demographic pressures in the developed world.

Given remittances' scale, trend, and impact on the receiving country, their determinants need to be better understood. Policymakers and forecasters are particularly interested in what policies may encourage remittances and how they move with other macroeconomic variables, including world oil prices, GDP in the host country, or the exchange rate in the home country. The latter will help illuminate the role of remittances in buffering economic shocks, such as term-of-trade shocks, large swings in capital flows, or natural disasters. An analysis of the determinants of remittances should focus on broadly three sets of variables, namely variables associated with the migrant's home country, variables related to the migrant's host country and variables that describe the relationship between the migrant's home and host countries together with factors affecting both countries simultaneously.

So far, the study of the macroeconomic determinants of remittances has been severely constrained by the lack of data on bilateral flows. The main data source on remittances, the balance of payments statistics published by the IMF, reports aggregate inward and outward remittances for a given country, but gives no breakdown by country of origin or destination. To capture variables related to both workers' host and home countries some papers have focused on a small set of countries (mostly a single one), whose diaspora is concentrated in a known country, or small group of countries². The only study that analyzes inward remittances for a large panel of countries proxies economic conditions in the host countries by global variables such as oil prices, world output, and LIBOR (see IMF (2005)). Both approaches have obvious shortcomings: the findings of the first lack generality, while the second relies on proxies for potentially important determinants of remittances. Indeed, LIBOR and world output may be poor proxies for investment opportunities and economic activity in the host countries, given that South-South remittance flows account for 30-45 percent of total remittances received by developing countries (World Bank (2006)).

² See Elbadawi and Rocha (1992), Swami (1981), Straubhaar (1986), El Sakka and McNabb (1999), Bouhga-Hagbe (2004), and Gupta (2005).

This paper, for the first time, estimates a gravity model for remittances using a novel dataset with bilateral remittance flows. The remittance data was obtained from 11 countries in Asia and Europe that break down their remittance receipts by country of origin and spans the period 1980-2004. The dataset consists of about 200 country pairings and nearly 1650 observations. Remittance data was provided by the central banks and compiled using international transactions reporting systems and surveys.

The paper contributes in several ways to the existing literature. First, it applies a gravity model, typically used to explain trade and, recently, FDI flows, to workers' remittances. Second, the paper no longer relies on proxies such as oil prices and LIBOR to capture the economic conditions in the migrant workers' host countries. The framework also allows us to test a whole new set of variables as potential determinants of remittances, namely variables that describe the relationship between workers' host and home country, such as distance, common border, shared history, or bilateral trade. Third, by including an indicator of natural disasters we shed new light on the motives to remit (altruism versus portfolio considerations). Finally, we derive implications about the cyclical properties of remittances and their role in limiting vulnerability to shocks.

We find that the gravity framework is very powerful in explaining remittance flows. In fact, a few gravity variables such as partner countries' GDP, distance, common border, and common language can explain more than 50 percent of the variation in remittance flows across time and countries. This is broadly in line with results from more common gravity models for trade, which report R^2 in the range of 50 to 60 percent (e.g. Feenstra and others (2001)). Beyond the common gravity variables we find a number of other variables to be significant in explaining remittance flows. Most notably, trade linkages and colonial ties between home and host countries emerge as strong indicators of the propensity to remit.

The evidence on the motives to remit is mixed, but altruism may be less of a factor than commonly believed. The paper does find a positive association between remittance receipts and the dependency ratio in the home country, suggesting that helping those at home is an important motive. Higher inflation in the home country is also found to encourage remittances to compensate for the loss of purchasing power at home. However, remittances do not appear to increase in the wake of natural disasters and appear positively aligned with the business cycle in the home country, evidence favoring the investment motive. Remittances are also sensitive to the investment and political climate in the home and host countries, again suggesting that investment considerations play an important role.

The results suggest that remittances can play some role, but perhaps not a major one, in limiting vulnerability to shocks. Being pro-cyclical, remittances tend to falter when exports weaken and GDP growth slows. They also decline when the home investment and political climate worsens and do not seem to respond to adverse shocks at home. Moreover, depreciation of the home country's currency tends to reduce remittances, suggesting they may provide only limited insurance against balance of payment crises.

However, as the case study for Sri Lanka shows, remittances are positively correlated with oil prices, offering a hedge against oil shocks. The second part of the paper explores to what

extent workers remittances have helped cushion Sri Lanka against economic shocks. Results indicate that during the most recent oil shock, robust growth in remittance flows has contributed to finance the current account, strengthen the balance of payments and accumulate reserves in Sri Lanka.

Earlier evidence on the importance of transaction costs for explaining remittances is confirmed and extended to conditions in the host countries. Both underdeveloped financial sectors and current account restrictions in the home country may discourage remittances through official channels, as do dual exchange rates in the workers' host country.

The paper concludes that while remittances should be encouraged they should not be seen as a panacea. Remittances can yield important economic benefits to recipient countries, providing financing and supporting consumption and investment. But they may be of only limited value in absorbing shocks and reducing vulnerability to crisis. To encourage remittances and maximize their economic impact, policies should be directed at reducing transaction costs, promoting financial sector development, and improving the business climate.

II. DATA

To date, lack of data on bilateral remittance flows has been an important shortcoming in the analysis of the determinants of workers' remittances. The IMF balance of payments statistics—the main data source on remittances—reports aggregate inward and outward flows for a given country, but gives no breakdown by country of origin or destination. As a result, it has been impossible to incorporate the economic conditions of both host and home country in a cross-country analysis of the determinants of remittances. Similarly, the literature has not been able to account for country-pair specific variables, for example, common language, distance, and colonial relationship.

This paper creates the first dataset of bilateral remittance flows for a limited set of developing countries for which such data exist. A data query to the central banks of 33 developing countries with significant remittance receipts in Asia, Europe, and the Middle East produced bilateral remittance data for 11 recipient countries: Bangladesh, Croatia, Indonesia, Kazakhstan, FYR Macedonia, Moldova, Philippines, Serbia and Montenegro, Slovenia, Tajikistan, and Thailand³. These countries produce estimates of inward remittances by country of origin using a variety of sources, including the International Transaction Recording System (ITRS), migrant surveys and statistics, as well as statements and surveys of banks and money operators. The number of source countries as well as the time period covered in the dataset vary across recipient countries. On average, each recipient country has recorded flows from about 16 source countries and over a period of 9 years (details can be found in Table 1). This amounts to almost 1650 bilateral remittance observations, albeit the

³ Latin America was excluded from the analysis, as most of its remittances originate in the United States, and this corridor has been widely studied by the Inter American Development Bank (IADB), among others.

number used in some of the econometric analysis is slightly lower owing to data limitations on some of the control variables⁴.

Bilateral flows captured in our dataset account for nearly 90 percent of all remittances recorded in the balance of payments of these countries. The coverage varies across countries, from 75 percent of all BOP remittances accounted for in the case of Bangladesh to 99 percent for Indonesia. In terms of the global market, the countries in our sample received about 16 percent of the total amount of remittances to developing countries in the period 2002-2004, and around 30 percent of total flows into Asia and Central and Eastern Europe, the regions of our sample countries. Nevertheless, the dataset is not comprehensive and caution should be exercised in extending our findings to the global level.

The data's main summary statistics are presented in Table 2. The average recipient country in the sample receives about \$93 million dollars per host country and per year. Nevertheless, the dispersion of bilateral flows is large, with countries receiving as little as of \$100,000 per host country per year and as much as \$6.4 billion (in the case of remittances sent from the US to the Philippines in 1998). South and East Asia (Bangladesh, Indonesia, Philippines, and Thailand) receive the greatest bilateral remittance flows in absolute terms (\$150 million per host country per year on average), while Central Asia (Kazakhstan, Tajikistan) reports the largest bilateral receipts in terms of GDP (9.5 percent of GDP on average).

The empirical analysis is based on an unbalanced panel over the period 1980-2004. The data sources of the gravity variables have been widely used in more common models for trade: GDP data are drawn from the international financial statistics dataset of the IMF and the time invariant factors—distance, common language, and shared border—come from the CIA's World Factbook. Other macroeconomic variables come primarily from IMF databases (International Finance Statistics, Direction of Trade, and Exchange Rate Arrangements and Exchange Rate Restrictions). Additional data sources are the World Development Indicators of the World Bank (dependency ratio), the International Migration Dataset of the United Nations (stock of migrants), the International Country Risk Guide (political risk), DataStream (stock market returns), CEPII (colonial relationship), and the International Disaster Database (earthquakes, floods, and wind storms). The list of variables and data sources used in the empirical analysis are shown in Table 3.

III. EMPIRICAL RESULTS

The empirical framework in this paper is based on a gravity model, well known for its empirical success in explaining international trade flows. In its simplest form, the gravity equation for trade states that trade flows between two countries are proportional to the two countries' economic sizes (GDPs) and inversely proportional to the distance between them. The model often includes variables to account for income level (GDP per capita) and physical and cultural proximity (shared border, language relationship, and colonial history).

⁴ The simplest gravity equation uses about 1640 of these country-pairs and our preferred specification uses 1108 observations. Additional variables are tested in a more restrictive sample of 891 observations.

Other factors either enhancing or impeding trade, such as price levels and tariffs, have also been included in extended specifications. The model has also been used to test the trade impact of currency unions, trade agreements, and organizations such as WTO and NAFTA. More recently, gravity models have also been applied to explain FDI and migration flows⁵.

We model remittance flows from country j to country i at time period t using the following specification:

$$\ln R_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln D_{ij} + \beta_4' X_{ijt} + \eta_t + \varepsilon_{ijt} \quad (1)$$

where R_{ijt} is the total amount of remittances received by country i from country j at time period t expressed in dollars; GDP_{it} is the nominal gross domestic product of country i in period t , D_{ij} is the physical distance between the two countries; X_{ijt} is a vector of potential factors influencing remittance flows; and η_t denotes time effects.

We first estimate the simplest form of (1), where vector X includes GDP per capita of both countries (to account for income levels), a dummy variable equal to one if the two countries share a border, and a dummy variable equal to one if the two countries have a common language (to account for cultural proximity). This equation is estimated using 1639 bilateral remittance observations for 11 recipient countries and an average of 16 sending countries for each recipient country, spanning the period 1980-2004. Table 4 presents the estimation results using various econometric techniques: (i) pooled ordinary least squares; (ii) fixed effects for region of origin and region of destination; (iii) fixed effects for receiving country and sending country; and (iv) random effects specific to country pairs. All regressions include time effects to account for common shocks.

Consistent with trade studies, we find that the gravity framework is very powerful in explaining remittance flows. Indeed, the standard gravity factors alone can explain more than half of the variation in bilateral remittance flows. As expected, larger countries receive (and send) larger volumes of remittances in dollar terms⁶. The greater the distance between the two countries, the smaller the flow of remittances. This is an interesting finding, since remittances are financial flows for which distance and transportation costs should not matter. To some extent this reflects the costs of migrating. However, it is also possible that greater distance increases the cost of monitoring how remittances are spent by raising the cost of trips home or by reducing the frequency of phone calls due to differences in time zones. This result is in line with Porter and Rey (2005), who estimate a gravity model of cross-border equity flows and underline the role of distance as proxy for information frictions. Sharing a border, on the other hand, has either a negative or no statistically significant impact. This

⁵ The theoretical foundations of the gravity equation can be found in Anderson (1979), Deardorff (1984) among others. See Demekas and others (2005) and Gupta and Mody (2006) for recent applications of gravity model to FDI and migration flows, respectively.

⁶ Our results are robust to using population, rather than nominal GDP, as the scale variable in the gravity equation.

may suggest that sharing a border facilitates remittances through non-official transfer channels or in kind remittances, not captured in our remittance data. It is also possible that migrants choose to hedge themselves (and their families) by moving to countries where cycles are different from those at home—typically countries that do not share a border with the home country. Finally, sharing a language is positively associated with remittance flows suggesting that cultural affinities are an important determinant of international migration and remittance flows. Also reflecting migration patterns, poorer countries (in terms of per capita income) attract more remittance flows and a larger volume of remittances is sent from richer host countries.

We next estimate an extended form of (1) where vector X contains a richer set of determinants of remittances. This is done in an attempt to explain some of the variation of remittance flows with relevant macroeconomic and policy variables in the recipient and host countries, rather than using country specific fixed or random effects. At the same time, this minimizes the bias that imposing fixed effects introduces into a dynamic panel. For the first time, this framework allows to incorporate variables that describe the relationship between the two countries, such as colonial linkages and bilateral trade flows, and to use the actual economic conditions in the host country rather than proxies, such as trading partners' GDP, LIBOR, and oil prices. As suggested by studies using household data, remittances might also be influenced by specific characteristics of the migration community (average age, number of years since migration, education, etc). Owing to data limitations, an analysis of this type is beyond the scope of this paper.

The additional set of conditioning variables comprises: real per capita growth in the two countries; an indicator variable for natural disasters in the home country; the total stock of migrants in the host country; a dummy variable for common colonial history of home and host country; financial development in the host and home country proxied by private sector credit as a share of GDP; bilateral export flows from country i (home) to country j (host); imports of country i from country j ; the inflation differential between the two countries, depreciation of the home country currency against the host country currency; the difference in stock market returns; the dependency ratio (fraction of child and elderly population) of the recipient country; a dummy for multiple exchange rates in the host and home country; and a dummy indicating whether the recipient country has imposed restrictions on current account transactions. Table 5 presents pooled ordinary least square estimates of this extended gravity model using 1108 bilateral remittance observations.

Beyond the standard gravity factors, we find a number of variables to be significant in explaining remittance flows. The aggregate stock of migrants in the host country is positively associated with remittance flows confirming that the two phenomena—migration and remittances—are closely linked. Ideally, one would like to include the stock of migrants from the receiving country in the analysis, including their characteristics (age, education, years abroad). Unfortunately, a disaggregation of the stock of migrants by country of origin is not available, precluding an analysis of the determinants of remittances per migrant.

Country ties, in the form of colonial and trade relations, matter for remittance determination. More remittances are sent from trade partners than from non-partners, and in particular from

destinations of the home country's exports. The positive correlation of remittance receipts and exports over time undermines the usefulness of remittances as a hedge against shocks. While generally less volatile than other sources of foreign exchange, remittances are likely to weaken when exports weaken and hence exacerbate balance of payment pressures. In addition to trade linkages, colonial relationships seem to be relevant; bilateral flows between countries with colonial ties are almost one and a half times larger than those without a colonial history⁷. This might not be surprising given the fact that many developed countries tend to have preferential visa arrangements with their former colonies.

The evidence on the motives of remittances is mixed. According to the altruism hypothesis, overseas workers care about those left behind and adjust remittances in response to income shocks experienced by the extended family. Under the portfolio hypothesis, remittances are profit-driven and the overseas worker allocates his earnings between home and host country depending on the marginal rate of return in either place. Here, the rate of return can be understood broadly to also include services rendered by the extended family in return for remittances.

The positive coefficient of the dependency ratio lends further support to the altruism hypothesis. More specifically, a one percentage point increase in the share of the dependent population in the home country boosts remittance flows by about 8.5 percent. Also in favor of the altruism hypothesis—by undermining the alternative hypothesis—is the fact that favorable stock market returns do not appear to be significant in attracting more remittance flows. This finding is in line with the literature, which consistently fails to establish a positive link between rates of return and remittances (see, for example, Swami (1981), Elbadawi and Rocha (1992), Straubhaar (1981), IMF (2005)).

On the other hand, we also find evidence that remittances are profit-driven and governed by portfolio considerations; or evidence simply at odds with the altruism hypothesis. For example, we do not find evidence that remittances increase following a natural disaster in the home country. And, this is so regardless of the measure of natural disaster employed—earthquakes, floods or wind storms⁸. This result is in contrast to Bluedorn (2005) and Yang (2006) and runs counter to the altruism hypothesis which predicts that remittances compensate for the reduced income of family members in the wake of natural disasters. Lending support to the portfolio approach is the positive coefficient associated with the home country's growth rate of GDP per capita. A one percentage point increase in this growth rate is associated with 2.8 percent higher remittances. This suggests that migrants tend to send more remittances when the economic conditions back home improve, possibly for investment

⁷ The coefficient of the dummy indicator for colonial relationship is 0.98. Thus, the impact on remittance flows is computed as $(e^{0.98}-1) = 1.43$.

⁸ Table 5 presents estimates using earthquakes. The coefficient estimates using floods and storms are also not significantly different from zero—0.25 (standard error of 0.18) and -0.2 (standard error of 0.15), respectively. Full results are available from the authors.

purposes.⁹ We also find that greater economic activity in the host country encourages migrants to keep their savings in the host country rather than sending them back as remittances—further evidence that portfolio considerations are at play. The latter findings are somewhat unconventional, given that altruism is widely believed to be the dominant motive behind remittances (as pointed out by Lucas and Stark (1985), Rapoport and Docquier (2005)). The findings also call into question the perceived usefulness of remittances in alleviating poverty and buffering against shock (e.g. IMF (2005), World Bank (2006)).

We find evidence that migrants seek to stabilize remittances in real terms. Higher inflation in the home country is found to encourage more remittance flows to compensate for the loss of purchasing power¹⁰. However, depreciation of the home country's currency reduces remittances as less dollars buy the same goods basket as before the depreciation. The desire to maintain remittances' purchasing power, irrespective of price changes, is more easily reconcilable with altruistic behavior than with a quest for profit.

The regression results also confirm that financial development, particularly in the home country, encourages remittance flows. Similarly, fewer restrictions on current account transactions in the recipient economy considerably enhance remittance flows; as does the removal of existing dual exchange rates in the host country. In fact, countries that restrict current account transactions receive 40 percent less remittances on average than countries with fully liberalized current accounts. And about 80 percent fewer remittances are sent from host countries with dual exchange rates. These results have also important implications from a policy point of view and indicate that the current policy of facilitating flows by promoting lower transaction costs, less restrictions on payments, and greater competition among money market operators are well placed. In addition, fostering financial sector development in the receiving country is key to attracting more remittances through formal channels, and possibly enhancing their development impact.

Despite the importance of remittances in Asia—Asia and the Pacific is the main destination region for remittances, accounting for 45 percent of the global total—South and East Asia receive fewer remittances than predicted by the model. This is also borne out by the fact that South and East Asia are the leading recipients of remittances in absolute terms, but lagging when it comes to remittances as a share of GDP, compared to some countries in Central Asia and Southeastern Europe. We also find evidence of a positive correlation between remittances and the host country being a net oil exporter or an advanced economy. However,

⁹ Giuliano and Ruiz-Arranz (2005) using the Hodrick-Prescott filtering technique conclude that remittance receipts tend to be procyclical in about two thirds of the developing world and Sayan (2006) finds that countercyclicality of remittance is not commonly observed in a study of 12 developing countries.

¹⁰ This result is in contrast with Elbadawi and Rocha (1992) who claim that high domestic inflation might be a proxy for macroeconomic and/or political instability and, hence, discourage remittance inflows.

this correlation turns statistically insignificant once other variables capturing economic activity, such as growth rate, are controlled for.

A country's political stability—broadly defined to reflect government stability, socioeconomic conditions, investment climate, internal and external conflict, corruption, involvement of the military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality—also constitutes an important determinant of remittance flows. This variable was not incorporated in the previous analysis due to limited availability of data for some of the countries used in the study. But, a separate regression is estimated for a reduced sample (891 bilateral observations) incorporating the ICRG rating of political risk¹¹. Our results (column 2, Table 5) show that remittances are sensitive to political conditions in the two countries. Less political risk (i.e. a higher rating) in the home country leads to larger volumes of remittances. Similarly, political instability and unfavorable business climate in the host country, by reducing their opportunity costs, encourages more remittances.

The regression results, and in particular the magnitude of the effects, should be interpreted with caution, as the analysis may suffer from endogeneity bias. For instance, there is evidence of causality running from remittances to financial development. Indeed Aggarwal et al. (2006) find that remittances foster financial development by increasing the aggregate level of deposits and credit intermediated by local banks. Large remittance flows have also stimulated product innovation in the field of savings and investment instruments. Other sources of reverse causality may arise if remittances affect growth, exports, inflation or the exchange rate. Giuliano and Ruiz-Arranz (2005) provide evidence that remittances have a positive impact on growth in some countries. There is also increasing evidence that migrants have become a new market attracting exports from their home countries as well as anecdotal evidence that large remittance inflows have created inflation in the housing market of certain regions in Latin America. Despite evidence to the contrary (Rajan and Subramanian (2004)), large remittance flows may also lead to real exchange rate appreciation or Dutch disease. Finally, large emigration of working age population may cause both larger remittance receipts and an increase in the country's dependency ratio.

Some robustness checks are performed in an attempt to minimize endogeneity concerns. First, we lag all variables thought to simultaneously be affected by, and affect remittances, namely financial development, growth, trade, the dependency ratio, inflation and the exchange rate. By using lagged values we expect the contemporaneous effect of remittances on these variables to be eliminated, and hence the bias that these interactions might introduce. As Table 6 shows, the main results are robust to this new specification. However, the exchange rate variable loses its significance. Second, to test the robustness of the procyclicality of remittances, i.e. the positive coefficient associated with growth in the home country, we instrument this potentially endogenous variable with its own lagged values. This is approach is borrowed from the generalized method of moments. Again, all coefficient

¹¹ Risk ratings range from a high of 100 (least risk) to a low of 0 (highest risk).

estimates, except for the one associated with the dependency ratio, are robust to this instrumentation technique.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

The major contribution of this paper is the creation of the first dataset of bilateral remittance flows and the attempt to explain these flows using a gravity model that incorporates home- and host-country characteristics as well as country-pair-specific variables. Notwithstanding the limited coverage of our dataset, the results provide useful insights about the motives to remit, the role of remittances as a shock absorber, and the policies that may facilitate these flows.

In line with models for trade and FDI flows, more than 50 percent of the variation in bilateral remittance flows can be explained by a few gravity variables such as partner countries' GDP, distance, shared border, and common language. With key macroeconomic variables (inflation, growth, exchange rate, trade) and variables capturing transaction costs (financial sector development, dual exchange rates, current account restrictions) added to the set of explanatory variables more than 70 percent of the variation in remittances can be explained.

The evidence on the motives to remit is mixed, but altruism seems to be less of a factor than commonly believed. Most strikingly, remittances do not increase in the wake of natural disasters and are sensitive to the investment climate in the home and host country. Also, somewhat at odds with conventional wisdom, remittance receipts are aligned with the business cycle in the home country.

Earlier evidence on the importance of transaction costs for explaining remittance receipts through official channels is confirmed and extended to conditions in the workers' host countries. Both underdeveloped financial sectors and current account restrictions in the home country discourage remittances through official channels, as do dual exchange rates in the workers host country.

Remittance receipts may be less of a shock absorber than commonly claimed. Being procyclical, they falter when exports weaken and GDP growth slows. They also stay away when the investment climate worsens—even if it is only relative to the sending country—and do not seem to respond to adverse shocks at home. Moreover, depreciation of the home country's currency tends to reduce remittances, suggesting they may provide only limited insurance against balance of payment crisis.

These findings have important implications. Policy makers who want to generate more remittance receipts through official channels are well advised to tackle financial sector deficiencies, ease current account restrictions, and discontinue dual exchange rate practices—and convince main sending countries to do the same. Remittances should be encouraged as they can yield important economic benefits to recipient countries. However, they might not play a major role in limiting vulnerability to shocks and they cannot substitute for good policies and structural reforms.

V. THE CASE OF SRI LANKA

This section explores to what extent Sri Lanka's large receipts of workers remittances have helped cushion against macroeconomic shocks and are likely to do so in the future. Both descriptive evidence and econometric analysis show that workers remittances are positively correlated with real GDP undermining their usefulness as shock-absorber. Moreover, the paper finds strong evidence that remittance receipts decline when the currency weakens and, hence, provide little insurance against balance of payment crisis. However, remittances are positively correlated with oil prices, offering a hedge against oil shocks.

Stylized Facts

Despite Sri Lanka's astonishing resilience the island remains vulnerable to external shocks. With average growth of close to 6 percent over the last 5 years and a single recession since independence, Sri Lanka's growth performance is remarkable. Nevertheless, the country's export base is narrow with garment and tea exports accounting for two-thirds of merchandise exports; and the expiration of the multifiber agreement in 2005 has added to competitive pressures. Tourism another major exchange earner has recovered from the tsunami, but faces new threats from a deteriorating security situation. Finally, the country's heavy reliance on oil, particularly in energy generation, exposes it more than others to movements in world prices. Between 2003 and 2005 Sri Lanka's oil balance deteriorated by 2.4 percentage points of GDP, compared to 1.7 percentage points of GDP for the average low-income country in Asia.

On the other hand, Sri Lanka has access to a large and relatively stable source of foreign exchange—workers remittances. Reported workers remittances in Sri Lanka increased at an average annual rate of 10 percent over the last 20 years. Since the mid-1990s they constitute the largest source of foreign financing (Figure 1). In 2005, workers remittances amounted to 8.3 percent of GDP, compared to 2.5 percent of GDP in official development assistance (ODA), 1 percent of GDP in FDI, and ½ a percent of GDP in portfolio investment. Sri Lanka's prime export, textile and garments, amounted to 12 percent of GDP. Inward remittances are large relative to the Sri Lanka economy. Among 13 countries of broadly equal size, Sri Lanka exhibits the fourth largest remittances-to-GDP ratio (Figure 2). In Asia, Sri Lanka is surpassed only by the Philippines (13.7 percent of GDP), Mongolia (13.3 percent of GDP), and Nepal (12.9 percent of GDP).

Inward remittances are sensitive to swings in oil prices, as close to 85 percent of Sri Lankan migrants reside in countries which are net oil exporters. According to the Sri Lanka Bureau of Foreign Employment (2004), the number of overseas workers amounted to 744,100 in 2004, or 3.8 percent of the population. These workers are concentrated in a few countries with Saudi Arabia, Kuwait, United Arab Emirates, and Qatar hosting 80 percent. Close to 85 percent of foreign workers reside in countries which are net oil exporters.

Sri Lanka remittances are less volatile than private capital flows and ODA, confirming a pattern observed for global aggregates (IMF, 2005). The standard deviation of remittances amounts to 43 percent of the mean, compared with 51 percent for ODA, 68 percent of FDI

and 164 percent for portfolio investment. Merchandise exports, on the other hand, are less volatile than remittances, deviating only 21 percent from the mean. Remittances sent to Sri Lanka seem to be pro-cyclical and, strikingly, more so than any other source of foreign exchange. Remittances and GDP, when de-trended by the Hodrick- Prescott filter, show a correlation of almost 70 percent over the period 1975-2004; slightly higher than the correlation of exports and GDP. Private capital flows and GDP are positively correlated at only 20 percent, while ODA is counter-cyclical. Figure 3 plots remittance receipts against a couple of macroeconomic aggregates. The pro-cyclicity of remittances is born out by the first figure, which plots the log-differences of Sri Lanka remittance receipts and GDP over 1985-2005. Since the mid-1990s remittances and GDP seem to be moving in log-step. Noteworthy also the year 2001, when Sri Lanka was hit by a number of severe shocks, including a military attack on the Colombo airport, disruptions of the power supply, and severe weather. GDP contracted for the first time in 50 years and remittances recorded the lowest growth in more than 10 years. Similar responses of remittances to dramatic changes in the home country's economic conditions have been observed for other countries (World Bank, 2003). In the Philippines, remittances rose steadily throughout the early 1990s, but became more volatile with the financial crisis in the late 1990s. In Turkey, remittance receipts increased for most of the 1990s, but started to decline when the crisis hit in 1999 and 2000.

Since the mid-1990s, one also observes a strong positive correlation between remittance receipts and GDP of the workers' host countries. But, although Sri Lankans seek employment mostly in oil exporting countries, the correlation with oil prices is less clear-cut. Moreover, remittances appear to be negatively correlated with the exchange rate (implying less remittances when the currency weakens) and the interest rate (if at all), but not correlated with the price level.

Econometric Analysis

We estimate a vector error correction model for Sri Lanka to determine the response of remittance receipts to shocks in macroeconomic variables. This approach seems warranted on several grounds. First, most of the macroeconomic variables are endogenous, suggesting a multi-equation estimation. Second, many of the variables are nonstationary, suggesting estimation in first (or higher) differences. Finally, the variables may be cointegrated, suggesting the inclusion of the cointegration relationship as an additional regressor.

Our dataset covers the period 1996-2004 on a quarterly basis. While annual remittance data is available back to 1975, such a series would contain less observations and is more likely to contain structural breaks. As potential shock variables the dataset includes what the literature usually refers to as macroeconomic determinants of remittances, namely real GDP and CPI in the receiving country, the exchange rate, and a relative rate of return. Another common determinant, real GDP in the host country, is not available on a quarterly basis for the Gulf states. It is proxied by the world oil price, which is of more immediate interest for this study, anyway.

The data used in the analysis are drawn from the IMF databases and the country's national statistics. Remittance (REM) data, in millions of US\$, is taken from the IMF Balance of Payments Statistics Yearbook and comprises the line items workers remittances, compensation of employees, and migrant capital transfers. Real GDP (GDP), in billions of rupees and at 1996 prices, is taken from the WEO database. The relative rate of return (I), in percentage points, is calculated as the difference between Sri Lanka's interest rate on 3-months fixed deposits and the LIBOR on 3-months dollar deposits. Data on interest rates, the Colombo consumer price index (CPI), the rupee/dollar exchange rate (E) and the oil price (OIL)—a simple average of UK Brent, Dubai, and West Texas crude prices—all stem from the International Financial Statistics Yearbook. Data is in levels and not seasonally adjusted.

We first test for the presence of unit roots in the macroeconomic time series using the augmented Dickey Fuller test and find that all series are integrated of order one. To determine the appropriate lag length we start with a large number of lags and subsequently eliminate lags with insignificant coefficients. The choice of model, that is whether to include an intercept or time trend, is based on the approach of Doldado and others (1990). Under this approach, one starts with the least restrictive of plausible models and then introduces restrictions until the null hypothesis of a unit root is rejected (if at all). As shown in Table 7, the data series are found to be nonstationary in levels (have unit roots) and stationary in first differences. Hence, all series are integrated of order one.

Next, we test for the existence of a cointegration vector following Johansen (1991) and find one cointegrating relationship. We use one lag to preserve sufficient degrees of freedom. Both the trace statistic and the eigenvalue statistic confirm the existence of a cointegration relationship between remittances, real GDP, oil prices, the exchange rate, and the price level. No cointegration relationship was found between these variables and the rate of return. Over the long run, remittances move with the other macroeconomic variables based on the following cointegrating relationship (t-statistic in parenthesis):

$$\text{REM} = -467.83 - 1.40*\text{OIL} + 4.33*\text{GDP} - 3.54*\text{E} + 1.62*\text{CPI}.$$

(1.36) (10.18) (2.02) (1.27)

Over the long run, remittance receipts decline as oil prices soften, increase as the Sri Lankan economy grows, decline as the currency weakens (E increases), and increase as the domestic price level rises.

The estimation of the VEC model and the impulse response functions confirm the evidence presented earlier, namely that remittances respond to shocks in GDP, the exchange rate, and oil prices. The estimates of the VEC model are presented in Table 9. The impulse response functions (Figure 4) illustrate how remittances react to one standard deviation shocks in the oil price, the exchange rate, domestic GDP, and the price level, before they are forced back onto their long-term path. The variables are ordered as listed, but other Cholesky orderings do not affect the qualitative results, with one exception. The response of remittances to a CPI shock is ambiguous and will be ignored henceforth.

- *Remittances are procyclical*: remittances increase when economic activity in the home country accelerates and they decrease when economic conditions deteriorate, an indication that investment considerations are at play. In particular, an increase in real GDP by 9 billion of 1996 rupees (1 percent) leads to an increase in remittances by \$25 million (2 percent). This suggests that remittances respond to investment opportunities and the business and political climate in the home country as much as to altruistic and insurance considerations. It also implies that remittance flows may not be as important to smooth fluctuations or shocks in the economy as commonly believed.
- *Remittances fall when the exchange rate weakens*: a one percent depreciation of the rupee against the dollar leads to a \$10 million to \$12 million (0.8 percent) reduction in remittances. Depreciation of the rupee reduces remittances as migrants may be able to purchase the same goods basket with less dollars.
- *Remittances increase with oil prices*: an oil price increase of \$2.8 per barrel increases remittances by \$14 million (1 percent) in the first year and another \$3 million in subsequent years. In the case of Sri Lanka, oil prices may be a good proxy for the economic activity in its migrants' host countries. This result suggests that greater economic activity in the host country increases the chances of employment and wages, allowing migrants to send more remittances.

Table 1. Remittance Flow Data

Recipient Country	Number Source Countries	Time Period	Data Coverage 1/
Bangladesh	12	1979–2004	75
Croatia	25	1997–2004	96
Indonesia	12	2003–2004	99
Kazakhstan	19	2003–2004	67
Macedonia FYR	19	1997–2004	97
Moldova	15	2003–2004	94
Philippines	31	1981–2004	85
Serbia and Montenegro	19	2000–2004	72
Slovenia	16	1994–2004	92
Tajikistan	3	2002–2004	95
Thailand	21	1993–2004	97

1/ Percent of total remittances from the balance of payments covered in the dataset (average all years).

Table 2. Summary Statistics

Variable	Units	Observation	Mean	Standard Deviation	Minimum	Maximum
Remittance flow from j to i	US\$ million	1,108	93	421	0.1	6403
Nominal GDP country i	US\$ billion	1,108	54.6	46.3	2.0	182.0
Nominal GDP country j	US\$ billion	1,108	1,134	2,247	2	11,734
GDP per capita country i	US\$	1,108	3,101	3,529	162	16,161
GDP per capita country j	US\$	1,108	20,928	11,467	380	69,737
Common border	Dummy; 1=yes	1,108	0.1	0.3	0	1
Log distance	Kilometers	1,108	8.1	1.1	4.7	9.7
Common language	Dummy; 1=yes	1,108	0.2	0.4	0	1
Colonial relationship	Dummy; 1=yes	1,108	0.1	0.2	0	1
Stock of migrants in country j	Millions	1,108	4.3	8.2	0	35
Exports from i to j	US\$ million	1,108	836	1,966	0	15,498
Imports of i from j	US\$ million	1,108	931	2,205	0	22,379
Dependency ratio in country i	Percent of population	1,108	36.0	6.0	29.2	49.5
Per capita growth country i	In percent of GDP	1,108	2.5	-3.6	11.6	9.3
Per capita growth country j	In percent of GDP	1,108	2.0	4.6	-29.7	44.3
Differential stock market returns	In percent	1,108	-5.5	39.7	-392.8	181.3
Credit to private sector in country i	In percent of GDP	1,108	41.9	26.5	7.3	121.1
Credit to private sector in country j	In percent of GDP	1,108	78.3	41.5	4.7	170.3
Inflation differential	In percent	1,108	2.9	-8.8	83.6	48.3
Depreciation differential	In percent	1,108	3.7	13.8	-212.3	50.4
Restrictions on current account	Dummy; 1=yes	1,108	0.5	0.5	0	1
Dual exchange rate in country i	Dummy; 1=yes	1,108	0.0	0.2	0	1
Dual exchange rate in country j	Dummy; 1=yes	1,108	0.0	0.1	0	1
Earthquake	Dummy; 1=yes	1,108	0.1	0.3	0	1
Flood	Dummy; 1=yes	1,108	0.4	0.5	0	1
Wind storm	Dummy; 1=yes	1,108	0.5	0.5	0	1
Political risk country i	100=min. risk; 0=max risk	891	64	13	29	81
Political risk country j	100=min. risk; 0=max risk	891	78	11	44	96

Table 3. Data Sources

Variable	Source
Remittance flows	IMF, <i>Balance of Payments Statistics</i> ; and authors' calculations
Nominal GDP	IMF, <i>International Financial Statistics</i>
GDP per capita	IMF, <i>International Financial Statistics</i>
Distance	Andrew Rose's website; and authors' calculations 1/
Common language	Andrew Rose's website; and authors' calculations 1/
Shared border	Andrew Rose's website; and authors' calculations 1/
Colonial history	CEPII dataset
Stock of migrants	United Nations, <i>International Migration Data</i>
Bilateral exports	IMF, <i>Direction of Trade Statistics</i>
Bilateral imports	IMF, <i>Direction of Trade Statistics</i>
Real GDP growth per capita	IMF, <i>International Financial Statistics</i>
Natural disaster	EM-DAT: The OFDA/CRED International Disaster database
Dependency ratio	World Bank, <i>World Development Indicators</i>
Stock market returns	Datastream
Credit to the private sector	IMF, <i>International Financial Statistics</i>
Inflation	IMF, <i>International Financial Statistics</i>
Depreciation	IMF, <i>International Financial Statistics</i>
Restrictions current account	IMF, <i>Annual Report on Exchange Arrangements and Exchange Rate Restrictions</i>
Dual exchange rate	IMF, <i>Annual Report on Exchange Arrangements and Exchange Rate Restrictions</i>
Political Risk	International Country Risk Guide dataset (ICRG)

1/ <http://faculty.haas.berkeley.edu/arose/>.

Table 4. Gravity of Remittance Flows 1/

Dependent variable is Log Remittance Flows from country <i>i</i> to country <i>j</i>				
Log GDP_ <i>i</i>	0.846 *** (0.04)	1.243 *** (0.10)	3.952 *** (1.45)	0.882 *** (0.09)
Log GDP_ <i>j</i>	0.45 *** (0.02)	0.581 *** (0.03)	0.065 (0.42)	0.392 *** (0.07)
Log GDP per capita_ <i>i</i>	-1.457 *** (0.05)	-1.815 (0.09)	-3.546 *** (1.34)	-1.218 *** (0.11)
Log GDP per capita_ <i>j</i>	0.287 *** (0.06)	0.086 (0.08)	1.194 *** (0.38)	0.539 *** (0.10)
Log Distance	-0.53 *** (0.05)	-0.508 *** (0.05)	-0.245 *** (0.07)	-0.544 *** (0.13)
Shared border	-0.61 *** (0.18)	-0.548 *** (0.18)	-0.055 (0.19)	-0.411 (0.40)
Common language	0.529 *** (0.09)	0.594 *** (0.09)	0.596 *** (0.12)	0.472 * (0.27)
Constant	7.177 *** (0.86)	11.128 *** (1.08)	0.831 (3.86)	2.494 (1.66)
Observations	1,639	1,639	1,639	1,639
R-squared	0.53	0.58	0.73	0.5
Number of country-pairs	190
Specific effects	No	Region (home and host) fixed effects	Country (home and host) fixed effects	Country-pair random effects

1/ All regressions include time fixed effects. Standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 5. Extended Gravity Equation 1/

Dependent Variable is Log Remittance Flows From Country <i>j</i> to Country <i>i</i>		
Log GDP_ <i>i</i>	1.281 *** (0.16)	0.971 *** (0.24)
Log GDP_ <i>j</i>	0.168 *** (0.06)	0.184 *** (0.06)
Log GDP per capita_ <i>i</i>	-2.835 *** (0.18)	-4.172 *** (0.38)
Log GDP per capita_ <i>j</i>	0.339 *** (0.08)	0.327 *** (0.10)
Log distance	-0.346 *** (0.07)	-0.195 ** (0.08)
Shared border	-0.492 *** (0.18)	-0.611 *** (0.22)
Common language	0.264 ** (0.12)	0.285 ** (0.12)
Colonial relationship	0.981 *** (0.19)	0.961 *** (0.21)
Log stock migrants_ <i>j</i>	0.362 *** (0.05)	0.252 *** (0.05)
Log exports of <i>i</i> to <i>j</i>	0.167 *** (0.04)	0.215 *** (0.04)
Log imports of <i>i</i> from <i>j</i>	-0.042 (0.04)	-0.012 (0.04)
Dependency ratio_ <i>i</i>	0.079 *** (0.03)	-0.041 (0.05)
Earthquake_ <i>i</i>	0.075 (0.14)	0.107 (0.14)
Per capita GDP growth_ <i>i</i>	0.028 * (0.02)	0.002 (0.02)
Per capita GDP growth_ <i>j</i>	-0.017 * (0.01)	-0.009 (0.01)
stock_ <i>ij</i>	0.001 (0.00)	0 (0.00)
Credit to GDP_ <i>i</i>	0.019 *** (0.00)	0.028 *** (0.01)
Credit to GDP_ <i>j</i>	0.001 (0.00)	0.001 (0.00)
Inflation diferencial <i>i</i> to <i>j</i>	0.049 *** (0.01)	0.038 *** (0.01)
Depreciation <i>i</i> to <i>j</i>	-0.007 * (0.00)	-0.01 ** (0.00)
Restrictions CA_ <i>i</i>	-0.503 *** (0.15)	0.331 (0.30)
Dual exchange rate_ <i>i</i>	-0.125 (0.28)	-0.414 (0.33)
Dual exchange rate_ <i>j</i>	-1.588 ** (0.64)	-2.941 *** (0.70)
Political risk_ <i>i</i>		0.069 *** (0.02)
Political risk_ <i>j</i>		-0.023 *** (0.01)
Asia_ <i>i</i>	-4.464 *** (0.51)	-6.417 *** (0.81)
Developed country_ <i>j</i>	0.242 (0.18)	0.023 (0.20)
Constant	7.763 *** (2.35)	23.619 *** (3.46)
Observations	1108	891
R-squared	0.71	0.72

1/ The regression includes time fixed effects. Standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 6. Robustness Test 1/

Dependent Variable is Log Remittance Flows From Country <i>j</i> to Country <i>i</i>	
Log GDP_ <i>i</i>	1.623 *** (0.18)
Log GDP_ <i>j</i>	0.119 ** (0.06)
Log GDP per capita_ <i>i</i>	-3.137 *** (0.19)
Log GDP per capita_ <i>j</i>	0.311 *** (0.08)
Log distance	-0.257 *** (0.07)
Shared border	-0.47 ** (0.19)
Common language	0.249 ** (0.12)
Colonial relationship	0.893 *** (0.19)
Log stock migrants_ <i>j</i>	0.361 *** (0.05)
Lag log exports of <i>i</i> to <i>j</i>	0.171 *** (0.04)
Lag log imports of <i>i</i> from <i>j</i>	0.02 (0.04)
Dependency ratio_ <i>i</i>	0.078 *** (0.03)
Earthquake_ <i>i</i>	0.06 (0.14)
Lag per capita GDP growth_ <i>i</i>	0.03 * (0.02)
Lag per capita GDP growth_ <i>j</i>	-0.014 (0.01)
stock_ <i>ij</i>	0 (0.00)
Lag credit to GDP_ <i>i</i>	0.018 *** (0.00)
Lag credit to GDP_ <i>j</i>	0.001 (0.00)
Lag inflation diferencial <i>i</i> to <i>j</i>	0.036 *** (0.01)
Lag depreciation <i>i</i> to <i>j</i>	-0.001 (0.00)
Restrictions CA_ <i>i</i>	-0.437 *** (0.17)
Dual exchange rate_ <i>i</i>	-0.026 (0.30)
Dual exchange rate_ <i>j</i>	-2.121 *** (0.58)
Asia_ <i>i</i>	-5.78 *** (0.56)
Developed country_ <i>j</i>	0.161 (0.19)
Constant	11.087 *** (2.37)
Observations	1025
R-squared	0.72

1/ The regression includes time fixed effects. Standard errors in parentheses; * significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent.

Table 7. Sri Lanka: Augmented Dickey Fuller Test for Nonstationarity 1/
(Sample: 1995Q1–2004Q4)

	Level			First Difference		
	t-ADF	Lags	Model 2/	t-ADF	Lags	Model 2/
Remittances	1.28	3	2	-5.34 ***	2	3
Real GDP	1.16	3	2	-13.28 ***	1	3
CPI	0.84	0	2	-2.91 ***	0	3
Exchange rate	-0.25	1	2	-4.43 ***	0	2
Interest differential	-1.13	1	3	-2.66 ***	0	3
Oil price	1.57	0	3	-4.68 ***	0	3

1/ *** denote rejection at the 1 percent level.

2/ Model 1 includes trend and intercept; Model 2 includes intercept, but no trend; and Model 3 includes neither.

Table 8. Sri Lanka: Cointegration Test
for REM, GDP, CPI, E, OIL 1/

Hypothesized Number of Cointegration Vector(s)	Eigenvalue	Trace Statistic	Maximum Eigenvalue Statistic
None	0.751	86.684 ***	47.336 ***
At most 1	0.510	39.348	24.280
At most 2	0.216	15.069	8.287
At most 3	0.179	6.782	6.710
At most 4	0.002	0.072	0.072

1/ Rejection at the 1 percent level denoted by ***.

Table 9. Vector Error Correction Estimates 1/

Error Correction	D(REM)	D(OIL)	D(GDP)	D(E)	D(CPI)
CointEq1	-0.113 (0.118)	0.002 (0.013)	0.279 (0.045)	-0.013 (0.005)	-0.007 (0.010)
D(REM(-1))	-0.524 (0.147)	-0.021 (0.017)	-0.239 (0.056)	0.003 (0.006)	0.002 (0.013)
D(OIL(-1))	1.690 (1.643)	0.179 (0.192)	0.767 (0.626)	-0.051 (0.070)	-0.161 (0.140)
D(GDP(-1))	0.653 (0.458)	-0.028 (0.053)	0.564 (0.174)	-0.030 (0.019)	0.045 (0.039)
D(E(-1))	-0.822 (3.874)	0.170 (0.452)	1.054 (1.476)	0.356 (0.165)	0.275 (0.331)
D(CPI(-1))	1.368 (2.394)	-0.268 (0.279)	-1.865 (0.912)	0.072 (0.102)	0.264 (0.204)
C	4.081 (7.861)	0.734 (0.917)	4.373 (2.995)	0.745 (0.334)	0.966 (0.671)
R-squared	0.46	0.11	0.71	0.43	0.29
Adj. R-squared	0.33	-0.09	0.65	0.30	0.17
Sum sq. residuals	15466	211	2244	28	112
S.E. equation	23.93	2.79	9.11	1.01	1.87
F-statistic	3.76	0.55	11.24	3.36	1.87
Log likelihood	-152.28	-79.25	-119.47	-44.92	-68.59
Akaike AIC	9.37	5.07	7.44	3.05	4.45
Schwarz SC	9.68	5.39	7.75	3.37	4.76
Mean dependent	4.32	0.33	1.70	1.34	2.01
S.D. dependent	29.37	2.67	15.42	1.22	2.19
Determinant residual covariance		248,429			
Log likelihood		-452.41			
Akaike information criterion		28.96			
Schwarz criterion		30.76			

1/ Sample: 1996Q1–2004Q4; 36 observations; standard errors in parantheses.

Figure 1. Sources of Foreign Financing, 1975–2004
(Percent of GDP)

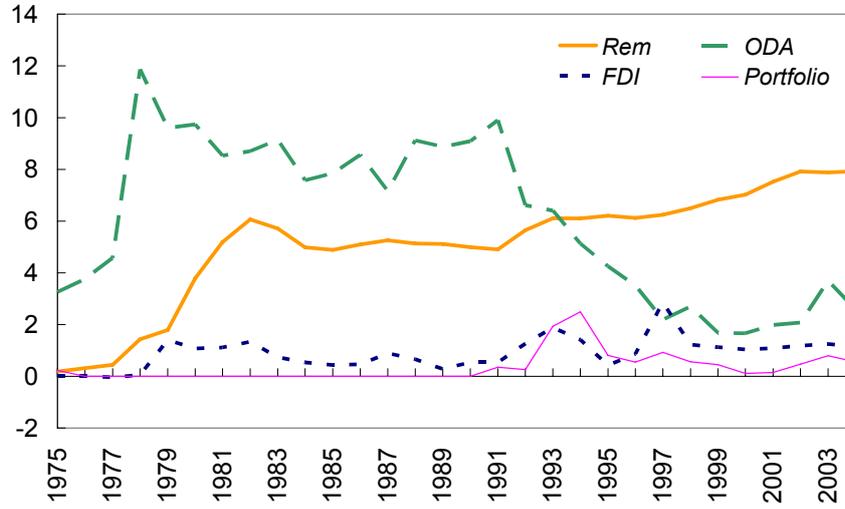
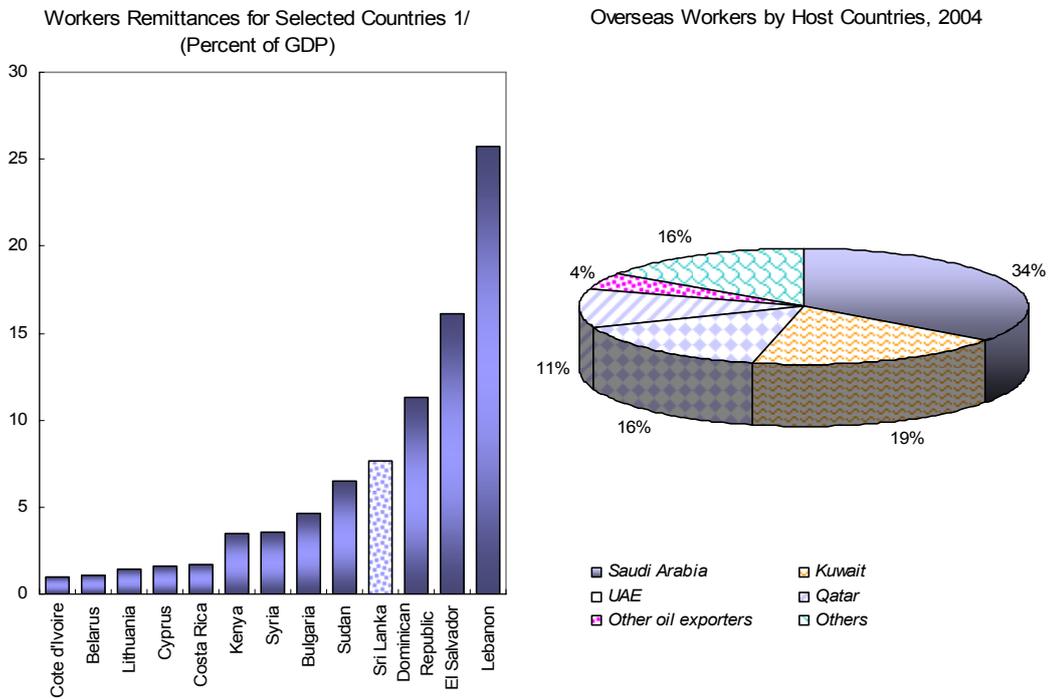
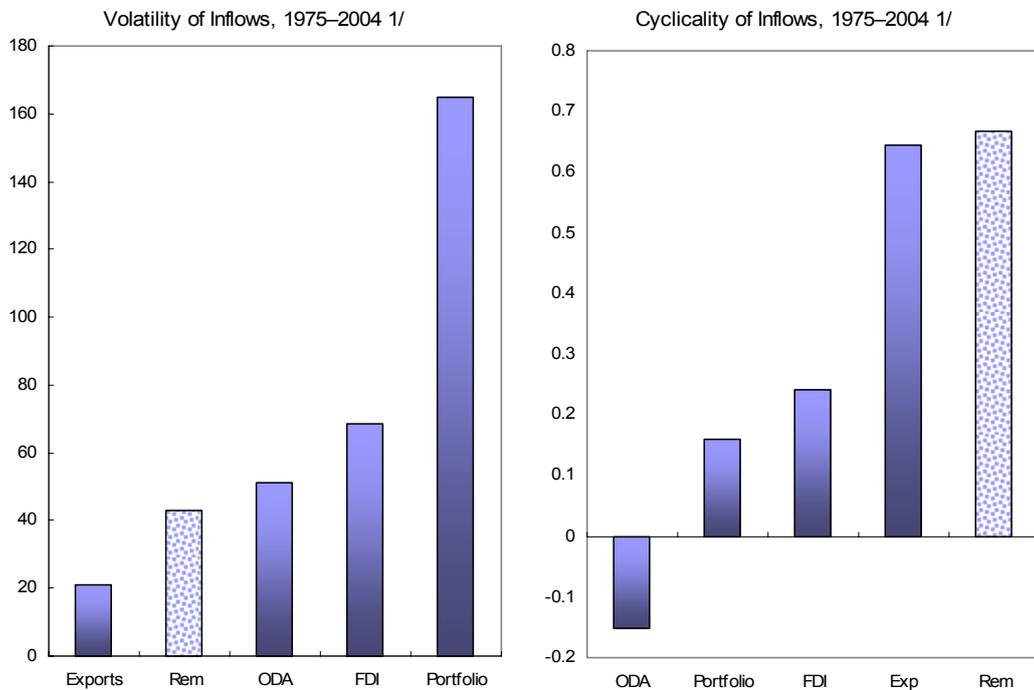


Figure 2. Sri Lanka: Stylized Facts About Remittances



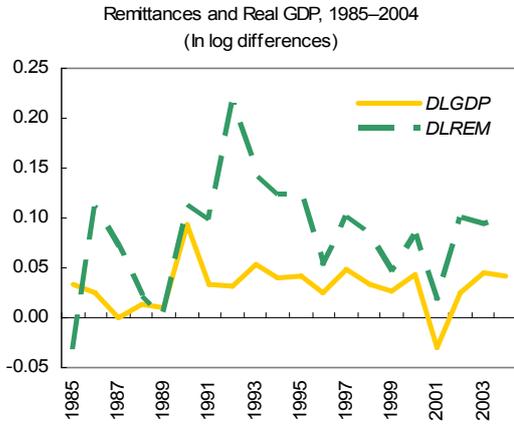
Source: IMF, *Balance of Payment Statistics Yearbook*.
 1/ Latest years. Countries have similar GDP in U.S. dollar terms.



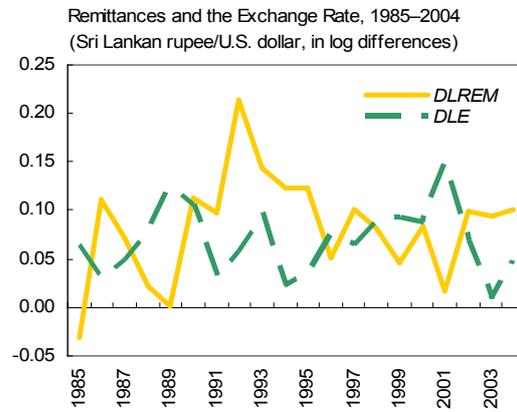
Source: IMF, *Balance of Payments Statistics Yearbook*.
 1/ Volatility is expressed in standard deviation as percent of the mean.

Source: IMF, *Balance of Payments Statistics Yearbook*.
 1/ Cyclicality is defined as the correlation between the inflow and GDP, both detrended.

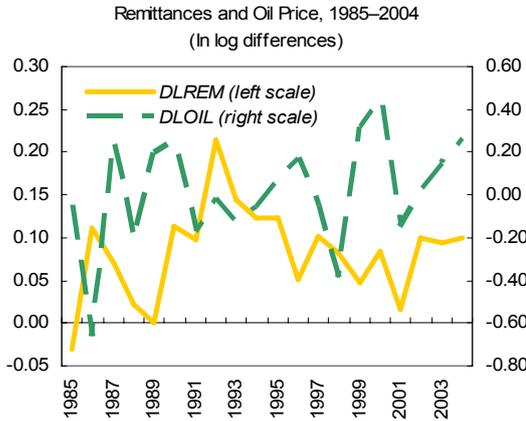
Figure 3. Sri Lanka: Correlations of Remittances and Macroeconomic Variables



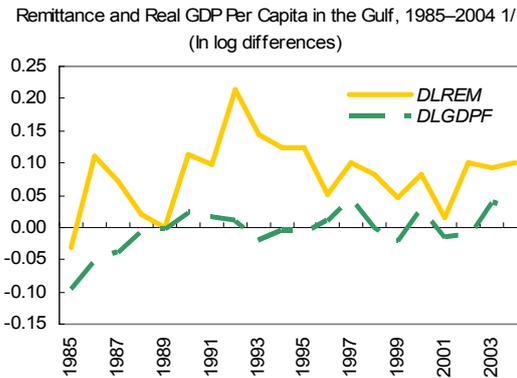
Sources: IMF, *Balance of Payments Statistics Yearbook*, and WEO database.



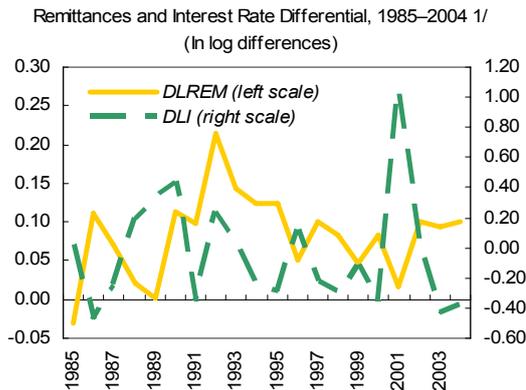
Sources: IMF, *Balance of Payments Statistics Yearbook*, and *International Financial Statistics Yearbook*.



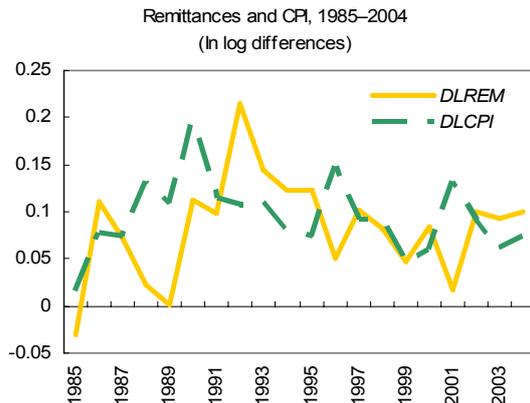
Sources: IMF, *Balance of Payments Statistics Yearbook*, and *International Financial Statistics Yearbook*.



Sources: IMF, *Balance of Payments Statistics Yearbook*, and *International Financial Statistics Yearbook*; World Bank, *World Development Indicators*.
1/ Average real GDP per capita of Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain, and Oman weighted by stock of Sri Lankan residents in 2004.

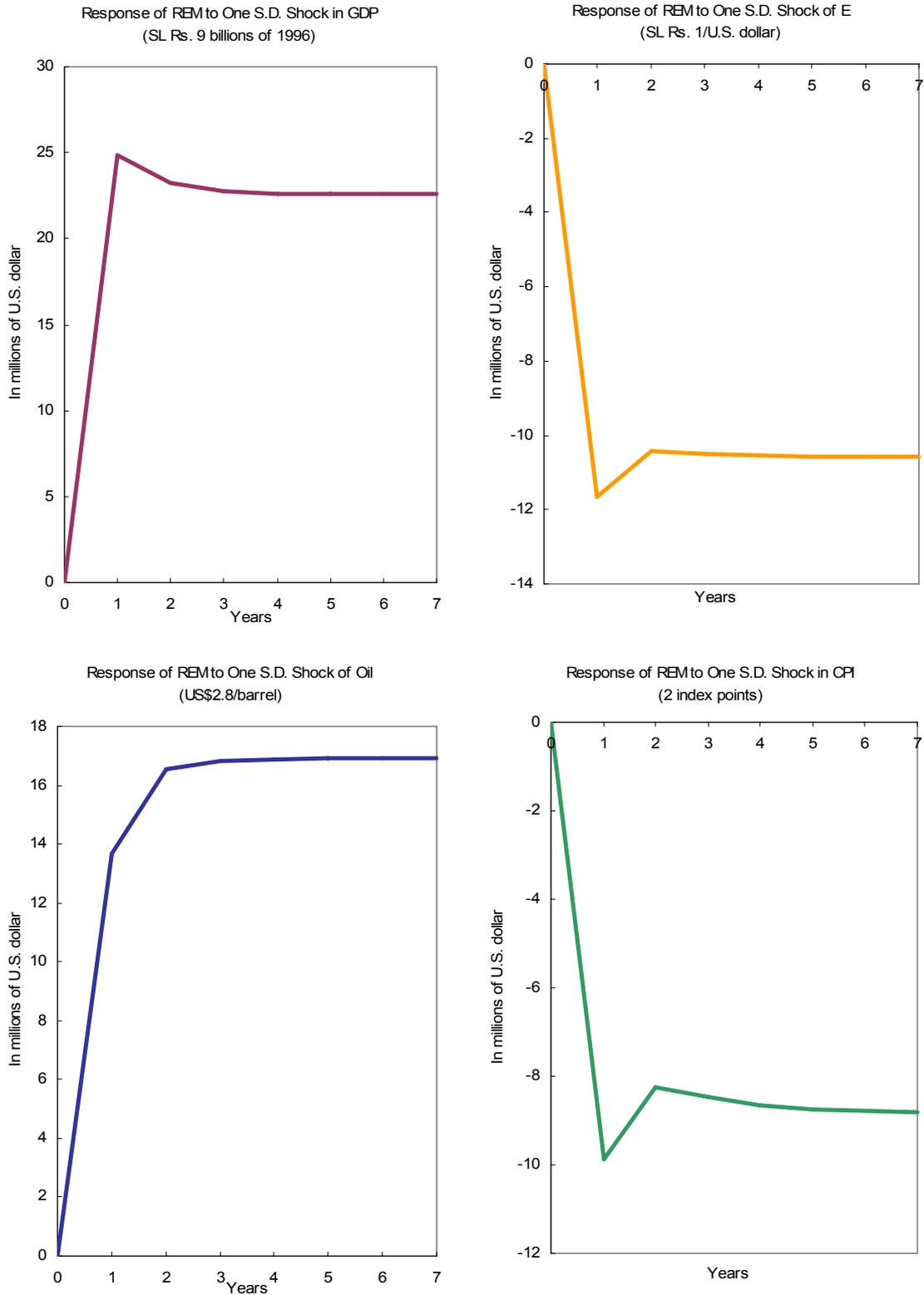


Sources: IMF, *Balance of Payments Statistics Yearbook*, and *International Financial Statistics Yearbook*; World Bank, *World Development Indicators*.
1/ Interest differential between the 3-month deposit rate in Sri Lanka and the 3-month LIBOR.



Sources: IMF, *Balance of Payments Statistics Yearbook*, and *International Financial Statistics Yearbook*.

Figure 4. Sri Lanka: Impulse Response Functions



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