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## Worker Remittances and Capital Flows

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## **Worker Remittances and Capital Flows**

by

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# Worker Remittances and Capital Flows\*

## Abstract

The debate on the risks and benefits of the globalisation of international capital markets has focused on the volume and the volatility of the main capital flows — foreign direct investment (FDI), portfolio investment, and foreign bank lending. Financial transfers in the form of worker remittances have received less attention in this context. This paper provides an analysis on the magnitude of remittances, their volatility, and their relationship to other capital flows. Moreover, we provide empirical evidence on the determinants of remittances and private capital flows.

Keywords: remittances, migration, capital flows

JEL classification: F22, F36, J61

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# 1 Motivation

The debate on the risks and benefits of the globalization of international capital markets has focused on the volume and the volatility of the main capital flows — foreign direct investment (FDI), portfolio investment, and foreign bank lending. The characteristics and determinants of worker remittances, in contrast, have received less attention. This is mostly attributable to the fact that worker remittances do not constitute capital flows in a strict sense for two reasons:

First, worker remittances are classified as current transfers and appear in the current account of the balance of payments, whereas capital flows belong to the capital or financial account. Current transfers are part of gross national product, while capital movements are a part of gross domestic product and are a source of financing.

Second, while capital flows between countries are defined as changes in the assets and liabilities of residents vis-à-vis non-residents, worker remittances are transfers of funds between nationals of a given country. Hence, an inflow of worker remittances does not constitute a capital import from a foreign country but rather a transfer of capital from nationals living abroad towards those living in the home country.

Despite these conceptual differences between worker remittances and international capital flows, it may be useful to think about worker remittances as enlarging the available funds that can be invested in the recipient country. In addition, remittances have grown in the context of the increased globalization. Thus, treating worker remittances as an alternative capital flow raises interesting questions that have not been treated in the literature so far. Much of the literature on the topic has focused on estimating the impact of remittances on income distribution, on identifying the determinants of remittances, or on studying the effects of migration and remittances for specific countries. In contrast to earlier work this paper focuses on the following five questions:

First, how important are worker remittances in quantitative terms? We provide cross-country evidence on the magnitude of remittances relative to key macroeconomic variables such as gross domestic product, exports, imports, domestic savings and investment, and international capital flows.

Second, what are the determinants driving worker remittances? The paper focuses on main macroeconomic determinants of remittances using a large cross-section of countries and comparing these determinants to those of private capital flows.

Third, how volatile are worker remittances? We compare the volatility of remittances to the volatility of capital flows. One prior of our analysis is that remittances could be more stable than private capital flows, and that they might even provide a stabilizing element during periods of financial instability.

Fourth, are remittances correlated with other capital flows? From a theoretical background, we could expect workers' remittances to be negatively correlated with private capital flows. If the motives for sending remittances are related to household constraints, migrants might try to shield their families against adverse shocks by increasing the flow of remittances.

The paper is structured as follows. In the following two sections, the economics of worker remittances and previous empirical work are discussed, both from a macroeconomic and microeconomic point of view. It follows a presentation of our own empirical evidence where we compare remittances with capital flows in terms of magnitude, determinants, volatility, and provide a correlation analysis between the different types of flows. Finally, we conclude with a summary of our results and an outlook for future research.

## **2 The Economics of Worker Remittances**

The economics of remittances and their determinants are both strongly linked to the theory of migration, as remittances are the economic contribution of migrants into labour-sending areas. Nevertheless, remittances and migration flows are not fully correlated, and although migrant streams have matured,<sup>1</sup> remittances have not declined (Graph 1). There are many reasons why remittances have been sustained, and these reasons are well founded both in macro- and microeconomic models.

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<sup>1</sup> For a limited set of countries for which data was available on a yearly basis, migration flows and remittances increased on average by 1.0 percent and 2.4 percent respectively over the 1975 – 1987 period (Graph 1).

## 2.1 Macroeconomic Models

Remittances can have a strong positive impact on the current account, but they can also have less beneficial features, such as leading to a Dutch disease effect. With remittances, an economy can spend more than it produces, import more than it exports or invest more than it saves, and this might even be more relevant for small economies (Connell and Conway 2000). Remittances are thus perceived as having a positive impact on the current account: They increase national income by providing foreign exchange and raising national savings and investment as well as by providing hard currency to finance imports preventing potential balance of payment crises. Thus, they perform a similar function as private and public capital flows since they provide both foreign exchange and additional savings for economic development (Djajic 1986, Quibria 1996, Russell 1986, Taylor 1999, Taylor et al. 1996a and 1996b).

However, if remittances generate demand greater than the economy's capacity to meet this demand, and if this demand falls on tradable goods, the import bill rises; if it falls on non-tradable goods, relative prices increase. Remittances can consequently draw resources away from the traditional tradable sector and into the non-tradable sector, thereby creating a Dutch disease effect. This can deteriorate the economy's payment position and worsen the welfare of families not receiving remittances (McCormick and Wahba 2000, Reichert 1981, Rivera-Batiz 1982).

Other potential negative welfare implications of remittances include the encouragement of continued migration of the working age population (Martin 1990). Also, remittances might create dependence among recipients accustomed to the availability of these funds, just as foreign aid might support inefficient governments (Boone 1995). All these attributes can perpetuate an economic dependency that undermines the prospects for development.

Remittances can influence growth and investment directly and indirectly. However, it is noteworthy that conditions that initially promote migration, such as low income and low productivity, may also discourage investment. The effects of remittances will therefore depend strongly on the government's policy to organize and control flows of remittances and to promote an economic environment conducive to investment in productive activities that would encourage migrants to remit (Glytsos 1997).

Apart of government policy, there are other macroeconomic determinants propelling the volume of remittances. These include the level of economic activity both in the host country, which should affect immigration quotas and wages, and in the home country, encompassing domestic income, the wage rate, the rate of inflation, black market exchange rates, interest rate differentials, secure means of transferring remittances, and the efficiency of the banking system (El-Sakka and McNabb 1999 and Russell 1986).<sup>2</sup> Finally, the number of migrant workers abroad, the share of temporary migrants in total migrants, and their wage are determinants of worker remittances.

## 2.2 Microeconomic Models

Welfare implications of remittances have also been derived based on microeconomic models, which stress risk sharing and access to informal loan markets. Stark and Bloom (1985) developed what is called the New Labour Economics of Migration (NELM) and focused on explaining remitters' behaviour by viewing the household as the relevant unit for the analysis.<sup>3</sup> NELM stresses the implicit co-insurance between migrants and their household of origin. Families engage in migration by sending one or more members abroad and bear the initial costs of migration. Subsequently, the migrants will share a portion of their income with the family of origin through remittances. The NELM theory argues that market failures that constrain local production (e.g., lack of access to credit markets) create incentives to send family members to work abroad. Migrants play, thus, the role of financial intermediaries by providing the family of origin with needed capital and income insurance (for instance, against crop failure) through remittances.<sup>4</sup> Thus, the NELM theory stresses risk spreading and the development of a relationship between migration and economic development by overcoming market failures (Massey and Par-

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<sup>2</sup> For instance, a widening difference between domestic and foreign interest rates will decrease the inflow of remittances, and a difference between official and black market exchange rates will lower the inflow of remittances through official channels. Furthermore, a well-developed financial infrastructure in the migrant-sending areas not only encourages migrants to send remittances, but also facilitates transfers on a more regular basis.

<sup>3</sup> These models are based on the neoclassic theory of Todaro (1969) that focused on migration behaviour as an individual decision, in which a person compares his expected income in two sectors or geographic areas.

<sup>4</sup> It is noteworthy that the decision to send remittances is also perceived as a two-way insurance contract, as remittances protect the migrant against the risk of losing contact with his family.

rado 1998). From a life cycle perspective, remittances are initially negative as the family bears the costs of migration. Subsequently, remittances increase once the migrant receives a salary abroad. Finally, if the migrants decide to settle down in the host country, remittances will fall. The migrant is then likely to play the role of an income insurer rather than income supporter, remitting only when needed.

The second theory has been developed by Poirine (1997) who suggested viewing remittances as an implicit family loan arrangement, which displays a “three waves” shape as illustrated in Graph 2.<sup>5</sup> Remittances are assumed to be the repayment of an informal and implicit loan contracted by the migrant for human capital development. The family invests first in the education of a future migrant and expects that the rate of return for the investment in human capital is higher than the one expected from investments, for instance, on a farm.<sup>6</sup> Once working abroad, the migrant remits a significant portion of his income to his family in order to pay back the loan during the first years. In a second stage, remittances are implicit loans made by migrants to siblings to finance their education back home, until they are themselves ready to migrate. In this phase, the amounts remitted are expected to diminish in aggregated numbers because not all migrants are expected to give a loan to family members. Before returning to their original country, migrants invest accumulated capital at home, therefore the amount of remittances increases. Later, the next generation’s emigrants repay the loan to the former emigrant-lenders, who may have retired in the home country. In addition, Poirine theorized that the average aggregated value of remittances to a country will be higher the larger the proportion of temporary migrants in total migrants because they will go through the three waves in a shorter time. As in the NELM theory, remittances will fall in the case of permanent migration, and they may cease eventually completely.

The effects of remittances on investment can be drawn from the two theories cited above. According to the NELM perspective, the money remitted, after paying migration costs, contributes first directly to household income. Second, remittances ease financial constraints on household production, and thus create a first-round of indirect effects, supplementing the primary contribution to income. Remittances

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<sup>5</sup> For a similar reasoning see Stark (1991).

<sup>6</sup> Instead of providing part of the family income by working on the farm or in the family business, the future migrant is sent to school. The family suffers from foregone income and costs for education arise, especially if housing and consumption have to be financed for the student not staying with his family.



might relax borrowing constraints that bank regulations impose on small-scale investments. Oftentimes, small businesses in developing countries tend to be family-owned, and they are generally undercapitalised and technologically disadvantaged. Consequently, remittances could be important for the establishment and growth of these businesses. Finally, the demand for goods stimulated in remittance-receiving households will foster economic activity in other households, thereby breeding second-round effects. Hence, migration (and thus remittances) will have positive welfare implications when the losses of labour are small and when households initially face binding constraints on local production. From a longer term and according to the informal loan theory, remittances can enhance investment and growth by providing better human development, as long as the migrant returns to his home country once the loan has been fully repaid.

Furthermore, remittances can have an impact not only on the quantity but also on the quality of investment. Since migrants have a better understanding of local conditions than foreign creditors, remittances might help to overcome asymmetric information and enforcement problems that typically beleaguer international capital markets. Gordon and Bovenberg (1996) and Razin et al. (1998) model the fact that domestic investors are better informed about local investment opportunities than foreign investors. Remittances not only provide access to funds from abroad, but they could also be associated with better information at lower costs than other forms of capital flows.

Obviously, the effects of remittances on investment and growth are strongly linked to the determinants of remittances. Theories mentioned above support a similar set of determinants that pertain to the socio-economic characteristics of the individual and his family, and that can influence the incentives to remit and the amount of remittances. Remittances are, on the one hand, driven by the demand side, that is the family's need for support, and they are, on the other hand, determined by the migrants' education, their income levels and the motivation to transfer the accumulated capital and to invest it in their home country (Brown 1997). As explained in the informal loan theory, the time horizon of the migrant worker is an important aspect, which affects the formation of the saving target (Glytsos 1997). Furthermore, Poirine (1997) identifies the amount lent by the family to the migrants, the implicit rate of interest, and the expected payback period as the variables determining the amount remitted.

### 3 Previous Empirical Work

Much of the available empirical evidence on remittances is at the microeconomic level, based on survey data with a focus on the migrant-worker and household behaviour. The literature on the implications of remittances on the overall economy is much less rich. We will briefly summarize the main findings below.<sup>7</sup>

#### 3.1 Microeconomic Studies

When empirically testing the hypotheses of the two microeconomic models aforementioned, evidence shows that migrants and their families engage in migration for improving their well-being and that remittances are perceived as the economic linkage between them (Hoddinott 1994, Lambert 1994, Lucas 1987, Lucas and Stark 1985, Massey and Parrado 1998, Rozelle et al. 1999).

Several microeconomic studies on different countries or regions indicated that the education and the income level of the migrant and his family are the main determinants of remittances.<sup>8</sup> Other important determinants shaping the amount remitted include the length of actual or expected stay of the migrant abroad, the number of dependents at home, and marital status (Durand et al. 1996a, 1996b, Merkle and Zimmerman 1992, Swamy 1981, Oberai and Singh 1980).

In empirical papers based on micro-data, the use of remittances is studied by comparing expenditure patterns of households with and without remittances. The evidence shows that the bulk of remittances is spent on consumer goods (Durand et al. 1996a, Georges 1990, Massey and Parrado 1994, Oberai and Singh 1980).<sup>9</sup>

At the same time, most studies indicate that a certain share of remittances is spent on income and employment generating activities or so-called productive invest-

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<sup>7</sup> Taylor et al. (1996a and 1996b) provides an exhaustive review on the empirical literature.

<sup>8</sup> The higher the migrant's education and income level and the lower the family's education and income level, the higher the amount that will be remitted. A high level of education of the migrant could imply higher income and therefore larger financial means for sending remittances. But a high level of education could also mean that the family lent a substantial amount to the migrant for his education, so significant remittances can indicate repayment of these schooling expenses. In addition, the lower the income of the family, the greater is the need for financial support.

<sup>9</sup> Like community surveys, national-level surveys show a fair consensus on the use of remittances for mostly daily expenses, regardless of the country studied (Russell 1986, Keely and Tran 1989, Durand and Massey 1992, Taylor et al. 1996a).

ment, and that remittances have facilitated the capitalization of migrant-owned businesses (Cornelius 1990, Durand and Massey 1992). Therefore, remittances can lead to some productive investment and local economic growth in receiving communities. Furthermore, evidence shows that remittance-receiving families exhibit a higher propensity to invest (Adams 1991). Remittances can thus play a positive role for investment, independent from their initial contribution to the household income. Applying the NELM theory and using a computable general equilibrium model, Adelman and Taylor (1996) found, for instance, that one percentage change in remittances generated a 0.3 percentage change in total income in a Mexican village and, in the long run, taking the positive investment effect into account, the income elasticity increased by 10 percent.

### 3.2 Macroeconomic Studies

The main problem of micro-economic case studies is that they tend to undervalue the macroeconomic impact of remittances by focusing on isolated communities. Therefore, several studies have looked also at the macroeconomic effects of remittances and found that remittances often provide a significant source of foreign currency, increase national income, and support the balance of payments (Durand et al. 1996a and 1996b, Haderi et al. 1999, Taylor et al. 1996b).

Regarding the determinants of remittances, there is no strong consensus in the literature. An econometric analysis carried out by Straubhaar (1986) of remittances data of Turkey shows that flows of remittances were neither affected by variations of the exchange rate nor by changes in the real return of investment. However, Nayyar (1989) claimed that, in India, repatriated deposits grew at a faster rate in response to interest rate differentials created by the drop in international capital market rates. Other main determinants identified include the level and cyclical fluctuation in economic activity in the host countries and the number of migrants abroad and their wages (Swamy 1981).

There is hardly any empirical work on how remittances affect savings and investments, except for aggregated case studies of individual countries. Adelman and Taylor (1990), for instance, have developed a social accounting matrix model for Mexico, and their findings reveal that for every dollar sent back to Mexico, GNP increases on average by US\$2.90 and the economic output by US\$3.2. Again, the

effects of remittances on economic development vary from country to country as the propensity to save differs.

## 4 Empirical Evidence

One shortcoming of the existing literature on worker remittances is that it mainly relies on microeconomic studies and, therefore, does not fully address the main questions of our current study. We thus begin by presenting evidence on the magnitude and determinants of remittances for a large cross-section of countries. To the best of our knowledge, there are no studies focusing on the volatility of remittances and on the interaction of remittances with other forms of capital flows. Hence, in this section, we provide new empirical evidence on these issues. Data presented in the following was drawn from a sample of 145 countries, for which information was generally available from 1970 to 1999 (Table 1).<sup>10</sup>

### 4.1 Magnitude

Contrary to earlier predictions that remittances would lose in importance over time (Birks and Sinclair 1979), remittances have grown more rapidly than international migration flows. Average annual worker remittances plus compensation of employees stood at about US\$81 billion (1995 prices) over the last decade, which is equivalent to about 1.5 percent of world merchandise exports. Remittances streams have developed over the years from an annual average of US\$22 billion in the 1970s to US\$81 billion in the 1990s, representing almost a twofold increase in each decade (see Table 2 and Graph 3). Developing countries and in particular the Western Hemisphere are increasingly becoming the recipients of these flows, to the detriment of developed countries; the developing country share in total remittances increased by 60 percent from 1970 to 1990, while the developed countries' share decreased by 33 percent over the same period. Looking at the structure of the data over time by computing the coefficient of correlation of the countries' ranking in absolute terms over the last three decades, we found that the structure of the data

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<sup>10</sup> Appendix 1 provides the definition and sources of the data.

changed very slowly, with a strong correlation between 1970s and 1980s (0.9), and a significant correlation between 1980s and 1990s (0.7).

Table 3 presents a detailed breakdown by country of the absolute and relative magnitude of remittances. Remittances are most significant in percentage of GDP for island states, like Samoa and Kiribati in the Pacific Ocean, Cape Verde in the Atlantic Ocean, and Jamaica and the Dominican Republic in the Caribbean Sea. Also for two small states, Lesotho and Swaziland, which border South Africa, remittances as a share of GDP are exceptionally high. South Africa is often seen as a hub by its neighbouring countries because of a significant wage gap, and both the agricultural and mining sectors employ a large proportion of migrants. A third group of countries receiving remittances far above average values are some Middle Eastern countries, including Yemen, Jordan, and Egypt. Half of the Middle Eastern countries receive more remittances than capital from abroad. The proximity of these countries to oil-producing OPEC countries and the resulting demand for labour is certainly a contributing factor. Finally, Albania and Georgia, as well as El Salvador stand out with high remittances as a percentage of GDP. The same group of countries is at the top when measuring remittances as a percentage of exports and imports. Exceptionally high values of remittances over exports are measured for Lesotho, Albania, and Cape Verde.

When comparing remittances to capital inflows, we find estimated aggregated private capital inflows to be much higher than remittances (17 times larger for the world and 31 times for developed countries). The mean value of remittances, of private and official capital inflows to developing countries, for our sample is 0.6, 2.2, and 1.6 percent relative to GDP respectively. Thus, for most countries remittances are lower than private capital flows and official capital inflows. Yet, our estimates show that for 18 countries, remittances are higher than private capital flows and, for 5 countries, they are higher than official capital inflows. Thus, for a number of developing countries, such as Lesotho, Albania, and Jordan, annual remittances exceeded private and official capital inflows, making remittances the principal source of foreign exchange (Table 4).<sup>11</sup>

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<sup>11</sup> To perform a better analysis over time, we excluded ten countries for which data were missing. The ten countries are Angola, Anguila, Barbados, Hong Kong, Mongolia, Montserrat, Netherlands Antilles, Solomon Islands, Turkmenistan and Uruguay. These countries were also excluded in Tables 5 and 7.

In addition, most countries have participated in the global increase of capital and remittance flows; world private capital inflows and world remittances have increased over the 1970–1999 period by 328 percent and 261 percent, respectively. Again, the pattern for developing countries differs: workers’ remittances, private and official capital inflows grew, respectively, at 470 percent, 238 percent, and 102 percent over the same time period (Table 6). However, several countries have even experienced a significant expansion of remittances, compared to growth rates of other capital inflows (30 percent of the countries had higher growth rates of remittances compared to private capital flows) (Table 5). Mexico is a good illustration with growth rates of remittances of 980 percent, private capital inflows of 370 percent and official capital inflows of 264 percent.

## 4.2 Macroeconomic Determinants

The previous section has shown that remittances are most important for small, less developed countries, and for island states. Also, remittances and private capital flows seem fairly uncorrelated. In order to test more rigorously for the determinants of workers’ remittances in comparison to private capital flows, we estimate cross-section regressions that use macroeconomic factors as explanatory variables. The dependent variables are workers’ remittances and private capital flows, both in logs and relative to GDP.<sup>12</sup>

As explanatory variables, we include log GDP per capita as a measure for the state of development of a country. As an alternative measure, we try the index of human development as published by the United Nations and the index of economic freedom as published by the Heritage Foundation.<sup>13</sup> However, both of these indicators turn out to be highly correlated with GDP per capita (correlation of 0.79 and –0.78, respectively). Including all three as a measure of economic development

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<sup>12</sup> Although it would be interesting to assess the determinants of official capital flows to GDP as well, we did not include such estimates because we lacked information on official capital flows for a large number of countries.

<sup>13</sup> This index includes the degree of regulation in the banking system, the importance of a black market for the domestic currency, and the degree of regulation of the labour market. All of these indicators can be expected to have an impact on the incentives to migrate and/or to send remittances back home. However, due to a high degree of correlation between the individual components of the aggregated index, we are unable to isolate these effects empirically. Note that the index of economic freedom increases in the degree of restrictions imposed on economic activities.

would thus create problems of multicollinearity. Due to greater explanatory power of GDP per capita, we use this measure in our baseline regression. We expect a negative coefficient for remittances since, in more developed countries, incentives for migrate abroad are relatively small.

In addition to the degree of economic development, macroeconomic instability is likely to have an impact both on the decision to migrate and on the incentives to remit part of the income earned abroad. We capture the degree of macroeconomic instability through the average domestic inflation rate for the 1990s. The expected impact on remittances is not clear-cut: On the one hand, an instable macroeconomic environment creates incentives to migrate abroad. Therefore, high inflation might have a positive impact on remittances as well. On the other hand, the higher inflation and the greater the uncertainty about future price changes, the lower the expected rate of return on money remitted. The expected impact of inflation on remittances would thus be negative. Finally, we include a dummy for island states in our baseline regression since the stylised facts reported above suggest that remittances are important for these countries.

In the baseline equation (results not reported), both GDP per capita and the island-dummy enter with the expected negative and positive signs, respectively, and they are statistically significant. Inflation, in contrast, is insignificant. The explanatory power is relatively low: only about 12 percent of the cross-country variation in the data is explained. However, adding GDP growth, an index for the importance of female economic activity, and the index of economic freedom, raises the explanatory power substantially to an adjusted  $R^2$  of 0.28 (Table 9).

High domestic growth rates have a positive effect on remittances, suggesting that the decision to remit is motivated by high rates of return that can be obtained in the home-country. Interestingly, the higher female employment in the home country, the lower are remittances, and this effect is statistically significant. The most plausible explanation of this finding is that there is less need to remit money from abroad to women who have stayed behind if women have relatively good employment opportunities.<sup>14</sup>

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<sup>14</sup> Our prior would have been that migration is typically a male activity and that we might find high shares of female employment in countries with high shares of outward-migration (and thus high remittances) Hence, the coefficient on the index of female activity would be possible. However, according to the “Gender and Migration” Report of the International Labour Organization, outward migration is not necessarily dominated by men. Rather, women repre-

Since we have specified these equations having in mind the potential determinants of remittances, it should not come to a big surprise that the explanatory variables have little power in explaining the cross-countries variation in private capital flows (Column 3).<sup>15</sup> In fact, virtually all variables that we find to be significant in explaining remittances are either insignificant (female activity, island dummy) or have the opposite sign (GDP per capita) for private capital flows.

As the above stylised facts have suggested that remittances are more important for the sub-sample of developing countries, we have additionally split the sample by interacting all variables with a dummy which was set equal to one for developing countries. As column 2 of Table 9 shows, our results are indeed driven almost entirely by this sub-sample. The positive ‘island-effect’, for instance, is a feature of developing countries only, and so is the negative impact of the share of female employment. Likewise, the negative effect of inflation is confined to developing countries; for the whole sample, the effect is positive. Finally, the coefficient on GDP growth is significant and positive for the entire sample, while it becomes significantly negative when being interacted with the developing country dummy.

### 4.3 Volatility

Basic theory tells us that savings might be viewed as a stable function of income, while investments are interest-elastic and hence more volatile. Since remittances are part of current transfers, which are a function of income, one could expect remittances to be less volatile than private capital inflows. Furthermore, private capital inflows are driven by foreign investors who seek for favourable business environment, while remittances are money sent by emigrants who have kept ties with their home families. Theoretical models suggest that remittances flows depend on the economic commitment between the migrant and his family. Therefore, remittances might be more stable than other capital flows and, especially in a context of financial crisis, when capital flows dry out, remittances may even increase.

We presume that remittances are more stable than other capital flows. Graph 3 portrays trends in remittances, private, and official capital inflows in constant prices

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sent half of the migrant population and in some countries, and they even account for 70 or 80% of the total.

<sup>15</sup> Also, the statistical properties of the equations estimated for private capital flows are worse than those for remittances. However, including a dummy for Japan could in most cases cure the violation of the assumption that the residuals are normally distributed.



over the 1970-1999 period, and Table 6 presents coefficients of variation of the three types of flows. The volatility of remittances is smaller than that of private capital flows and also smaller compared to official capital inflows. This is true for all regions, except Asia which generally experienced much higher levels of volatility. On average, world remittances and private capital flows had a coefficient of variation of 0.60 and 1.18, respectively. Regarding developing countries, remittances, private and official capital flows had coefficients of variation of 0.66, 2.52, and 0.89, respectively, over the same period (Table 6).

The difference in volatility is even more striking when looking at individual countries. 107 out of 135 countries have a volatility of workers' remittances lower than that of private capital inflows, 70 countries have a lower remittance volatility compared to that of official capital inflows, and 62 countries have a lower remittance volatility compared to both capital inflows (Table 7). Both the African and Middle-Eastern and North African continents had a lower remittances' volatility compared to private capital flows (88 percent of the countries). Generally, most of the 14 countries for which the volatility of remittances equals the volatility of official capital inflows (accounting for a 5 percentage point difference) are Latin American countries.

#### 4.4 Correlation Analyses

While theoretical considerations might suggest that workers' remittances are negatively correlated to private capital flows, this does not show up in the data. Rather, remittances as a percent of GDP appear to be strongly correlated with a coefficient of 0.78 when looking at all the countries, less correlated when looking only at the developed countries (0.58), and even less for developing countries (0.44). Regarding official bilateral inflows, workers' remittances are insignificantly correlated (0.35) (Table 8). Analysing the correlation between workers' remittances and private and official capital inflows from a country-by-country angle, we found no clear pattern, neither for developed, nor for developing countries. The coefficients of correlation between remittances and private capital inflows and between remittances and official capital inflows both range from being highly positive (0.9) to highly negative numbers (-0.9). Countries for which a negative correlation was found include Slovenia, Indonesia, Slovak Republic, Cambodia, Chile, Comoros, Lesotho and Tanzania.

Developing countries tend to be vulnerable to external shocks, such as terms of trade shocks, and they typically face liquidity constraints. These macroeconomic disturbances impede them from allowing the stabilizers to work fully and therefore they tend to adopt procyclical fiscal policy. When looking at the empirical regularities of official aid, Bulir and Hamann (2001) and Pallage and Robe (2001) find that aid flows tend to be procyclical, therefore not providing support to the government facing macroeconomic difficulties. These negative effects must then be taken into consideration when assessing the welfare implications of foreign aid.

According to the theory, migrants play the role of financial intermediaries by providing the family of origin with needed income through remittances. We could therefore expect that remittances will be sent to shelter the family of origin against adverse shocks. Using the first differences of remittances and GDP (in constant prices), aggregated remittances were found to be positively correlated to business cycles. This implies that remittances do not harbour family against loss of income, but rather are perceived as funds for possible additional investment as previously underlined in the macroeconomic determinants section. When looking at individual country data, it appears that remittances exhibit a characteristic of anticyclicity for some countries, such as Rwanda, St. Lucia, Yemen, Trinidad & Tobago, St. Vincent & the Grenadines, Antigua and Barbuda and the Dominican Rep.

## **5 Summary of Results and Outlook for Future Research**

The economics of worker remittances have so far largely been ignored in the globalisation debate in general and in international finance in particular. Worker remittances were typically viewed as being important for a few smaller developing countries only, as being used mainly for consumption purposes, and thus as having a relatively limited aggregated impact on investment and growth.

Yet, the evidence presented in this paper suggests that the low profile that worker remittances have in the academic and policy debate is unwarranted. Worker remittances might not only be more stable than private capital inflows, hence providing countries with relative reliable access to financial resources. Also, they might help to overcome information asymmetries in inefficient domestic financial markets and thereby improve the quality of investment in developing countries.

The results of this study thus hold potentially interesting implications for policy-makers not only in developed but also in developing countries. By granting access to their labour markets, industrialized countries cannot only contribute to a more efficient allocation of labour internationally. They can also contribute to more stable and more efficient flows of capital towards lesser-developed countries and potentially promote growth in these economies. More specifically, the results of this study can be summarized as follows:

First, remittances worldwide have increased during the last three decades, especially for developing countries. However, compared to private and official capital flows, remittances are generally small.

Second, we find that worker remittances relative to GDP are high especially for small and relatively disadvantaged developing countries such as island states or countries with a poor institutional framework. Demographic factors such as the share of female employment were also found to have a significant impact on remittances.

Third, we find the volatility of remittances to be lower than that of private and official capital flows. Hence, countries having a high share of remittances relative to capital flows might be experiencing more stable inflow of funds from abroad.

Fourth, we have analyzed not only whether remittances are more or less volatile than capital inflows but also how these flows are correlated. A negative correlation between remittances and private capital flows would support theories that suggest that workers living abroad try to shield their families back home from adverse economic shocks by sending remittances. Contrary to this, we find remittances to be strongly positively correlated to private capital flows and insignificantly correlated with official capital flows when looking at all countries. However, analyzing the countries individually shows that patterns of correlations differ substantially between groups of countries.

Finally, for the aggregated data, remittances are positively related to the business cycle. However, the correlation analysis also reveals widespread results for individual countries.

One interpretation of our findings is that remittances are found to be linked positively to economic growth. Thus remittances may not only tend to shield families back home as suggested by the literature, but may also be seen as additional funds that can enlarge the pool of capital.

There are several interesting routes along which the results of this study could be extended and modified. Most of the results we have presented are based on univariate statistical measures. Adding additional explanatory variables in a framework would be a natural extension. Moreover, it would be of interest to analyze the determinants of remittances in a panel framework to investigate determinants of remittances also over time. Finally, using bilateral data in remittances and migration flows would allow testing additional determinants such as the presence of a common cultural framework.

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Table 1 — List of Countries

Developed	Developing Countries				
	Africa	Asia	Europe	Middle-East & N. Africa	Western Hemisphere
Australia	Angola	Bangladesh	Albania	Egypt, Arab. Rep.	Anguilla
Austria	Benin	Cambodia	Armenia	Israel	Antigua and Barbuda
Belgium	Botswana	China, People's Rep of	Azerbaijan	Jordan	Argentina
Denmark	Burkina Faso	Fiji	Belarus	Morocco	Aruba
Finland	Cameroon	Hong Kong, China, P.R.	Bulgaria	Oman	Barbados
France	Cape Verde	India	Croatia	Syrian Arab Republic	Belize
Germany	Central African Rep.	Indonesia	Cyprus	Tunisia	Bolivia
Greece	Chad	Kiribati	Czech Republic	Yemem, Republic of	Brazil
Iceland	Comoros	Korea	Estonia		Chile
Ireland	Congo, Republic of	Lao People's Dem. Rep	Georgia		Colombia
Italy	Core d'Ivoire	Malaysia	Hungary		Costa Rica
Japan	Djibouti	Maldives	Kazakhstan		Dominica
Luxembourg	Equatorial Guinea	Mongolia	Kyrgyz Republic		Dominican Republic
Netherlands	Ethiopia	Myanmar	Latvia		Ecuador
New Zealand	Ghana	Nepal	Lithuania		El Salvador
Norway	Guinea	Pakistan	Macedonia, FYR		Guyana
Portugal	Guinea-Bissau	Philippines	Malta		Haiti
Spain	Kenya	Samoa	Moldova		Honduras
Sweden	Lesotho	Solomon Islands	Poland		Jamaica
Switzerland	Madagascar	Sri Lanka	Romania		Mexico
United Kingdom	Mali	Thailand	Russia		Montserrat
USA	Mauritania	Vanuatu	Slovak Republic		Netherlands Antilles
	Mozambique		Slovenia		Nicaragua
	Namibia		Turkey		Panama
	Niger		Turkmenistan		Paraguay
	Nigeria		Ukraine		Peru
	Rwanda				St. Kitts and Nevis
	Senegal				St. Lucia
	Seychelles				St. Vincent & the Grenadines
	South Africa				Suriname
	Sudan				Trinidad & Tobago
	Swaziland				Uruguay
	Tanzania				Venezuela
	Togo, Zimbabwe				



Table 2 — Total Workers' Remittances by Region (annual average)

	1970–1979	1980–1989	1990–1999	1970–1979	1980–1989	1990–1999	1970–1979	1980–1989	1990–1999
	in US\$ billion (constant prices)			as a share of total remittances (in percent)			Per capita in US\$ (constant prices)		
<b>Total</b>	<b>22</b>	<b>49</b>	<b>81</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>6</b>	<b>11</b>	<b>15</b>
Developed countries	14	22	34	64	44	43	20	28	42
Developing countries	8	28	46	36	56	57	3	7	10
Africa	1	2	3	3	4	3	4	5	5
Asia	3	12	18	12	23	22	3	5	6
Europe	2	3	6	9	6	7	6	8	13
Middle East	2	7	10	9	15	12	16	43	44
Western Hemisphere	1	4	11	3	8	13	3	11	24

Source: IMF (2002a) and World Bank (2002).

*Table 3 — Total Workers' Remittances in Absolute and Economic Terms (Average 1990's, ordered by percentage of GDP)*

Central African Rep., Chile, Congo Rep. of, Guyana, Haiti, Kenya, Suriname and Uruguay are excluded from the list as no data was available for this period. For remittances as a percentage of gross domestic investment, the figures for 1999 were extrapolated using the growth rate of gross national investment from 1998 to 1999.

	Total (US\$ million, (1995 prices)	per capita (US\$, 1995 prices)	as a percent of GDP	as a percent of exports of goods and ser- vices	as a percent of imports of goods and ser- vices	as a percent of gross domestic savings	as a percent of gross domestic investment	as a percent of LT debt ser- vice
Lesotho	391	204.78	44.55	200.96	40.26	(137.98)	67.44	1 174
Samoa	41	250.49	26.75	68.24	33.55	(329.19)	71.23	888
Albania	365	104.95	19.05	139.42	48.26	(206.16)	105.34	3 712
Jordan	1 150	206.16	18.44	36.93	25.22	381.33	63.67	179
Cape Verde	79	205.04	18.27	99.13	33.73	544.77	47.62	812
Kiribati	7	80.48	15.37	34.72	12.92	(44.29)	27.76	-
El Salvador	932	165.52	10.77	48.84	30.32	302.33	63.87	336
Yemem, Republic of	1 170	80.96	10.03	42.96	41.76	419.63	120.58	-
Jamaica	487	196.54	8.92	17.05	15.29	46.49	34.73	92
Swaziland	91	102.60	7.86	9.85	7.93	35.78	31.75	326
Georgia	316	58.57	7.30	32.51	19.70	789.97	59.70	444
Dominican Republic	840	108.77	7.28	17.05	14.85	46.95	30.71	270
Egypt, Arab Rep.	4 177	71.38	6.59	32.26	23.63	50.95	34.47	199
Philippines	4 047	58.50	6.37	16.29	13.98	39.45	28.11	94
Morocco	2 039	77.82	6.37	23.89	20.09	40.50	28.97	72
St. Kitts and Nevis	16	388.25	6.29	11.97	8.75	24.54	13.64	361
Sri Lanka	739	41.12	6.05	17.86	14.18	36.84	24.37	213
Comoros	14	23.56	5.83	31.60	14.01	(177.54)	28.95	649
St. Vincent & the Grenadines	14	124.66	5.13	9.79	7.36	48.29	17.13	-
Dominica	10	140.51	4.70	9.37	7.27	29.46	15.61	171
Benin	97	18.06	4.56	17.41	12.76	80.25	28.46	264
Vanuatu	10	58.39	4.52	8.95	8.72	48.13	14.37	713
Bangladesh	1 212	10.23	4.36	30.23	19.66	23.07	16.34	215
Mali	107	10.97	4.31	21.66	11.71	54.39	18.59	179
Portugal	4 149	418.49	4.30	14.20	11.00	24.78	16.88	-

Table 3 continues ...

... Table 3 continued

	Total (US\$ million, (1995 prices))	per capita (US\$, 1995 prices)	as a percent of GDP	as a percent of exports of goods and ser- vices	as a percent of imports of goods and ser- vices	as a percent of gross domestic savings	as a percent of gross domestic investment	as a percent of LT debt ser- vice
Antigua and Barbuda	22	322.04	4.17	5.11	4.91	14.86	12.87	-
Armenia	90	24.11	4.15	17.86	9.76	5 301.15	16.21	389
Nicaragua	107	24.32	4.04	20.05	9.69	(126.93)	24.68	58
Burkina Faso	101	9.94	3.82	31.68	14.18	49.20	17.41	257
Tunisia	634	71.62	3.72	8.87	8.01	15.61	13.24	47
Honduras	141	25.43	3.61	8.96	7.55	15.83	11.99	36
Belize	19	87.69	3.35	6.29	5.51	17.47	13.06	69
St. Lucia	19	129.44	3.30	5.21	4.70	20.95	14.92	180
Djibouti	15	26.28	3.12	7.00	4.50	(29.34)	25.26	-
Croatia	488	106.08	3.10	6.63	5.63	24.56	14.96	100
Pakistan	1 602	12.66	2.96	17.47	12.33	23.57	15.19	72
Barbados	54	204.83	2.72	5.00	5.13	15.50	18.81	63
Nepal	104	5.14	2.68	12.19	7.91	20.22	11.61	126
Moldova	82	19.60	2.67	5.55	4.75	10.77	7.81	99
Senegal	127	15.25	2.52	9.21	7.27	26.21	15.61	76
Greece	2 781	267.13	2.51	18.62	12.18	20.20	12.45	-
Sudan	266	9.64	2.38	48.48	21.20	n.a.	n.a.	4 432
Mozambique	61	3.89	2.21	15.44	5.48	(47.39)	11.40	66
Ecuador	308	27.13	2.09	7.09	7.45	9.14	9.75	23
Nigeria	776	7.93	2.09	6.15	7.37	10.96	13.45	58
Paraguay	161	33.83	2.08	4.51	4.26	16.58	9.36	70
Turkey	3 589	59.64	2.06	9.96	9.19	10.28	8.55	37
Macedonia, FYR	66	32.55	1.99	5.86	4.56	27.08	14.48	66
India	6 293	6.90	1.80	18.19	14.57	8.97	7.71	67
Belgium-Luxembourg	4 336	412.56	1.71	2.52	2.67	7.02	9.17	-
Fiji	27	35.18	1.54	2.73	2.62	11.64	11.61	49
Togo	22	5.44	1.50	4.13	3.04	20.00	9.07	81
Seychelles	7	98.72	1.45	2.37	2.05	6.63	4.62	41

Table 3 continues ...

... Table 3 continued

	Total (US\$ million, (1995 prices))	per capita (US\$, 1995 prices)	as a percent of GDP	as a percent of exports of goods and ser- vices	as a percent of imports of goods and ser- vices	as a percent of gross domestic savings	as a percent of gross domestic investment	as a percent of LT debt ser- vice
Botswana	60	41.73	1.37	2.48	2.80	3.82	4.97	60
Mexico	4 606	51.03	1.25	5.20	4.80	5.90	5.40	22
Slovenia	193	97.13	1.21	2.04	2.06	5.19	5.41	-
Panama	95	36.32	1.19	1.32	1.29	4.78	4.33	32
Cyprus	82	112.61	1.04	2.18	2.01	5.33	4.10	-
Mauritania	12	5.11	1.03	2.38	1.98	14.03	5.42	13
Thailand	1 294	21.95	0.99	2.29	2.20	2.81	2.68	18
Peru	445	19.02	0.99	7.46	5.85	5.18	4.06	34
Cote d'Ivoire	102	7.56	0.99	2.54	2.91	5.66	8.18	9
Colombia	675	17.66	0.89	5.76	5.15	4.52	3.85	15
Maldives	2	8.94	0.88	0.73	0.74	5.95	n.a.	20
Malta	26	71.28	0.83	0.93	0.84	4.45	2.94	-
Latvia	44	16.67	0.79	1.66	1.60	2.42	2.43	37
Iceland	55	208.38	0.77	2.26	2.26	4.22	4.57	-
Syrian Arab Republic	362	25.74	0.71	6.75	7.21	14.19	8.90	158
Russia	211	25.74	0.71	6.75	7.21	14.19	8.90	-
Poland	772	20.06	0.71	2.74	2.51	3.55	3.23	25
Solomon Islands	2	4.91	0.68	1.12	0.94	33.33	3.28	18
Costa Rica	68	20.56	0.66	1.64	1.58	3.60	3.11	13
Mongolia	6	2.61	0.61	1.37	1.11	3.24	2.84	26
Spain	2 662	67.97	0.50	2.14	2.06	2.21	2.28	-
Niger	10	1.15	0.49	2.74	1.87	17.90	5.60	18
Cambodia	11	1.17	0.49	1.89	1.28	7.32	2.80	268
Ireland	310	85.80	0.47	0.60	0.70	1.50	2.61	-
Namibia	14	9.30	0.47	0.88	0.72	3.14	2.23	-
Austria	918	114.93	0.47	1.14	1.14	1.93	1.95	-
Bolivia	29	3.91	0.46	2.67	1.91	4.52	2.68	8
Switzerland	1 174	168.35	0.45	1.05	1.16	1.75	2.05	-
France	5 977	103.10	0.44	1.79	1.94	2.09	2.39	-

Table 3 continues ...

... Table 3 continued

	Total (US\$ million, (1995 prices))	per capita (US\$, 1995 prices)	as a percent of GDP	as a percent of exports of goods and ser- vices	as a percent of imports of goods and ser- vices	as a percent of gross domestic savings	as a percent of gross domestic investment	as a percent of LT debt ser- vice
Equatorial Guinea	1	2.75	0.42	0.59	0.36	1.22	0.53	33
Bulgaria	44	5.19	0.41	0.82	0.79	2.54	2.33	5
Azerbaijan	19	2.56	0.40	2.04	1.02	4.72	1.70	57
Trinidad & Tobago	21	16.71	0.40	0.86	1.04	1.37	2.07	-
Denmark	594	113.72	0.38	1.04	1.20	1.60	1.96	-
Rwanda	6	1.01	0.35	5.64	1.63	(16.94)	2.36	33
Indonesia	544	2.82	0.35	1.19	1.27	1.15	1.25	4
Madagascar	11	0.80	0.32	1.66	1.19	7.90	2.66	13
New Zealand	184	50.92	0.30	1.04	1.07	1.42	1.51	-
Oman	40	19.29	0.28	0.64	0.79	1.27	2.15	7
Ethiopia	19	0.34	0.28	2.63	1.39	6.27	2.03	15
Ghana	17	1.00	0.27	1.12	0.75	2.28	1.33	6
Brazil	1 585	206.16	18.44	36.93	25.22	381.33	63.67	11
Guinea-Bissau	2	1.62	0.26	5.62	2.06	53.53	2.94	22
Italy	2 846	49.70	0.24	1.02	1.15	1.10	1.32	-
Malaysia	177	8.67	0.24	0.26	0.27	0.59	0.65	4
Czech Republic	117	11.48	0.24	0.49	0.48	0.97	0.89	6
Korea	925	20.61	0.23	0.72	0.73	0.67	0.69	-
Aruba	2	29.56	0.23	0.12	0.12	n.a.	n.a.	-
Germany	4 521	55.65	0.22	0.81	0.84	0.91	0.97	-
Slovak Republic	35	6.67	0.21	0.38	0.34	0.82	0.64	5
Israel	138	25.27	0.17	0.54	0.44	1.57	0.73	-
Cameroon	18	1.39	0.17	0.77	0.85	0.89	1.03	5
Netherlands	561	36.41	0.16	0.27	0.29	0.59	0.80	-
Belarus	39	3.83	0.16	0.75	0.47	0.62	0.55	34
Tanzania	8	0.29	0.14	0.89	0.44	7.25	0.74	4
Finland	146	28.64	0.13	0.38	0.45	0.53	0.71	-
China, People's Rep of	828	0.68	0.13	0.63	0.72	0.32	0.34	-

Table 3 continues ...

... Table 3 continued

	Total (US\$ million, (1995 prices)	per capita (US\$, 1995 prices)	as a percent of GDP	as a percent of exports of goods and ser- vices	as a percent of imports of goods and ser- vices	as a percent of gross domestic savings	as a percent of gross domestic investment	as a percent of LT debt ser- vice
Hungary	49	4.81	0.13	0.29	0.28	0.56	0.50	1
Australia	428	23.78	0.12	0.65	0.62	0.59	0.60	-
Norway	164	37.80	0.12	0.31	0.36	0.40	0.51	-
United Kingdom	1 297	22.21	0.12	0.44	0.42	0.74	0.73	-
Sweden	250	28.49	0.11	0.29	0.33	0.52	0.71	-
Romania	31	1.37	0.10	0.43	0.34	0.55	0.43	2
Lao People's Dem. Rep	1	0.31	0.10	0.42	0.27	0.76	0.33	-
South Africa	139	3.57	0.10	0.42	0.47	0.56	0.66	2
Turkmenistan	4	0.87	0.09	0.28	0.23	0.43	0.16	2
Guinea	3	0.41	0.09	0.40	0.31	0.60	0.45	2
Kyrgyz Republic	2	0.37	0.08	0.27	0.20	1.37	0.39	3
Angola	5	0.44	0.07	0.13	0.14	0.30	0.39	1
Myanmar	79	1.82	0.07	7.70	4.96	n.a.	n.a.	73
Chad	1	0.16	0.07	0.39	0.21	(3.47)	0.53	7
Estonia	2	1.32	0.05	0.08	0.07	0.20	0.15	5
Lithuania	2	0.59	0.03	0.06	0.05	0.13	0.10	2
Hong Kong, China, P.R.	28	4.60	0.02	0.02	0.02	0.07	0.08	-
Argentina	56	1.61	0.02	0.25	0.23	0.14	0.13	1
Ukraine	11	0.22	0.02	0.06	0.06	0.07	0.07	1
United States of America	1 256	4.80	0.02	0.17	0.15	0.11	0.11	-
Japan	688	5.49	0.02	0.16	0.19	0.05	0.06	-
Zimbabwe	1	0.09	0.01	0.04	0.04	0.08	0.07	0
Kazakhstan	3	0.18	0.01	0.03	0.03	0.08	0.06	0
Montserrat	11	n.a.	n.a.	43.10	22.47	n.a.	n.a.	0
Netherlands Antilles	6	31.83	n.a.	n.a.	0.33	n.a.	n.a.	-
Anguilla	4	n.a.	n.a.	7.66	7.12	n.a.	n.a.	-

Sources: IMF (2002a, 2002b) and World Bank (2002).

*Table 4 — Remittances, Private and Official Capital Inflows Across Countries (Average 1970–1999)*

1) Only a one-percentage point difference. — 2) Includes Barbados, Haiti, Mexico, Moldova and St. Kitts & Nevis. — 3) Includes Bangladesh, Belize, Bulgaria, Dominica, Dominican Rep., India, Jamaica, Madagascar, Mali, Moldova, Nigeria, Peru, Philippines, Portugal, Russia, Sudan, Swaziland, Syrian Arab Rep., Turkey and Vanuatu. — 4) Includes Albania, Croatia, Dominican Rep., Egypt, Arab Rep., El Salvador, Georgia, Jordan, Lesotho, Morocco, Pakistan, Philippines, Samoa, Swaziland, Turkey and Yemen, Rep. of.

	Private capital-to-GDP ratio	Official capital-to-GDP ratio	Private capital-to-GDP ratio	Official capital-to-GDP ratio
	Number of countries		Percentage of countries	
Remittances-to-GDP ratio is higher than	18	5 <sup>2)</sup>	13	4
Remittances-to-GDP ratio is lower than	97	84	72	62
Remittances-to-GDP ratio is equal <sup>1)</sup>	20 <sup>3)</sup>	15 <sup>4)</sup>	15	11
Missing data	0	31	0	23
Total	135	135	100	100

Sources: IMF (2002a, 2002b).

*Table 5 — Growth Rate of Remittances, Private and Official Capital Inflows Across Countries (Average 1970–1999)*

	Growth rate of private capital inflows	Growth rate of official capital inflows	Growth rate of private capital inflows	Growth rate of official capital inflows
	Number of countries		Percentage of countries	
Growth rate of remittances is higher than	41	33	30	24
Growth rate of remittances is lower than	94	71	70	53
Missing data	0	31	0	23
Total	135	135	100	100

Sources: IMF (2002a, 2002b).



Table 6 — Mean and Coefficient of Variation (1970–1999)

Data are in percent, unless indicated otherwise. — a) US\$ billion. — b) as a percent of GDP.

Variables	World	Developed Countries	Developing Countries	Africa	Asia	Europe	Middle East and North Africa	Western Hemisphere
	Mean							
workers' remittances <sup>a)</sup>	50.7	23.3	27.4	1.7	10.7	3.5	6.3	5.2
official capital inflows <sup>a)</sup>			68.8	12.0	24.0	7.7	9.2	15.9
private capital flows <sup>a)</sup>	841.0	733.1	107.9	6.4	44.6	10.6	9.5	36.7
workers' remittance <sup>b)</sup>	0.2	0.1	0.6	0.5	0.6	0.9	0.9	0.4
official capital inflows <sup>b)</sup>	...	...	1.6	3.7	1.5	1.6	1.5	1.3
private capital flows <sup>b)</sup>	3.8	4.2	2.2	2.0	2.4	1.9	1.5	2.5
	Growth rate of mean in real terms							
workers' remittance	261.3	141.8	470.3	257.7	575.3	177.2	387.4	1265.7
official capital inflows	...	...	101.5	83.3	90.4	681.1	-21.2	133.1
private capital flows	327.7	347.0	237.7	67.1	560.8	410.9	-13.2	167.4
	Coefficient of variation in real terms (data in percent of GDP)							
workers' remittance	60.3	58.5	66.6	88.1	71.7	46.7	46.8	77.0
official capital inflows	...	...	89.0	93.9	80.6	70.2	64.2	120.3
private capital flows	118.9	80.9	252.7	411.3	93.6	503.6	289.9	173.8

Sources: IMF (2002a, 2002b) and World Bank (2002).

*Table 7 — Volatility of Remittances, Private and Official Capital Inflows Across Countries (Average 1970–1999)*

1) Only a five-percentage point difference. — 2) Includes Bangladesh, Botswana, Cyprus, Dominica, Lithuania and Slovenia. — 3) Includes Belarus, Belize, Botswana, Cameroon, Colombia, Comoros, Dominican Rep., Fiji, Guinea-Bissau, Lao People’s Dem. Rep., Nicaragua, Paraguay, Philippines and St. Kitts and Nevis.

	Private capital inflows volatility	Official capital inflows volatility	Private capital inflows volatility	Official capital inflows volatility
	Number of countries		Percentage of countries	
Remittances volatility is lower than	107	70	79	52
Remittances volatility is higher than	22	20	16	15
Remittances volatility is equal <sup>1)</sup>	6 <sup>2)</sup>	14 <sup>3)</sup>	4	10
Missing data	0	31	0	23
Total	135	135	100	100

Sources: IMF (2002a, 2002b).

Table 8 — Correlation Analysis (1970–1999)

\* indicates significance at 5 percent level.

	workers' remittance to Private Capital In- flows	workers' remittance to Official Capital Inflows	Private to Official Capital Inflows
World	0.78*	...	...
Developed Countries	0.58*	...	...
Developing Countries	0.44*	0.35*	-0.20*
Africa	0.68*	0.66*	0.03
Asia	0.44*	0.05*	-0.38*
Eastern and Central Europe	0.30	-0.23	-0.17
Middle East and North Africa	-0.02	-0.43*	-0.32*
Western hemisphere	0.22*	0.42	-0.49*

Sources: IMF (2002a, 2002b) and World Bank (2002).

Table 9 — Cross-Section Estimation Results

This Table presents the results of the following regression:

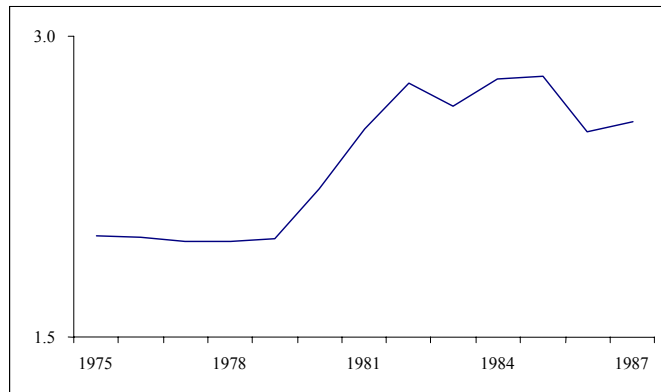
$$(\text{Remittances/GDP})_i = \alpha + \beta_1(\text{GDP/capita})_i + \beta_2(\text{inflation})_i + \beta_3(\text{dummy islands}) + \beta_4 X_i + \varepsilon$$

$X_i$  relates to additional control variables. The dependent variable, worker remittances and private capital flows, respectively, relative to GDP, are averages for the 1990s. Likewise, GDP per capita, GDP growth, and inflation are averages for the 1990s. *Female activity* is the employment share of women aged 15 or above in total employment. *Freedom* is the index of economic freedom (Heritage Foundation). *Transition* includes all formerly communist countries, both European and Asian. All variables except dummies, inflation, and GDP growth are in logs. All equations were estimated using White heteroskedasticity-consistent variance-covariance matrices. \*\*\* (\*\*, \*, (\*)) indicate significance at the 1 (5, 10, 20) percent level of confidence. *t*-values are given in brackets. Interaction terms are the explanatory variables multiplied with a dummy variable that was set equal to one for developing countries, using the World Bank classification of countries. Jarque-Bera = test for normal distribution of the residuals (probability), White = test for heteroskedasticity of the residuals (probability).

	Dependent variable			
	Worker remittances / GDP		Private capital flows / GDP	
	(1)	(2)	(3)	(4)
Constant	15.48*** (3.59)	17.86*** (3.37)	0.49 (0.24)	-0.04 (-0.02)
GDP per capita	-0.78*** (-4.06)	-2.21*** (-3.57)	0.16(*) (1.56)	0.34 (0.73)
Islands	0.64(*) (1.51)	-0.45 (-0.56)	0.04 (0.16)	-0.43 (-0.56)
Inflation	-0.001 (-1.04)	0.03 (0.18)	-0.001** (-2.10)	0.11 (0.67)
GDP growth	0.01** (2.51)	0.01 (1.20)	0.001 (0.45)	0.01 (0.97)
Female activity	-2.25*** (-4.01)	0.43 (0.42)	-0.02 (0.06)	0.12 (0.10)
Freedom	-1.23 (-0.82)	1.03 (0.27)	-0.09 (0.12)	-3.18 (-1.29)
	<i>Interaction terms</i>			
GDP capita		1.28** (2.35)		-0.16 (-0.35)
Islands		1.59* (1.69)		0.55 (0.68)
Inflation		-0.03 (-0.18)		-0.11 (-0.67)
GDP growth		-0.00 (-0.04)		-0.01 (-0.89)
Female activity		-2.83** (-2.61)		-0.12 (-0.09)
Freedom		-3.01 (-0.72)		3.34 (1.33)
$\bar{R}^2$	0.28	0.30	0.13	0.11
Jarque-Bera	0.54	0.53	0.00***	0.01**
White	0.52	0.62	0.85	0.00***
N	99	98	89	89

*Graph 1 — Migration Flows (in millions, 1975–1987)<sup>1)</sup>*

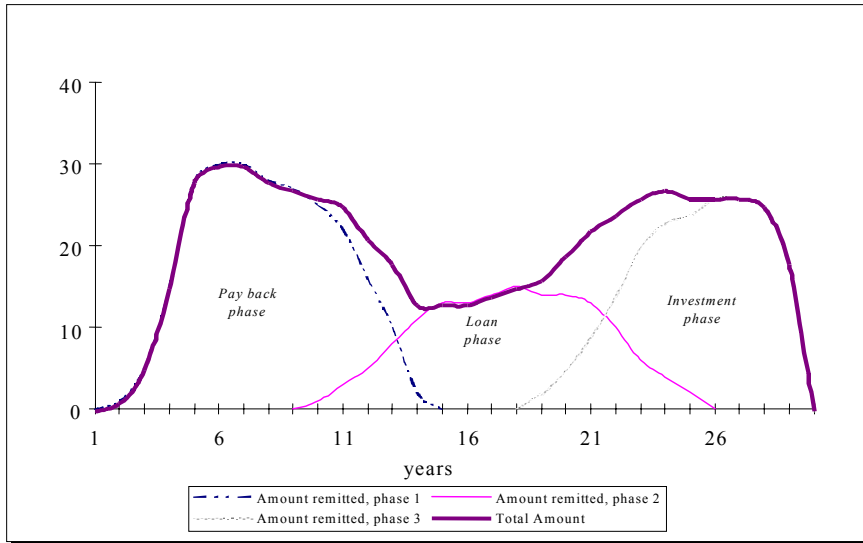
Data referred to residents intending to remain abroad for a period of more than one year. The countries include Australia, Cyprus, Czech Rep., Denmark, Finland, Germany, Japan, Malta, Mauritius, Netherlands, Norway, Poland, Portugal, Seychelles, Spain, Sweden, U.K., and Zimbabwe.



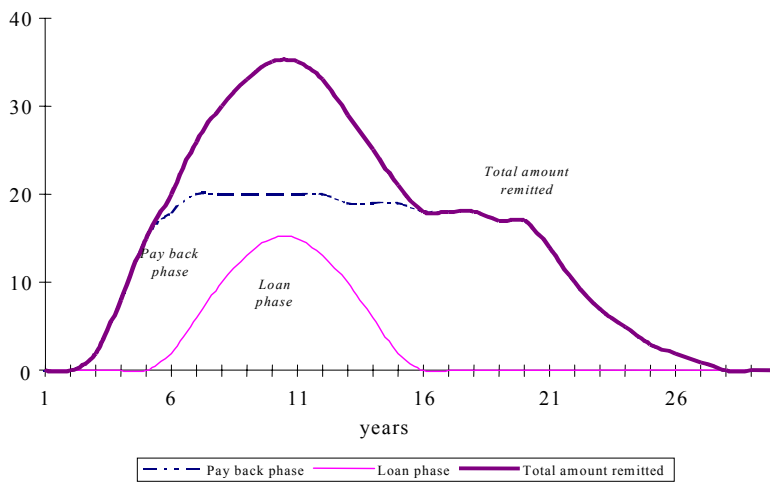
Source: United Nations Statistics, Demographic Yearbook 1989.

Graph 2 — Three Waves Theory

a) assuming the migrant returns back home



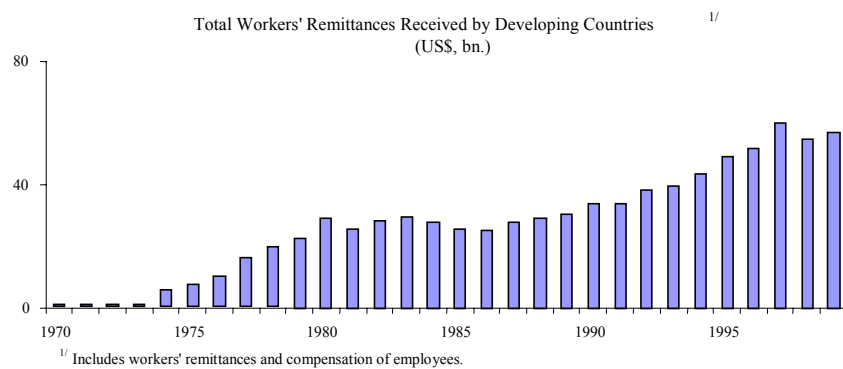
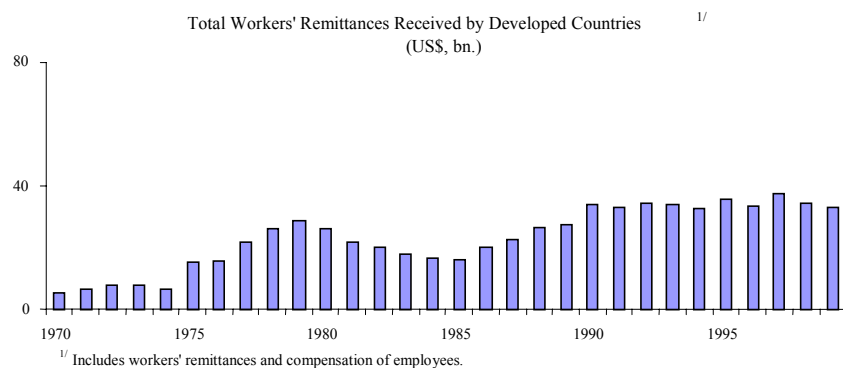
b) assuming the migrant settles down in the host country



Source: Poirine (1997).

*Graph 3 — Workers' Remittances (In billions of U.S. dollar, 1970–1999).*

The aggregated figures presented below on total workers' remittance are not the ones pushed in the IMF Balance of Payments Statistics, but they reflect the sum of total workers' remittances for all individual countries. The data is in constant prices of 1995 using the US consumer price index.



Sources: IMF (2002a, 2002b) and World Bank (2002).

## Appendix I: Description of Data

- **Remittances** are the monies that migrants return to the country of origin. If labour is considered an export, then remittances are that part of the payment for exporting labour services that returns to the country of origin. The International Monetary Fund (IMF) separates remittances into three categories: (i) workers' remittances, from workers who have lived abroad for more than one year; (ii) compensation of employees or labour income, including wages and other compensation received by migrants who have lived abroad for less than one year; and (iii) migrant's transfers, the net worth of migrants who move from one country to another. To construct our dataset, we used both workers' remittances (B19A..9) and compensation of employees (B12A..9) from the IMF Balance of Payments Statistics Yearbook. Migrant's transfers were excluded since we had sporadic data for only few countries.

It is worth noting the weaknesses of existing data on remittances. These numbers likely under-represent the scale of remittances since many countries, and particularly low income countries for which remittances are important, have no processes or inadequate ones for estimating or reporting on the funds remitted by workers from abroad. Furthermore, a large share of remittances is not channeled through formal banking systems, but rather through a myriad of informal channels, such as postal money orders. Remittances can be in-kind (including consumer goods, capital goods and skills, and technological knowledge) and clandestine.

Correcting for underreporting, Korovilas (1999), for instance, estimated that total remittances in Albania exceed the official number by approximately 75% in the early 1990s.

Our estimated aggregated figures do not reflect the ones published by the IMF Balance of Payments Statistics Yearbook (IMF 2002a), but consist of the sum of all published data on a country-by-country basis. Thus, if a country does not report on time its amount of workers' remittances, the IMF will add a proxy for that country to his estimated total aggregated amount. The difference between the aggregated number published by the IMF and the one we have computed is small, however.

- **Private Capital Inflows** are defined as the liabilities of the direct foreign investment (78 BEDZF) and of portfolio investment (78 BGDZF) and other investment (78 BIDZF). The series are taken from the International Financial Statistics Database (IMF 2002b).



- **Official Capital Inflows** include disbursements from official creditors (including the IMF purchases) and the official grants. The series are taken from the Global Development Finance database (World Bank 2002).
- **Gross Domestic Product.** We used the GDP in national currency (99B ZF) converted in US\$ using the exchange rate (..AZ.ZF) published in the International Financial Statistics Database. For the following sixteen countries, there was no data available: Albania, Angola, Azerbaijan, Belarus, Cambodia, Cape Verde, Comoros, Croatia, Djibouti, Georgia, Guinea, Kiribati, Maldives, Samoa, Solomon Islands, and Turkmenistan, we used therefore the World Development Indicator database (World Bank 2002).
- **Exports of Goods and Services** comprise all transactions involving a change of ownership of general merchandise, goods sent for processing and repairs (78AADZF), and services (78ADDZF). The series were taken from the International Finance Statistics database.
- **Imports of Goods and Services** represent the value of all goods (78ABDZF) and other market services (78AEDZF) provided to or received from the rest of the world. Labour and property income (formerly called factor services) is excluded. The series were taken from the International Finance Statistics database.
- **Gross Domestic Savings** are calculated as the difference between GDP and total consumption. The series are taken from the World Bank (2002).
- **Gross Domestic Investment** consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include for instance land improvements, equipment purchases; and the construction of roads. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales. The series are taken from the World Development Indicator 2000 database. There was no data available for 1999, we used therefore the gross national investment growth between 1998 and 1999 as a proxy (World Bank 2002).
- **Inflation:** We used annual change in the consumer price index published in the International Finance Statistics database (64...ZF). The base year is 1995.
- **Population.** We used the data published in the International Finance Statistics database (99Z..ZF)

- **Human Development Index** is published in the Human Development Report Office 2000 and is composed of three indicators: longevity, as measured by life expectancy at birth; educational attainment, as measured by a combination of the adult literacy rate (two-thirds weight) and the combined gross primary, secondary and tertiary enrolment ratio (one-third weight); and standard of living, as measured by GDP per capita (PPP US\$).
- **Heritage Foundation:** We used an aggregated measure of this index that, inter alia, captures the degree of regulation in the banking system, the importance of a black market for the domestic currency, and the degree of regulation of the labour market. All of these indicators can be expected to have an impact on the incentives to migrate and/or to send remittances back home. However, due to a high degree of correlation between the individual components of the aggregated index, we are unable to isolate these effects empirically. Note also that the index of economic freedom increases in the degree of restrictions imposed on economic activities.