WPS3766

# DO WORKERS' REMITTANCES REDUCE THE PROBABILITY OF CURRENT ACCOUNT REVERSALS?

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## Abstract

The paper combines the literature on financial crises in emerging markets and developing economies with that on international migrations by investigating whether the increasingly large flows of workers' remittances can help reduce the probability of current account reversals. The rationale for this stands in the great stability and low cyclicality of remittances as compared to other private capital flows: these properties, combined with the fact that remittances are cheap inflows of foreign currencies, might reduce the probability that foreign investors suddenly flee out of emerging markets and developing economies and trigger a dramatic current account adjustment. We find that remittances can indeed have such a beneficial effect. In particular, we show that a high level of remittances, as a ratio of GDP, makes the relationship between a decreasing stock of international reserves (over GDP) and a higher probability of current account crises less stringent. The same occurs, though less neatly, for the positive relationship between an increasing stock of external debt (over GDP) and the probability of current account reversals. Our results point also to a threshold effect of remittances: the mechanisms just described are, in fact, much stronger when remittances are above 3 percent of GDP.


JEL codes: F32, F36, J61, O1.
Keywords: current account reversals, workers' remittances, international reserves, external debt

World Bank Policy Research Working Paper 3766, November 2005



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## 1. Introduction

In line with the recent intense migration flows from emerging and developing to advanced countries, the transfers of funds by migrants back to their countries of origin have become increasingly significant. According to IMF (2005), these transfers of funds have grown five-fold between 1980 and 2003 reaching $91 billion, that is 1.6 percent of these countries' total GDP[1]. Interestingly, after inward foreign direct investment they are now the second largest source of capital inflows to emerging markets and developing countries.

Economists and policymakers' increasing attention to migrants' transfers of funds is not only due to their size, but also to their "good" features. In particular, as again pointed out by IMF (2005), they are much more stable and less cyclical than other capital flows. The rationale for this would be that migrants' transfers of funds are mostly driven by altruistic reasons, i.e. migrants' desire to enhance the welfare of relatives still living in the country of origin, rather than by investment-like motives.

These "good" properties of migrants' transfers of funds, along with their increasing size, make them a good candidate to reduce macroeconomic instability in the receiving country. In particular, migrants' transfers of funds, being inflows of foreign currencies that can be used to repay foreign debt, often denominated in foreign currency, without adding to the stock of external debt and generating any debt-servicing cost, could contribute to reduce the probability of financial crises.

This paper focuses on the empirical relationship between workers' remittances, by far the main component of migrants' transfers of funds, and the occurrence of financial crises. As far as we know, this potential effect of workers' remittances has not been explored yet. So far the empirical literature on migrants' transfers has mainly focused on their potential influence on growth, poverty and output volatility. IMF (2005) documents that they may actually contribute to reduce poverty and volatility of output, consumption and investment in the receiving

[1] Admittedly, these figures are underestimated due to transfers of funds not channeled through the banking system and other official intermediaries which are often the only source of official statistical data.

countries. The IMF's empirical analysis rejects the hypothesis of any link between migrants' transfers of funds and growth.

The literature on financial crises is much more developed. As pointed out by Calvo, Izquierdo and Mejìa (2004), financial crises can be measured in different ways depending on the type of event used to identify the occurrence of the crisis. Most of the empirical work has focused on currency crises (Frankel and Rose, 1996; Kaminsky and Reinhart, 1999; Edwards, 2001; Arteta, 2003), which relate to large nominal currency depreciation. More recently, the attention has gone to current account reversals (Edwards, 2004a and 2004b; Milesi-Ferretti and Razin, 1998 and 2000), that is, to dramatic adjustments of current account deficits. On the wave of the recent financial crises in Asia, some authors (Calvo, 2003; Calvo, Izquierdo and Talvi, 2003; Calvo, Izquierdo and Mejìa, 2004; Frankel and Cavallo, 2004) have focused on the occurrence of sudden stops, which are unexpected contractions or even reversals in the inflows of private foreign capital.

This paper looks at current account reversals and amends the typical empirical specification used in this literature to include the inflows of workers' remittances. We first can confirm the results of the literature: the probability of reversals increases with the stock of external debt and the initial level of the current account deficit, and decreases with the stock of international reserves. Importantly, since our empirical specifications always include country fixed effects, the appropriate interpretation of our results is that a crisis is triggered by a widening in the external debt and in the current account deficit, and a reduction in the stock of international reserves.

Country fixed effects, needed to control for unobserved time-invariant country features, have another important implication: any direct effect of workers' remittances, which turn out to have mostly a cross-country rather than a within-country variance, cannot be identified. Therefore we choose to interact workers' remittances with the main robust determinants of current account reversals, that is, the stock of international reserves over GDP and the stock of external debt over GDP.

We find that indeed workers' remittances increase financial stability in emerging markets and developing economies by reducing the probability of current account reversals. More

specifically, this effect kicks in as follows: the probability that a current account reversal occurs because of a worsening in the stock of international reserves and external debt is lower the larger is the level of workers' remittances in terms of GDP. This becomes even more important in the light of the negative correlation between current account reversals and growth found by Razin and Rubinstein (2004).

Our result is not difficult to rationalize. For example, current account reversals might be triggered by sudden stops of foreign capital; such stops might in turn be the result of foreign investors' confidence loss in the face of worsening fundamentals (lower reserves, higher external debt). In this case, a high level of stable and a-cyclical workers' remittances might make a given worsening of fundamentals less worrying from foreign investors' perspective.

Another interesting result we find is that the effect of workers' remittances is shaped by a clear threshold effect. In particular, when workers' remittances reach 3-4 percent of GDP, their contribution to financial stability becomes much stronger and neater.

Importantly, our results turn out to be robust to different criteria for identifying current account reversals, different measures of remittances, different distributional assumptions on the error component and to the potential endogeneity of remittances.

The rest of the paper is structured as follows. The next section is devoted to a critical review of the literatures on remittances and on current account reversals. In section 3 we present the data and provide a thorough descriptive analysis of workers' remittances and current account reversals. Section 4 introduces our empirical specification whose base results are presented in section 5. The link between workers' remittances and current account reversals is investigated in section 6 that presents also a series of robustness exercises. Concluding remarks and the future plans in our research agenda are resumed in the last section.

## 2. Related literature

To our knowledge, the question we address in this paper is completely new.

Set against a broad theoretical analysis on the economic impact of remittances on the

recipient countries[2], empirical studies still lag behind and have focused mostly on growth, inequality and poverty, leaving issues of macroeconomic stability largely uninvestigated.

Relying on the idea that remittances could relax financial constraints and favor investment, few scholars have run cross-country growth regressions. The results are mixed: Faini (2002, 2004) finds a positive, but not very robust, relationship between growth and remittances, while Chami, Fullenkamp and Jahjah (2003) find the opposite; using instrumental variables to account for the potential endogeneity of remittances, IMF (2005) finds no statistically significant relationship. The mechanism through which remittances can positively affect growth can be better detected in micro-econometric studies based on household-level data. On the basis of recent and quite accurate evidence, surveyed by Lopez Cordova and Olmedo (2005a), the positive impact of remittances on education and entrepreneurship at the household-level is at this stage widely acknowledged[3].

Remittances could instead finance basic consumption needs. Along these lines, cross-country evidence by Adams and Page (2003), Adams (2004) and IMF (2005) shows that indeed remittances have a clear-cut poverty-reducing effect. Similar results are found by Esquivel and Huerta-Pineda (2005) and Lopez Cordova (2005) using a Mexican household survey and a cross-section of Mexican municipalities, respectively. In the same spirit, remittances help improve health conditions (Amuedo-Dorantes and Pozo, 2004a; Hildebrandt and McKenzie, 2004; Dureya et al., 2005; Lopez Cordova, 2005).

The first attempt to link remittances and volatility appears in IMF (2005), which finds lower volatility of aggregate output, consumption and investment in countries with larger remittance inflows. Amuedo-Dorantes and Pozo (2004b) find that remittances can cause an appreciation of the real exchange rate; as a result of this loss of price competitiveness, export flows might decrease (Lopez Cordova and Olmedo, 2005b).

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[2] Docquier and Rapoport (2005) provide a comprehensive and clear survey of such studies.

[3] McCormick and Wahba (2001) on entrepreneurship in Egypt; Dustmann and Kirchkamp (2002) on entrepreneurship in Turkey; Cox Edwards and Ureta (2003) on education in El Salvador; Hanson and Woodruff (2003), Lopez Cordova (2005) and McKenzie and Rapoport (2005) on education in Mexico; Woodruff and Zenteno (2004) on entrepreneurship in Mexico; Adams (2005) finds a positive effect on education and real estate investment in G . Yang (2005) on education and entrepreneurship in the Philippines.

Turning to the literature on current account reversals, the main papers are by Edwards (2004a, 2004b) and Milesi-Ferretti and Razin (1998, 2000; henceforth MFR) who examine the country-specific factors affecting the probability of sharp current account adjustments. In terms of the econometric analysis, while both Edwards and MFR use a multivariate probit model and restrict the sample to emerging markets and developing economies, they differ for the definition of current account reversals and the set of explanatory variables.

According to MFR (2000), *"[…] the definition of reversal events … want[s] to capture large and persistent improvements in the current account balance, that go beyond short-run current account fluctuations as a result of consumption smoothing"*. For this, they impose three requirements: i) an average reduction in the current account deficit of 3 or 5 percentage points of GDP over a period of three years with respect to the three years before the reversal; ii) the maximum deficit after the reversal must be no larger than the minimum deficit in the three years preceding the reversal; iii) the average current account deficit must be reduced by at least one third. Criteria i) and ii) aim at excluding temporary reversals, while criterion iii) avoids considering, as reversals, limited adjustments of very large initial current account deficits (say, from 25 to 20 percent in terms of GDP).

Edwards (2004a) uses two definitions of current account reversals. The first one is a reduction in the current account deficit of at least 4 percent of GDP in one year; the second one raises the adjustment to 6 percent of GDP in a three-year period. Edwards (2004b) focuses only on the former.

MFR (1998, 2000)[4] relate their measure of reversals to a very large set of potentially endogenous – and thus lagged (*t-1*) – variables and a smaller set of exogenous – and thus contemporaneous – variables, which overall should capture the degree of sustainability of a given current account deficit. The lagged variables are the size of the current account deficit in terms of GDP, the economic growth rate, the rate of investment, the level of per capita GDP, the real effective exchange rate, openness to trade, the level of foreign exchange reserves as a fraction of imports, the level of official transfers as a fraction of GDP, the ratio of external debt

to GDP, the share of concessional debt in total debt, the share of public debt in total debt, the ratio of credit to GDP, which should proxy the degree of financial development, the ratio of foreign direct investment to GDP, the share of short term debt in total debt[5]. MFR include also the lagged and contemporaneous real interest rate in the United States, a proxy for world interest rates, the lagged and contemporaneous rate of growth in OECD countries, the lagged level of the terms of trade and their change in the year of reversal.

Their results, based on regressions without country fixed effects and time dummies[6], are the following: the probability of a current account reversal increases with the size of the current account deficit and decreases with the level of reserves in terms of imports, the share of concessional debt over total debt and the level of official transfers as a fraction of GDP. Among the macroeconomic exogenous factors, MFR find that high real interest rates in the US force reversals by raising the cost of borrowing in emerging markets and reducing capital flows toward these markets.

Edwards (2004a, 2004b)[7] takes a more parsimonious approach and relates the probability of current account reversals to the following lagged variables: the size of the current account deficit in terms of GDP, the levels of external debt and net international reserves, both in terms of GDP, the share of short term external debt in total external debt, the domestic credit growth[8]. The regressions, which always include year dummies and country fixed effects, deliver a robust positive effect of external debt over GDP and a robust negative effect of current account deficit and net international reserves, both in terms of GDP.

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[4] In the 1998 paper MFR work on a sample of 86 low- and middle-income countries for the period 1971-92. In the 2000 paper they extend the sample to 105 low- and middle-income countries, also including years until 1994.

[5] The fiscal deficit has not been included for data availability problems.

[6] The authors include continent dummies and claim to exclude time dummies on the basis of a joint F-test.

[7] Edwards' descriptive analysis is based on a very large sample of countries (157) for the period 1970-2001. The econometric analysis is restricted to emerging markets and countries with a population above 500,000 and income per capita above US$ 500 as of 1985 PPP.

rds (2004a) includes also the ratio between external debt service and exports that turns out not to be signıtıcant. Edwards (2004b) includes a measure of financial openness, whose estimated coefficient is insignificant, a dummy variable for the incidence of reversals in the region, that appears to be strongly and positively related to the probability of current account reversals, and the logarithm of initial per capita GDP, which instead negatively affects the occurrence of reversals.

## 3. Data and descriptive evidence

In this section we describe in great detail our data on workers' remittances and current account reversals, also providing a wide range of descriptive evidence. The other variables used in the econometric analysis are listed and described in Table A1; some statistical evidence on the relationship between these variables and current account reversals is postponed to section 4, where it is useful to motivate our empirical specification.

Before digging into our data, a comment is needed. Our descriptive analysis closely follows the one by IMF (2005). However, this must not be considered a useless repetition for two reasons. Firstly, we believe that our way to look at the data has some value-added: in particular, we devote a special care in dealing with the issue of the changing sample size and composition over time, which very likely biases IMF's analysis on the evolution of migrants' transfers in the last decades. Secondly, since our analysis focuses on workers' remittances, we need to be sure that the "good" properties, which characterize IMF (2005) sample of migrants' transfers, characterize our more restricted sample of workers' remittances, too.

According to the IMF Balance of Payments Manual Fifth Edition (BPM5, 1993), the inflows of funds that may be properly interpreted as transfers from migrants can be distinguished into three different categories: i) workers' remittances, included among the current transfers in the current account; ii) compensation of employees, which is a component of income again in the current account; iii) migrants' capital transfers, which instead belongs to the capital transfers in the capital account[9].

Our sample, entirely drawn from the IMF Balance of Payments Statistics database, includes all available country-data on the three items above from 1976 to 2003[10]. After dropping

[9] Workers' remittances cover current transfers by migrants (defined as those who come to an economy and stay, or are expected to stay, for a year or more) who are employed in new economies and considered residents there. Persons who work for and stay in new economies for less than a year are considered non residents; their transactions are appropriate mainly to the component for compensation of employees. Migrants capital transfers are not transactions between two parties but contra-entries to flows of goods and change in financial items that arise from the migration of individuals from one economy to another (IMF, BPM5).

[10] We have chosen to drop observations before 1976 due to the very limited data availability.

advanced countries and countries with a population smaller than 200,000 persons as of 2002[11], we are left with a set of about 110 emerging countries and developing economies (Table A2).

As pointed out in the introduction, the descriptive evidence one wants to see when dealing with migrants' transfers relates to three main characteristics: their increasingly large size, their limited volatility and their low correlation with the economic cycle in the receiving economy. In what follows, we mostly focus on workers' remittances, which is not only the largest item among the three relating to migrations, but also the one with the largest coverage in terms of countries. For a better assessment of the above properties, we compare workers' remittances to net FDI inflows that, excluding workers' remittances themselves, have always been the largest and the least volatile item among capital inflows to emerging countries (Lipsey, 1999).

In our sample, workers' remittances in 2003 totaled 65.2 billion US dollars, compensation of employees a lower $18.3 billion, migrants' capital transfers only $1.3 billion. Overall, the transfers of funds from migrants reached about $85 billion[12]. In the same year, FDI inflows towards the same set of countries for which workers' remittances data are available amounted to $111.9 billion.

In the past 30 years workers' remittances have grown continuously, starting from 3.6 billion in 1976 (fig.1). This increase partly reflects an expansion of the set of countries for which workers' remittances data are available: 23 in 1976, 47 at the end of the 1980s, up to 77 at the beginning of the current decade. However, it also reflects a widespread increase of the relevance of workers' remittances towards most of the countries for which long time series are available.

Comparing workers' remittances and net FDI inflows over time, having again restricted the sample to the country-year observations for which both data are available, it appears that workers' remittances exceeded net FDI inflows up to 1992 (fig. 2). Since then, FDI gained prominence, although the consistent gap which opened up at the end of the 1990s was partly

[11] This is a typical cleaning procedure in cross-country analyses aimed at avoiding that volatile behavior of economic indicators in small countries may affect the results.

[12] This compares with the $91 billion estimate reported by the IMF (2005), which made a special effort to fill the gaps in the database using information received from country desks and national authorities.

closed at the beginning of the current decade. It is worth stressing that for a large set of countries (37 out of 73 in 2002) workers' remittances still outsize FDI.

Compensation of employees recorded similar dynamics in the same period (fig. 3), growing from 0.3 billion US dollars in 1976 (with data available for 21 countries) to 4.6 billion in 1990 (with data available for 40 countries) and 18.3 billion in 2003 (with data available for 56 countries). Migrants' capital transfers have always played a much more limited role (fig. 4) and are still recorded for a restricted set of emerging countries (24 in 2003)[13].

For a proper assessment of volatility, we calculate for each country the ratio of the standard deviation to the mean of workers' remittances (measured in percentage of GDP) and then compute the unweighted average of the resulting country's index of volatility. The same procedure is followed for net FDI inflows (taking the absolute value of the mean, whenever this is negative).

The figures reported in Table 1 confirm that workers' remittances volatility is rather low, more importantly it is much lower than the one of FDI. As far as workers' remittances are concerned, the unweighted average of that ratio calculated over a sample of 93 emerging countries, equals 0.65. It records a modest increase if countries with smaller samples are excluded. For net FDI, the same unweighted average, calculated over a sample of 108 emerging countries, equals 2.08; when we restrict the sample to the 91 countries with available data on workers' remittances, the resulting estimate of volatility (1.87) is lower but still much above the 0.65 of workers' remittances.

Cyclicality is investigated looking at the correlation of workers' remittances – in percentage of GDP – with per capita GDP growth in the receiving country[14]. The resulting correlation is almost nil (0.03), especially when compared to the same statistics for net FDI inflows (0.12).

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[13] The peculiar dynamics recorded since 1994 is almost entirely driven by Russia.

[14] Cyclicality can not be investigated at the aggregate level, i.e., looking at the correlation between workers' remittances towards all emerging countries and emerging countries' total output, because the evolution of the aggregate workers' remittances is deeply affected by the changes of sample size and composition.

We now move closer to the core of our empirical analysis and relate workers' remittances to current account reversals. The source of the data on current account is again the IMF Balance of Payments Statistics database; we divide the current account balance, measured in dollars, by the GDP, again in current dollars, as provided by World Bank's World Development Indicator database.

Our preferred definition of a current account reversal occurring at time *t* is based on the following three requirements: i) the current account balance at time *t-1* must be a deficit; ii) the current account balance must improve by at least 5 percentage points of GDP; iii) the size of the improvements must exceed one half of the current account balance at time *t-1*. For every country-year observation, we thus create a dummy variable, denoted by BP5[15], which takes on a value equal to 1 if a current account reversal occurs and 0 otherwise.

Few comments on BP5 are needed. Firstly, BP5 stands in a close relationship with some of the measures used by MFR and Edwards: criteria i) and ii) are common to all measures, while criterion iii) is a stricter version of MFR's last requirement. This strict analogy with MFR and Edwards is crucial: our purpose is not to innovate on the criteria for identifying current account reversals, but to show that remittances can play a role while using "well-established" measures of current account reversals. Along these lines, we will show that our results hold also when using only criteria i) and ii) so as to resemble more closely Edwards' first measure; in particular, we provide two versions of it: ED4 denotes an adjustment of the initial current account deficit equal to at least 4 percentage points of GDP, exactly as in Edwards (2004b), while ED5 raises the required adjustment to 5 percentage point[16]. Secondly, we purposely choose not to allow for the adjustment to take more than one year, as in Edwards (2004a)' second measure and in MFR's criterion i). We believe that our single-year criterion better capture a crisis episode which wants to be the focus of our analysis[17].

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[15] A bit presumptuously, BP stands for Bugamelli and Paternò, while 5 refers to the 5 percent minimal adjustment.

[16] Here the purpose is to create a bridge between Edwards' measure and BP5 in terms of adjustment size.

[17] An important feature of BP5 is that it does not require any persistence in the current account adjustment, i.e., any current account adjustment might be reversed in the very next years. Furthermore, it might lead us to break

(segue)

According to BP5, there were about 200 current account reversals during our sample period. This number falls to slightly more than 100, if we drop out of the sample the current account reversals which will not enter our econometric analysis because of the limited availability of data on workers' remittances (Table A3). Not surprisingly, the frequency of current account reversals depends on the measure: it is higher (about 13 percent) with ED4, the less stringent measure among the ones used in this paper, decreases to 10 percent with ED5 and further to 8 percent with BP5.

Now we are ready to link remittances and current account reversals. As shown in Table 2, workers' remittances are substantially stable or slightly increasing around episodes of current account reversals. The mean of workers' remittances goes from 3.1 percent of GDP in the year preceding the current account reversal to 3.5 in the year of the reversal and down to 3.3 in the year after the reversal. By contrast, the mean of net FDI inflows, measured again as a percentage of GDP, decreases from 2.4 percent to 1.6 percent, and then down to 1.4 percent. The evidence does not change when the median and the 75th percentile of the distribution are used instead of the mean.

## 4. Empirical specification

Building on the work by Edwards, Milesi-Ferretti and Razin, our base specification is as follows:

$$\text{Prob}(\text{current account reversal}_{i,t}) = \Phi(X'_{i,t-1}\,\beta + \mu_i + \delta_t)$$

where $i$ indexes countries and $t$ year, $\Phi$ stands for the c.d.f of the normal distribution. $X'_{t-1}$ include the following one-period lagged variables: current account deficit over GDP (denoted by CA), net international reserves over GDP (RES), external debt over GDP (EXTD), share of short term external debt in total external debt (SHORTD), domestic credit growth (CREGRO), GDP per capita (PPPGDP), trade openness (OPEN), net official transfers over GDP (OT), concessional debt as a share of total external debt (CONCD).

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down a current account adjustment, which is realized over a couple of years, into two episodes of current account reversals. In this section 6.3 we will take care of this slightly modifying BP5.

In the regressions we always include year dummies ( $\delta_t$ ) and country fixed effects ( $\mu_i$ ), the latter ones controlling for all unobserved and omitted country-specific features that might influence the probability of a current account reversal, the former ones capturing common (across countries) trends in current account adjustments and explanatory variables. Due to the presence of country fixed effects, we can only identify time-varying determinants of reversals, but also exclude spurious relationships due to correlation between observables and unobserved time-invariant country-specific factors.

Moreover, we estimate both a probit and a linear probability model so as to prove the robustness of our results to different distributional assumptions on the errors. The linear model turns out to be particularly useful when we add the migrants' remittances to our base specification. Before getting to this, we need a brief logical detour.

In the absence of a theoretical model that links workers' remittances to current account reversals, we rely upon a series of heuristic considerations, which takes us to expect a negative relationship between workers' remittances and the occurrence of reversals.

A current account reversal in a given country is often due to sudden reversals of private capital inflows triggered by foreign investors' confidence loss on the ability of that country to repay its liabilities; this loss of confidence is typically, though not always, induced by a worsening of the fundamentals. A reduction in the level of international reserves below a certain threshold and/or an increase in the external debt above a certain threshold can be seen as events triggering such a loss of confidence and hence inducing the current account reversal. In this context one might expect that a high level of workers' remittances, whose mostly altruistic determinants are reflected in the "good" statistical properties outlined in section 3, makes given fundamentals appear to be better so reducing the probability of financial crisis[18].

The properties of stability and a-cyclicality of workers' remittances have also an important empirical implication: any effect of workers' remittances can only be identified through the cross-country variance rather than the within-country across-time variance. This is to say that we

[18] Incidentally, the IMF in its April 2005 World Economic Outlook (Chapter II) writes: *"[…] remittances display a significant, positive association with credit ratings for sovereign debt"*.

have no hope to identify any direct effect of workers' remittances on the probability of current account reversals in our empirical specification with country fixed effects and year dummies. Figures 5 and 6 clarify this point. In Figure 5 we plot the distribution of workers' remittances/GDP in our data in two distant years (1988 and 1996). When the distributions refer to the raw data (panel A), we find some heterogeneity across countries, in particular in the range between 0 and 5 percent. But when we net out country fixed effects and year dummies (panel B), little is left over: in both years countries are bunched around 0, that is to say that country fixed effects and year dummies take out all the variation in workers' remittances/GDP.

A more direct evidence is reported in Figure 6. Here we plot the kernel densities of (lagged) remittances over GDP by occurrence of a current account reversal – according to BP5 – that is separately for country-year pairs where a reversal did and did not occur. Again country heterogeneity in the raw data (panel A) fully disappears when we net out country fixed effects, year dummies and the current account balance[19].

For a better assessment of Figure 6, it is useful to repeat the exercise plotting the distribution of those variables that Edwards finds to significantly affect the probability of current account reversals. In Figures 7-9, we do it for the lagged current account balance over GDP, the lagged level of international reserves over GDP, and the lagged total external debt over GDP, respectively. In all cases, the two distributions remain sufficiently different, even after netting out country fixed effects, years dummies and, when relevant, the current account balance.

Combining the above rationale for a negative relationship between reversals and workers' remittances and the constraints coming from the empirical identification, we search for an indirect effect of workers' remittances by interacting them with those variables having instead a significant direct effect. For example, we test the hypothesis that a given deployment of international reserves is less likely to trigger a current account reversal if it is accompanied by a higher level of workers' remittances. By the same token, high workers' remittances might weaken the positive relationship between the level of external debt and the probability of current account reversals.

To close the circle, the linear probability model turns out to be a much more friendly environment – as compared to a probit – for detecting and interpreting the coefficients of interaction terms (Ai and Norton, 2003). Obviously, we switch to a linear model only after showing that the results do not differ from those obtained in the probit specification.

In the linear specification, the equation we estimate is thus as follows:

$$\text{Reversal}_{i,t} = X'_{i,t-1}\beta + \gamma * (RES_{i,t-1} * DREM_{i,t-1}) + \vartheta * (EXTD_{i,t-1} * DREM_{i,t-1}) + \mu_i + \delta_t + \varepsilon_{i,t}$$

where *Reversal* is a dummy variable identifying the occurrence of a current account reversal according to our alternative criteria (ED4, ED5, BP5). It is worth remarking that we do not interact reserves and external debt with the continuous variable workers' remittances/GDP (REM) – which however we include as a separate control – but, more parsimoniously, with a dummy variable (DREM) that takes on a value equal to 1 whenever REM is above some yearly threshold. More precisely, we work with three thresholds: the median, the mean and the 75$^{th}$ percentile of the yearly distribution of workers' remittances over GDP. With a clear positive time trend, in 2000 the thresholds corresponded approximately to 1.6, 3.3 and 3.7 percent, respectively.

## 5. Current account reversals: base regressions

Table 3 reports the results from our base regression. In the first 4 columns our measure of current account reversals (BP5) is regressed on the set of explanatory variables, using a multivariate probit model. All the explanatory variables are lagged one period; a detailed description of these variables is reported in Table A1.

When we omit country and year fixed effects (column [1]) the only significant coefficients are those of the lagged current account balance with the expected negative sign and the lagged per capita GDP – measured in PPP – which turns out to be positively correlated with the

[19] Given the robust evidence on the large relevance of the initial current account balance, it is essential to compare the explicative power of remittances (and other variables) having controlled for that balance.

probability of a current account reversal[20]. When we add country fixed effects (column [2]), the picture slightly changes: the level of international reserves over GDP becomes robustly significant and with the expected sign. This is signaling that it is not the level per se that triggers a crisis but its worsening, that is a reduction in the stock of international reserves. Year dummies do not change the results (column [3]). In column [4] we add other regressors, in particular those that MFR find significant: openness to trade, the level of official transfers as a fraction of GDP and the share of concessional debt in total debt. None of them is significant, the previous result on international reserves is unchanged[21].

In the remaining part of the table we test the robustness of the results to a linear specification. The specifications without non-linear terms (column [5]) and with squared international reserves (column [6]) fully confirm the results from the probit. When we add a squared term for external debt (column [7]), the level of external debt – net of country fixed effects – becomes significant with the expected positive sign.

In Table 4a we replicate Edwards' results using his first measure of current account reversals (ED4) as a dependent variable. In all specifications, this less restrictive measure conveys the well-known result that both international reserves and external debt have a significant coefficient. Table 4b replicate the same set of regressions using ED5: the results are less clear-cut with only the external debt significant in 4 out of 7 specifications.

Overall, we conclude that our results confirm Edwards' findings that international reserves and external debt over GDP, along with the initial current account balance, are the most important and robust determinants of current account reversals.

## 6. Current account reversals and workers' remittances

In this section we turn to workers' remittances.

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[20] MFR rationalize this result with the difficulty of extremely poor countries to reverse their external imbalances. Edwards (2004b) finds instead a negative and significant coefficient. We do not try any interpretation at this stage, especially since this result will turn out to be very weak across our different specifications.

[21] We do not report the results with terms of trade and fiscal balances over GDP. Both were not significant and, due to data availability problems, reduced the sample size considerably.

As explained in section 4, workers' remittances enter our specification both linearly and interacted with international reserves and external debt. To save space, we will focus on our preferred measure of current account reversals (BP5) and on ED4, that, being exactly the measure used by Edwards (2004a, 2004b), allows us to better hook our new results on remittances within the literature on current account reversals. In both cases we go for the linear specification with squared terms.

Table 5 contains the results for both measures of reversals and, for each measure, for the three different thresholds on remittances. On the basis of ED4, a sufficiently high level of workers' remittances in terms of GDP lowers the sensitivity of the probability of current account reversal to external debt and international reserves; in other words, it helps reducing the impact of increasing external debt and decreasing international reserves on the probability of a financial crisis. Interestingly, this indirect impact of workers' remittances is shaped by a threshold effect. When we split the sample according to the median value of workers' remittances over GDP, we do not find any indirect effect of remittances; when the split is moved up to the mean ($75^{th}$ percentile), both interactions become significant at 10 (5) percent.

Using BP5 (columns [4] – [6]), we find stronger results. Already when above the median level, remittances reduce the negative impact of international reserves with a coefficient significant at 5 percent. Instead a neat threshold effect still applies to the external debt: the coefficient of the interaction with remittances becomes significant, at 5 percent, only when remittances are above the $75^{th}$ percentile. In a linear specification without squared terms for reserves and external debt, the results (not reported) are fully confirmed for international reserves; for external debt, instead, both the coefficient of its direct effect and that of its interaction with remittances are no more significantly different from zero[22].

Importantly, as it emerges from Table 6, the results are robust to a different measure of migrants' remittances that includes the balance of payments item "Compensation of employees"

[22] Differently, the lack of squared terms does not affect the results based on ED4.

only for those countries that, according to the country-specific notes in the Balance of Payments Statistics Yearbook, explicitly advice to do so[23].

While recognizing that the balance of payments data on remittances very likely underestimate the true amount, we believe that measurement error does not significantly affect our findings for at least two reasons. First, since classical measurement error causes an attenuation bias, that is a reduction in the significance of the coefficients of the variables imprecisely measured, we conclude that our results on remittances are possibly even stronger than what found here. Secondly, we do not see any a-priori reason for the underestimation of remittances to bias the cross-country variance which our results are drawn from; along these lines, the just shown exercise with a different measure of migrants' remittances can be seen as a partial and indirect proof of it.

A different issue concerns the validity of the results over the entire distribution of observations: unpleasantly, as it can be inferred by combining the coefficients of the linear, the quadratic and the interaction terms, the intuitive negative (positive) effect of reserves (external debt) on the probability of current account reversals may become, less intuitively, positive (negative) for high values of reserves (external debt) over GDP. We believe, though, this not to be a too serious issue for two reasons. On one hand, a linear model can not be asked to capture strong nonlinearities occurring in the tails; in particular, the apparent inversion could instead be reflecting that the probability effect of decreasing reserves and increasing external debt asymptotically converges to 1. On the other hand, these turning points occur at the very extremes of the distribution of the variables[24].

As a further check, we have excluded the country-year cells falling below the 1st or above the 99th percentile of the distributions in terms of international reserves and external debt: the

[23] Countries for which compensation of employees are to be excluded from total remittances are: Argentina, Azerbaijan, Barbados, Belize, Benin, Brazil, Cambodia, Cape Verde, China, Cote d'Ivoire, Dominican Republic, Ecuador, El Salvador, Guyana, Panama, Rwanda, Senegal, Seychelles, Turkey and Venezuela. It is well known that the inclusion of compensation of employees is quite relevant for the Philippines.

[24] As an example, in column [7] of Table 3, reserves need to go above 89 percent of GDP, a value that in our sample is greater than the 99th percentile of the distribution in terms of reserves/GDP. In the same way the external debt must reach 216 percent of GDP to invert the relationship, a value again around the 99th percentile. Admittedly, these turning values occur at lower percentiles in the estimates reported in Table 5.

results (not shown) are qualitatively unchanged, the sign reversion disappears for debt and moves further to the upper extreme of the distribution for reserves.

*6.1 Robustness: omitted variables*

Could the negative indirect effect of workers' remittances be spuriously due to other unobserved country-specific features that are correlated with both workers' remittances and current account reversal?

For example, the degree of development of financial markets could sustain the flows of workers' remittances – especially those channeled through the banking system and, as such, more likely recorded in the official balance of payments statistics – and, at the same time, reduce the probability of financial crises. Similar effects could descend from a higher flexibility of exchange rates and greater freedom in capital movements. Another potential channel for a spurious relationship is political instability that could reduce migrants' willingness to send money back home and, at the same time, be correlated to financial instability. To the extent that there is some relationship between the literacy rate of migrants and their propensity to remit[25], a spurious correlation might arise if education[26], through its positive effects on potential growth, reduce the probability of financial crises.

We address some of these issues by adding to our empirical specification the interactions between international reserves and external debt on one side, and indicators of financial development, exchange rate arrangements, political instability, literacy rate of working-aged residents and country size on the other side. As a further robustness exercise, we also add interactions with dummy variables for African and Asian developing scountries to prove that our results are not specific to any particular geographical area, and for small countries. Given the results in the previous section, we present, for both measures of reversals, only the most clear-cut results based on the 75$^{th}$ percentile workers' remittances-dummy variable.

[25] As far as we know, only Faini (2002) empirically tests how migrants' skills affect their propensity to remit and finds a not very robust negative relationship.

We measure financial development with the ratio of private credit to GDP: again we prefer to work with a dummy variable (FD) that takes on a value equal to 1 if this ratio is larger than its yearly median value. When we add in our model the interactions between the financial development dummy variable and international reserves and external debt over GDP, the results on workers' remittances are by large confirmed (Table 7, columns [1] and [3]). As to exchange arrangements, we use the measure constructed by Reinhart and Rogoff (2002) which is meant to be alternative to the standard classification published in the IMF's *Annual Report on Exchange Rate Arrangements and Exchange Restrictions*. More precisely, we start from Reinhart and Rogoff' coarser classification that group countries according to 5 categories from "no separate legal tender" to "freely falling" and we further group them into 3 categories[27]. As shown in columns [2] and [4] of Table 7, the introduction of the interaction between the exchange rate arrangement dummy (ARR) on one side and international reserves and external debt on the other do not affect the results on remittances.

Table 8 proposes three other robustness exercises. The first one relates to country size: here we build a dummy variable (SMALL) that is equal to 1 for countries with less than 500,000 resident as of 2002. The second one splits countries according to their literacy rate, again below and above the median (LIT). The third one aims at separately identifying the effects of civil wars on financial instability. For this, we use the Armed Conflict Dataset which is a comprehensive new database of civil conflicts developed by the International Peace Research Institute of Oslo (Norway) and the University of Uppsala (Sweden)[28]. The database, which focuses only on politically motivated violence, allows us to define a dummy variable (WAR) which is equal to 1 if a country experiences in a given year a conflict with more than 1000 battle deaths. All the

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[26] From Docquier and Marfouk (2005)'s estimates on emigration stocks by educational attainment, it emerges a strong positive correlation across countries between emigrants and working-aged resident population in terms of average years of education.

[27] The first category contains the most restrictive arrangements: from "no separate legal tender" to "pre announced crawling band that is wider than or equal to +/- 2%". The second category includes the intermediate arrangements: "de facto crawling band that is narrower than or equal to +/- 5%", "moving band that is narrower than or equal to +/- 2% (i.e., allows for both appreciation and depreciation over time)", "managed floating" and "freely floating". Following the suggestions by Reinhart and Rogoff, we leave the last item "freely falling" in a third separate category.

splits in Table 8 appear not to impact on our results on workers' remittances and current account reversal. Such a robustness is confirmed also when we add interactions with continent dummies. In particular, as shown in Table 9, the beneficial effects of workers' remittances on financial stability is neither specific to African economies nor to Asian developing countries.

*6.2 Robustness: endogeneity of remittances*

How about endogeneity of remittances? Could it be the case that altruistic migrants increase their remittances when a financial crisis becomes more likely?

The issue is not so simple and requires to be developed further. Being remittances lagged one period in our specification, the risk is that forward looking migrants would react to an increase in the ex-ante probability of a current account reversal. Then two scenarios open up. In the first one, the associated increase in remittances is not capable of avoiding the reversal; in this case, endogeneity would work against our result in that biasing towards a positive indirect effect of remittances on the probability of current account reversals[29]. In the second one, the associated increase in remittances is capable of avoiding the current account reversal; in this case, endogeneity would bias toward finding a negative indirect effect of remittances on the probability of current account reversals. Only in this case, endogeneity would bias in favor of our result.

Besides recalling the high stability and low volatility of remittances, our best answer to the endogeneity issue is to show that the within-country dynamics of remittances is not crucial for the identification of their stabilizing effect. For this, we perform two exercises. The first one consists in computing the frequency of switches in DREM since in our specification an increase in remittances before the crisis raises an endogeneity issue only if it determines a switch in the dummy variable DREM. Should we observe a low share of switches, we would conclude that endogeneity is not a serious issue.

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[28] Miguel, Satyanath and Sergenti (2004) use this dataset to estimate the impact of economic conditions on the likelihood of civil conflicts. For details on the methodology and the set of countries with civil conflicts, we send to Strand, Wilhelmsen and Gleditsch (2004).

When we focus on all country-year observations, we find that 12.8 percent of cases with a level of remittances above the 75$^{th}$ percentile were below the threshold a year before. Restricting to the country-year observations where a current account reversal – according to BP5 - occurs at time t, the share of upward switches at time t-1 is equal to 17 percent. In the complementary subset of observations with no current account reversals, the upward switches amount to 11.6 percent.

Admittedly, these figures do not allow to conclude that switches are unimportant for identification. Therefore we perform a second exercise consisting in replicating our main regressions and using only the cross-country variance in the level of remittances over GDP. For this, we re-define DREM on the distribution of country means in the level of remittances over GDP (denoted by DREMave). In confirming our previous results the evidence reported in Table 10 largely retrenches the endogeneity issue[30].

In our view, the fact that our results do not depend on the time-variation in remittances protects us from another possible critique of spurious correlation between remittances and current account reversals, that is the one driven by exchange rate movements. On one side, it could be argued that a currency depreciation in the remittance receiving country at year t-1 has expenditure switching effects that end up into a current account adjustment at year t; on the other side, the same depreciation is equivalent to a positive wealth effect for migrants who might decide to increase their remittance flows: this is not obviously the case in the regressions reported in Table 10.

### *6.3 Robustness: measure of current account reversals*

Undoubtedly, the generality of our results is limited by the measure of current account reversals. In the impossibility of proving that they hold for any possible definition of current

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[29] More precisely, toward a positive coefficient on the interaction between external debt and remittances and a negative coefficient on the interaction between international reserves and remittances.

[30] As a further robustness check, we have re-estimated the regressions in Table 5 defining DREM over higher lags of REM, in particular 2 or 3 years instead of 1 or over a 5-year average (from t-5 to t-1). Again the results are qualitatively unchanged, even if the validity of this exercise is weakened by the fact that BP5 does not exclude successive current account adjustments.

account reversals, our best strategy has been to show that they do hold for a series of reasonable and widely accepted measures. In this section we do a further step in this direction and test our results to two other different measures.

We first restrict BP5 by imposing the further requirement that the current account reversal is accompanied by a simultaneous reduction in the real per capita GDP. This measure, which we name "contractionary current account reversal", aims at excluding sharp current account adjustment due to positive shocks such as strong improvement in the terms of trade. A nice side-effect is the exclusion of consecutive current account reversals.

When we apply this new requirement to BP5, the fraction of current account reversals in our sample reduces to 3 percent, making hard the identification of any effect on the probability of reversals. Therefore we choose to show the results on contractionary current account reversals applying the new requirement to BP4, that is to our preferred measure with a 4 instead of a 5 percentage points adjustment in the current account deficit over GDP; with this measure the share of current account reversals rises to 5 percent.

The base regressions, shown in the columns [1] – [3] of Table 11, fully confirm the well-known picture: both in the enriched probit (column [1]) and in the more general linear probability model (column [3]) a reduction in the level of international reserves may trigger a current account reversal; the linear model gives the usual prediction for an increase in the external debt, too.

When remittances are added to the linear model (columns [4] – [6]), we find again a positive indirect effect of a high level of remittances on financial stability. In particular, a remittances/GDP above the 75$^{th}$ percentile reduce the probability of a contractionary current account reversal triggered by both a reduction in international reserves and an increase in external debt[31].

[31] When we omit the squared terms, we find again that only the interaction between remittances and international reserves remains significant. Using instead a contractionary BP5 (and keeping the squared terms), the coefficients of the two interactions are again significantly different from zero but less neatly: that with reserves is positive and significant at 10 percent, while that with the external debt is negative and significant at 5 percent.

As a second robustness exercise, we have amended our BP5 definition by not considering as reversals situations where the (t-1) current account deficit is smaller than 2 or 5 percentage points of GDP. Again the results (not shown) are qualitatively unchanged.

## 7. Concluding remarks and directions for future research

In chapter II of the April 2005 World Economic Outlook dedicated to migrants' remittances, the IMF writes: "*[…] the relatively stable nature of remittances suggests that countries with access to significant remittance inflows may be less prone to damaging fluctuations, whether in output, consumption or investment. In extreme cases, remittances might reduce the probability of financial crises. Such considerations are strengthened by the fact that remittances, unlike capital inflows, are unrequited transfers which do not create future debt-servicing or other obligations"*.

In this paper we have shown that this seems indeed to be the case: workers' remittances help reduce the probability of financial crises. According to our findings, a sufficiently high level of workers' remittances, in terms of GDP, reduces the probability of sharp current account reversals triggered by an increase in external debt or a decrease in the stock of international reserves.

As pointed out by Calvo, Izquierdo and Mejìa (2004), current account reversals is only one of the possible ways to identify financial crises, the other being currency crises and sudden stops of capital inflows. An empirical analysis of the relationship between remittances and sudden stops could indeed give a wider breadth to our results and shed some light on the mechanism through which a high level of remittances reduces the probability of current account reversals.

On the basis of our results, efforts to reduce the cost and the risk of transferring workers' remittances across countries should be part of the political agenda both at the international and national level.

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**Figure 1**

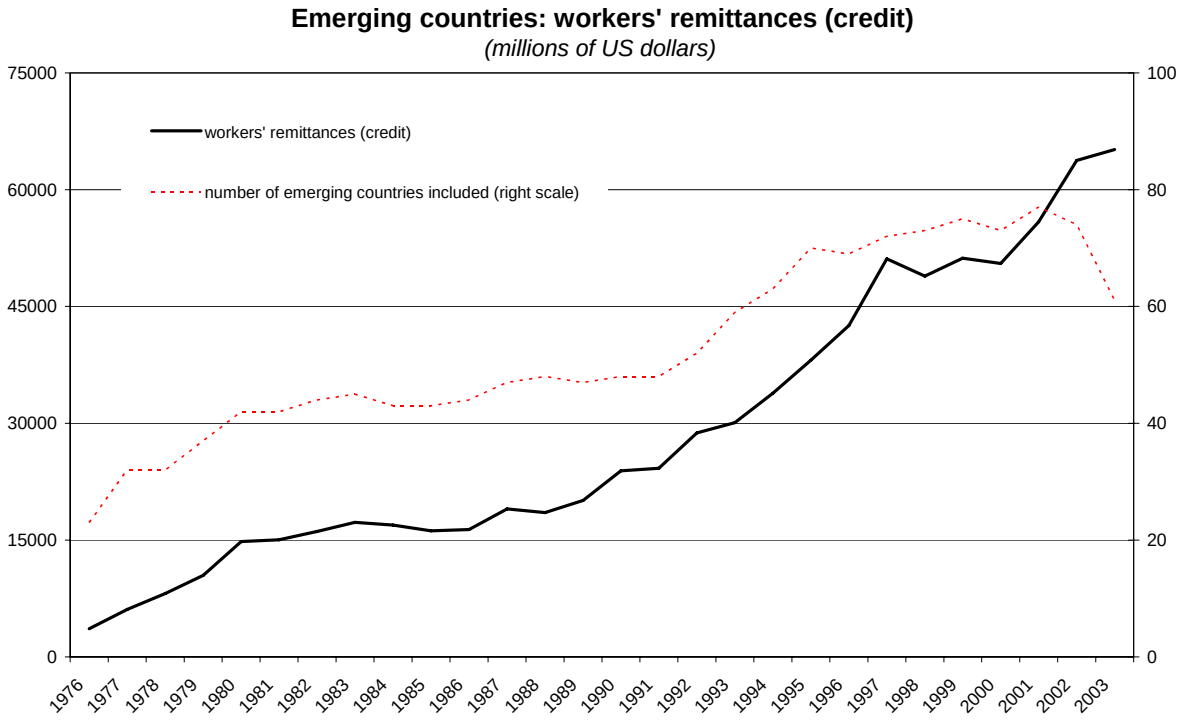



**Figure 2**

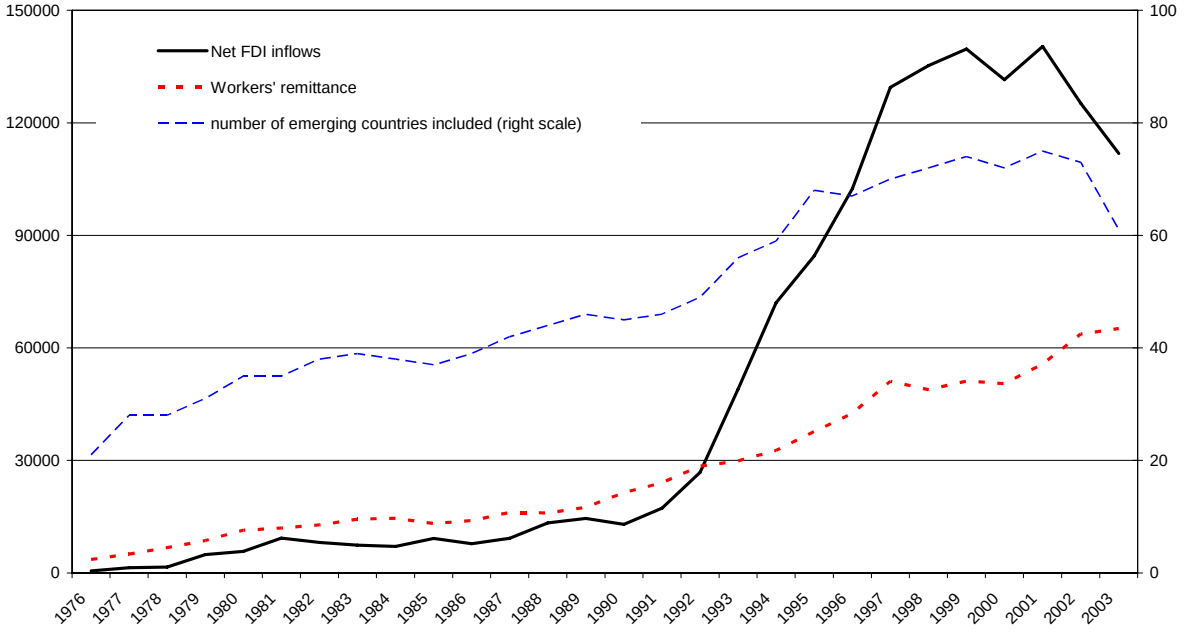


**Figure 3**

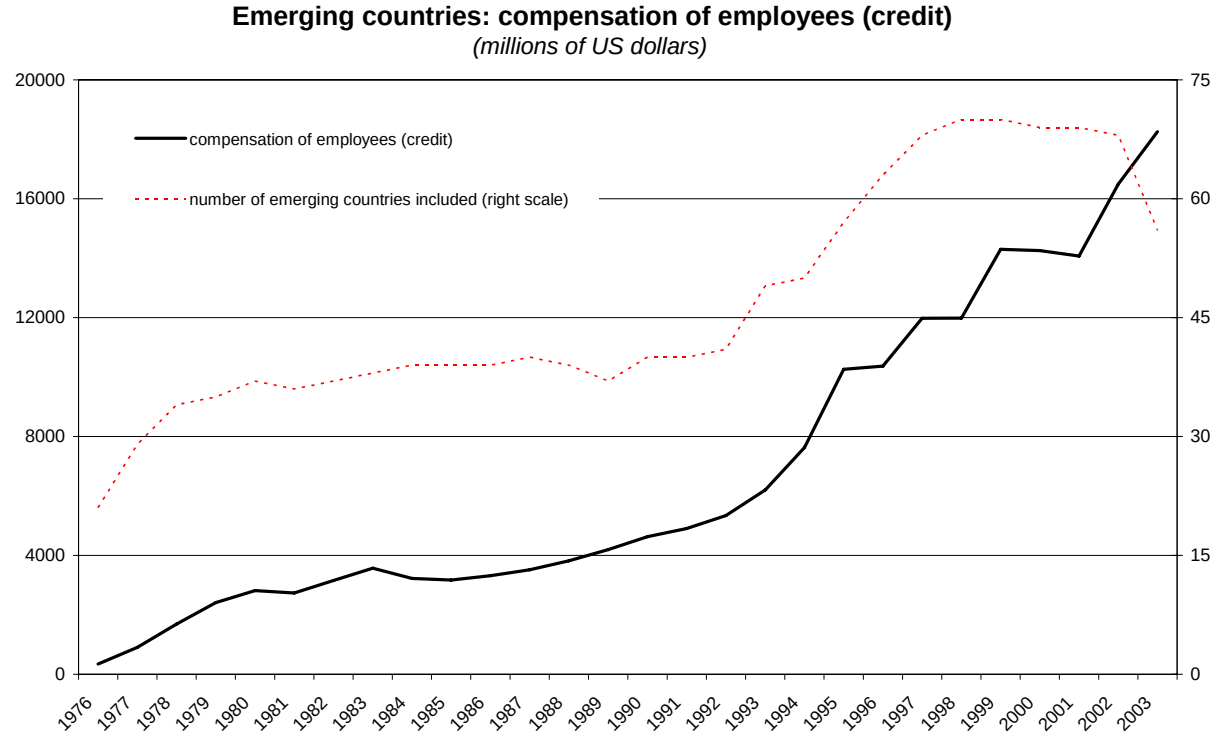



**Figure 4**

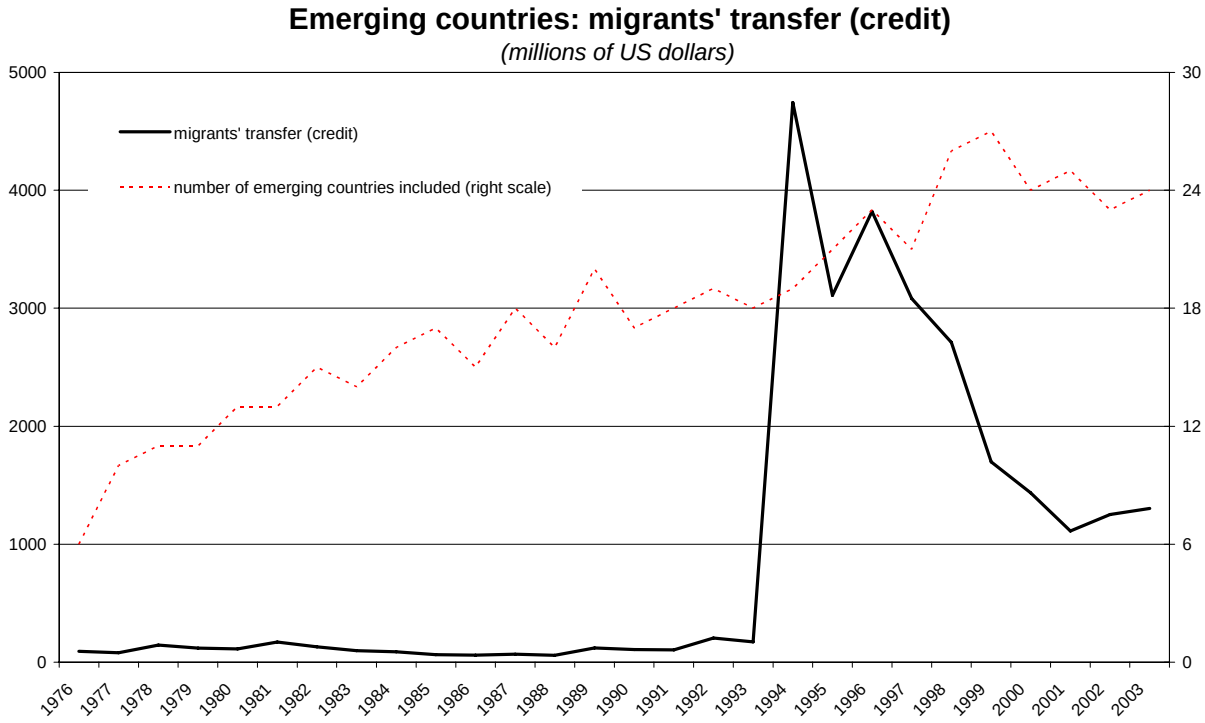
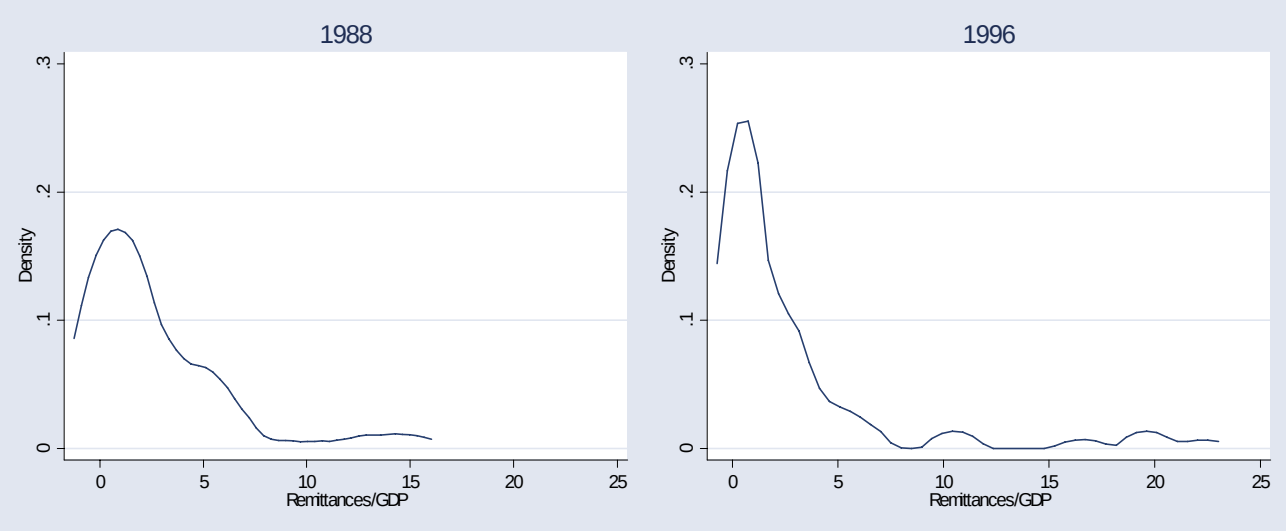


**Figure 5**

**Kernel density of remittances over GDP**

*Panel A: raw data*




*Panel B: net of country dummies and year dummies*

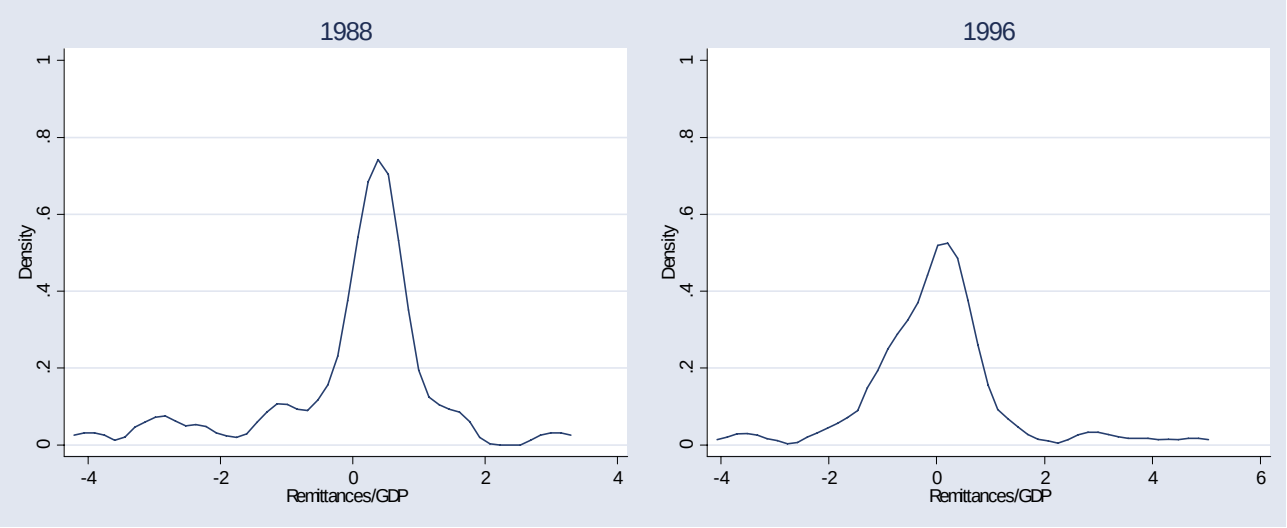
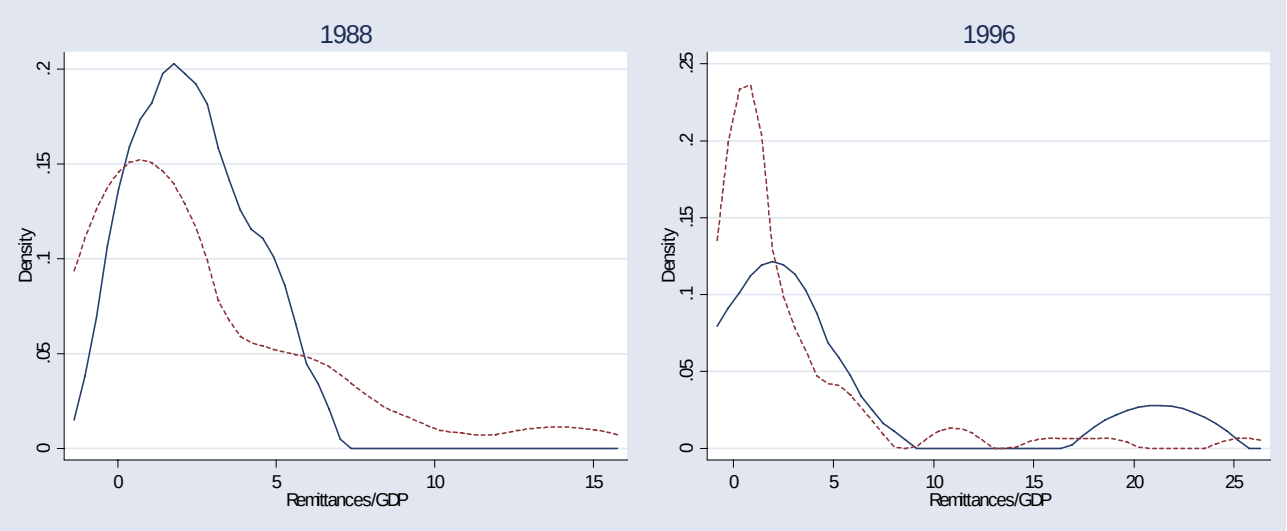


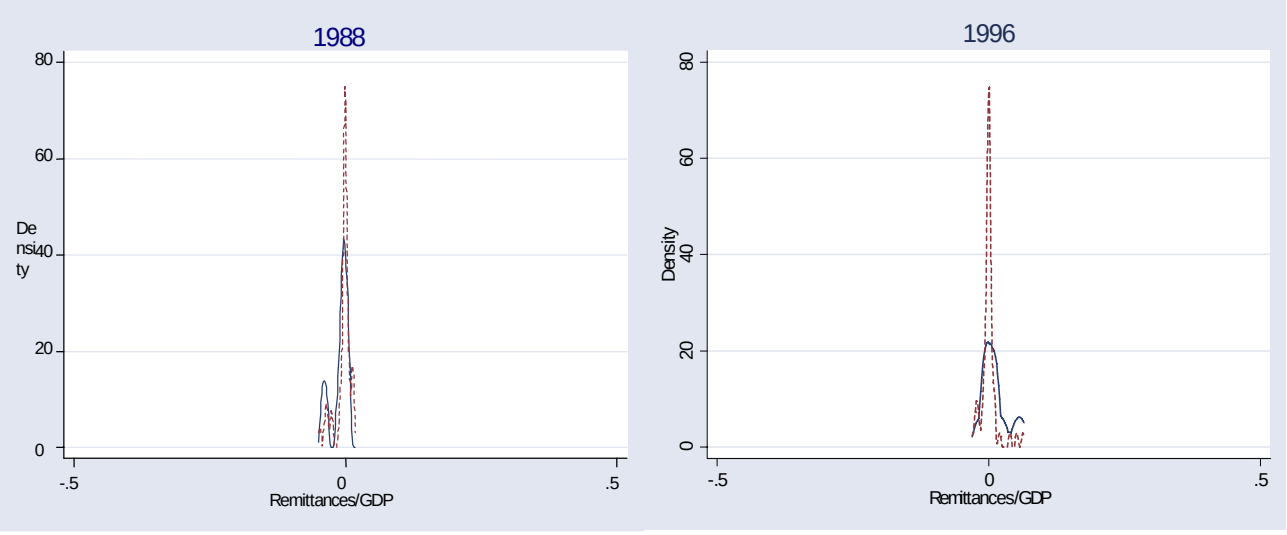
**Figure 6**

**Kernel densities of (lagged) remittances over GDP by occurrence of a current account reversal**

*Panel A: raw data*




*Panel B: net of current account balance, country dummies and year dummies*

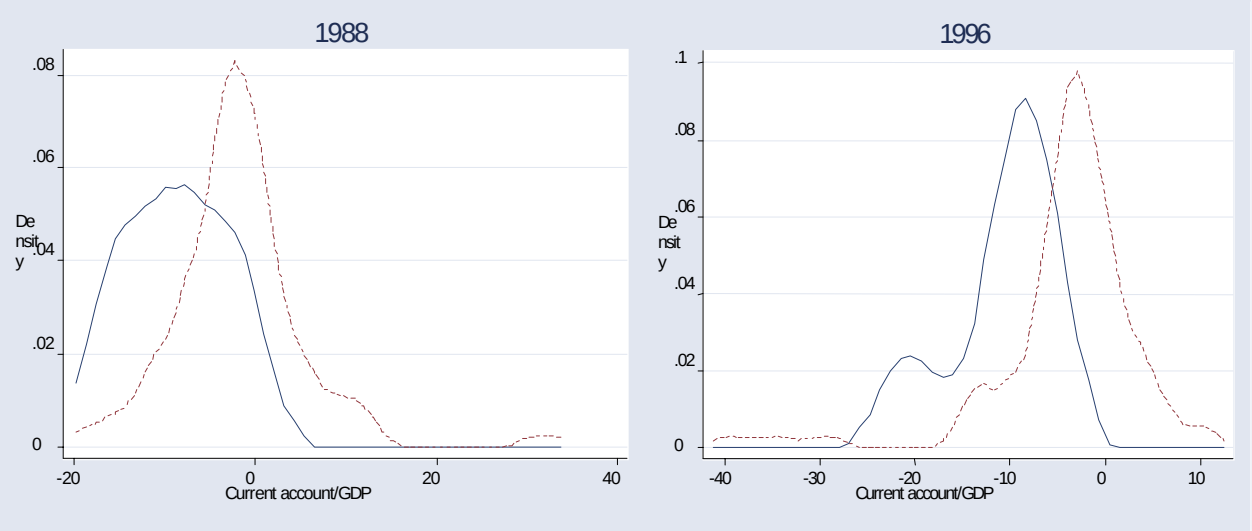



solid line: reversals short-dashed line: no reversals

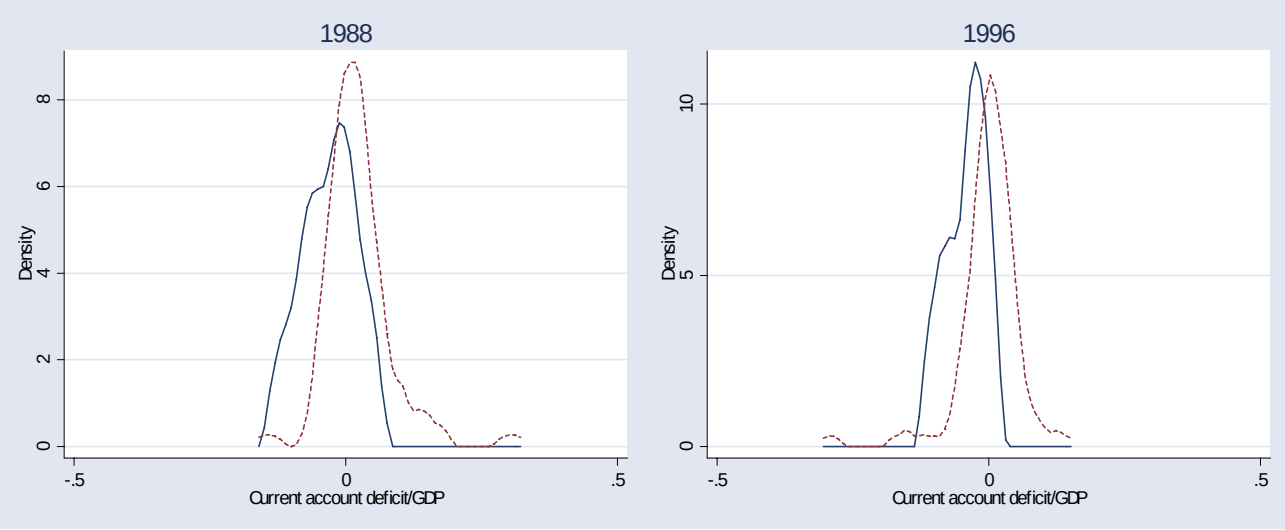
**Figure 7**

**Kernel densities of (lagged) current account balance over GDP by occurrence of a current account reversal**

*Panel A: raw data*




*Panel B: net of country dummies and year dummies*

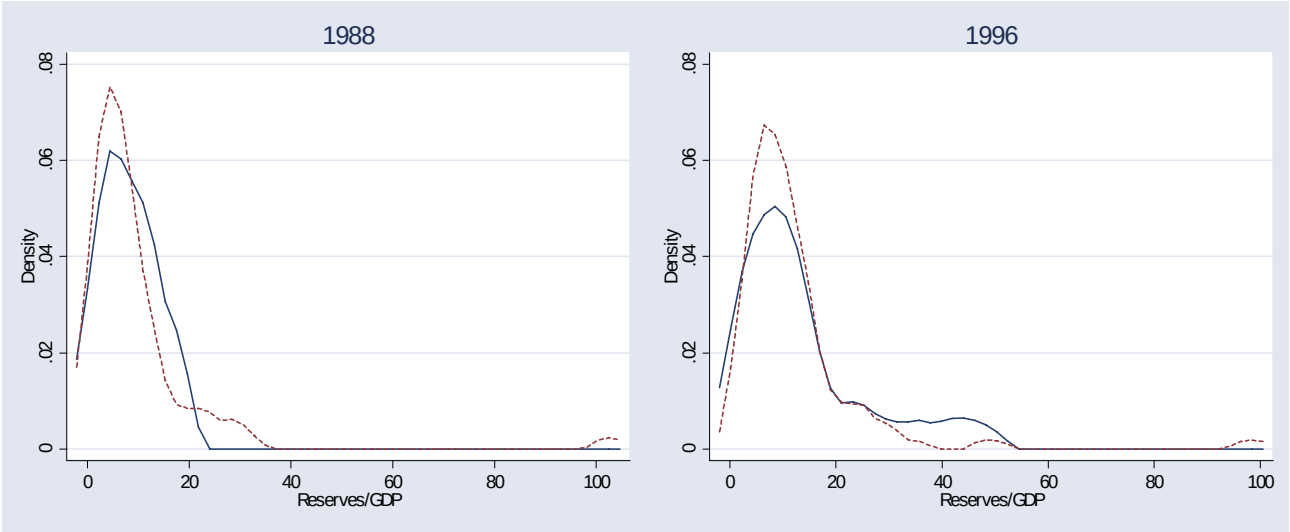



solid line: reversals short-dashed line: no reversals

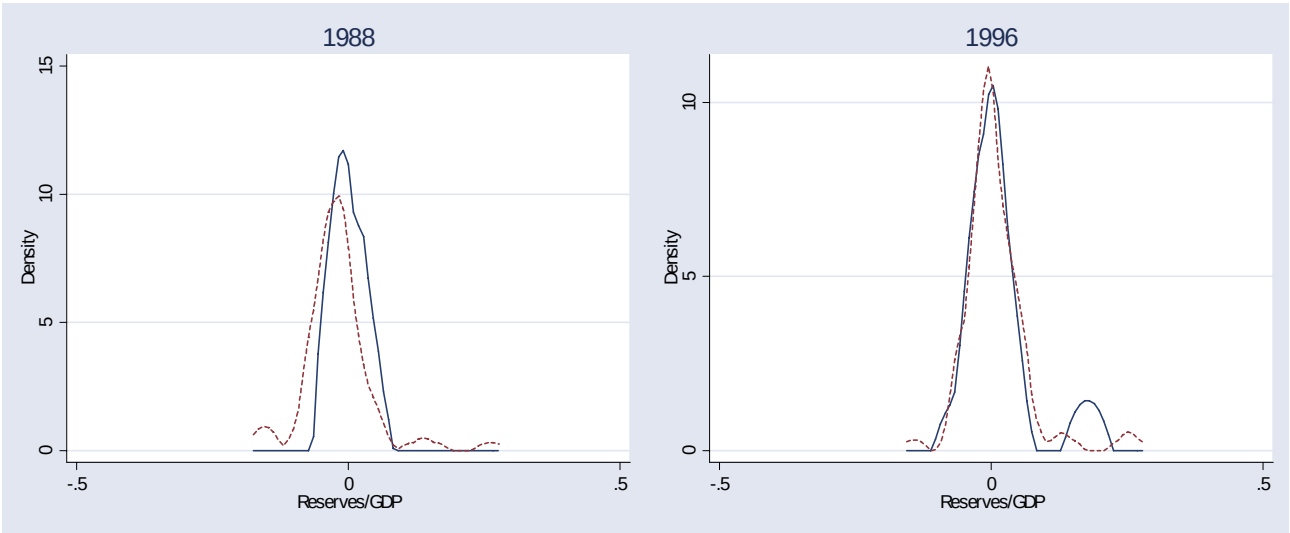
**Figure 8**

**Kernel densities of (lagged) international reserves over GDP by occurrence of a current account reversal**

*Panel A: raw data*




*Panel B: net of current account balance, country dummies and year dummies*

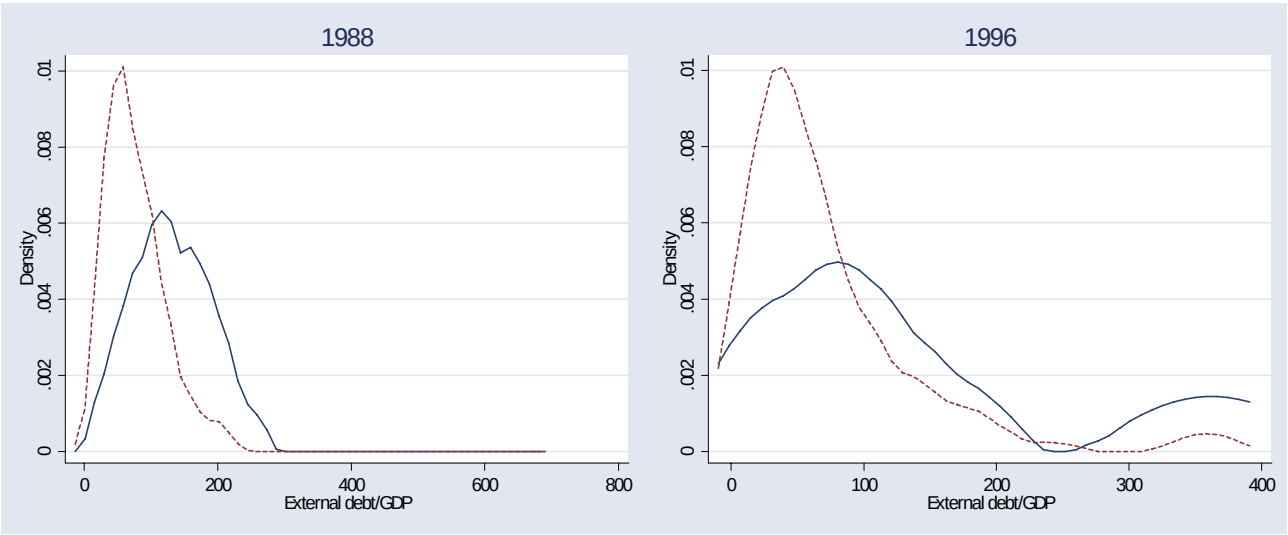



solid line: reversals short-dashed line: no reversals

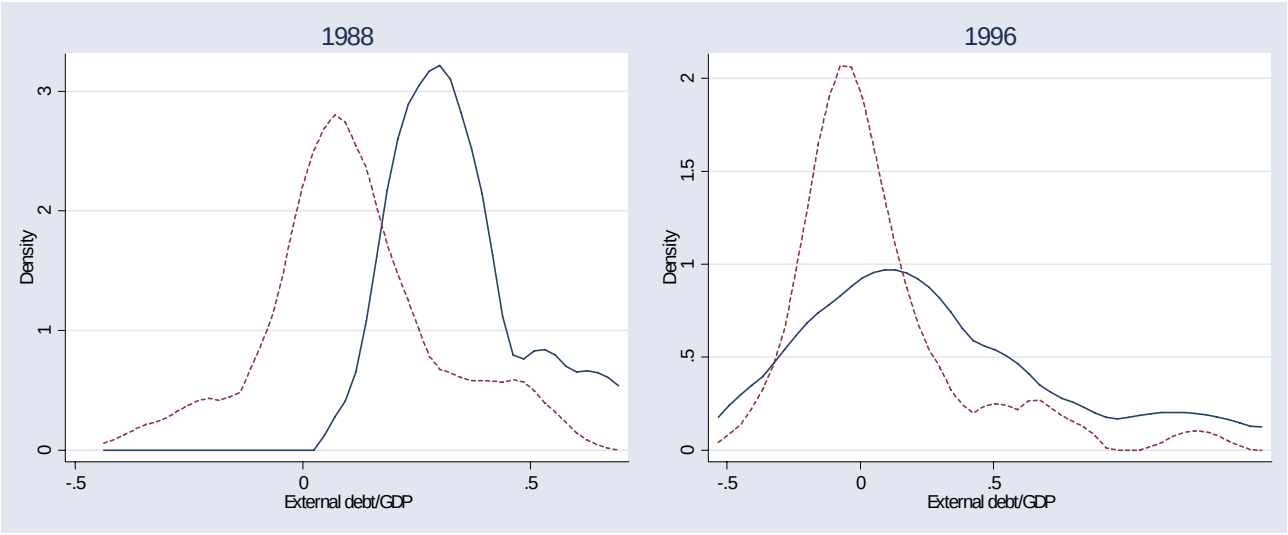
**Figure 9**

**Kernel densities of (lagged) external debt over GDP by occurrence of a current account reversal**

*Panel A: raw data*




*Panel B: net of current account balance, country dummies and year dummies*




solid line: reversals  short-dashed line: no reversals

**Table 1**

**Volatility: workers' remittances and net foreign direct investment inflows**

| | Workers' remittances (credit) | Net FDI inflows |
|---|---|---|
| Full sample (108 countries) | - | 2.08 |
| Excluding country-year observations with missing data on remittances (93 countries for remittances and 91 for FDI) | 0.65 | 1.87 |
| - excluding countries with less than 5 observations (83 countries for remittances and 81 for FDI) | 0.68 | 2.07 |
| - excluding countries with less than 10 observations (60 countries for remittances and 58 for FDI) | 0.68 | 2.45 |

*Notes*: volatility is measured as the unweighted average of countries' ratios of standard deviation to mean

**Table 2**

**Workers' remittances and net foreign direct investment inflows during current account reversals**
*(in percentage of GDP)*

| | t-1 | t | t+1 |
|---|---|---|---|
| Workers' remittances (mean) | 3.1 | 3.5 | 3.3 |
| Net FDI inflows (mean) | 2.4 | 1.6 | 1.4 |
| Workers' remittances (median) | 1.4 | 1.4 | 1.7 |
| Net FDI inflows (median) | 1.4 | 1.1 | 0.9 |
| Workers' remittances (75$^{th}$ percentile) | 4.5 | 5.1 | 4.9 |
| Net FDI inflows (75$^{th}$ percentile) | 3.2 | 3.1 | 2.8 |

*Notes***:** a current account reversal at time *t* is defined as a reduction of a current account deficit of at least 5 percentage points of GDP and equal to at least half of the (t-1) current account deficit.

**Table 3**

**Base regression**

*(measure of current account reversals: BP5)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | probit | probit | probit | probit | linear | linear | linear |
| CA | -5.301 | -7.188 | -7.417 | -7.385 | -1.206 | -1.214 | -1.233 |
| | [0.641]*** | [0.848]*** | [0.911]*** | [0.893]*** | [0.138]*** | [0.137]*** | [0.138]*** |
| RES | -0.216 | -1.946 | -1.942 | -2.005 | -0.311 | -0.494 | -0.468 |
| | [0.527] | [0.918]** | [0.906]** | [0.957]** | [0.132]** | [0.211]** | [0.211]** |
| EXTD | -0.027 | 0.162 | 0.087 | -0.001 | 0.007 | 0.006 | 0.095 |
| | [0.082] | [0.134] | [0.145] | [0.153] | [0.027] | [0.027] | [0.041]** |
| SHORTD | 0.117 | 0.052 | 0.337 | 0.478 | 0.007 | 0.007 | 0.007 |
| | [0.449] | [0.604] | [0.644] | [0.670] | [0.088] | [0.088] | [0.088] |
| CREGRO | 0.003 | 0.001 | 0.005 | 0.003 | 0.001 | 0.001 | 0.001 |
| | [0.016] | [0.019] | [0.019] | [0.019] | [0.003] | [0.003] | [0.003] |
| PPPGDP | 0.053 | 0.202 | 0.170 | 0.123 | 0.018 | 0.016 | 0.018 |
| | [0.019]*** | [0.089]** | [0.100]* | [0.111] | [0.017] | [0.017] | [0.017] |
| OPEN | | | | 0.600 | 0.090 | 0.106 | 0.107 |
| | | | | [0.455] | [0.064] | [0.067] | [0.067] |
| OT | | | | 1.039 | 0.127 | 0.135 | 0.066 |
| | | | | [1.415] | [0.266] | [0.265] | [0.268] |
| CONCD | | | | -0.298 | -0.027 | -0.021 | -0.001 |
| | | | | [0.667] | [0.080] | [0.079] | [0.079] |
| RES^2 | | | | | | 0.257 | 0.263 |
| | | | | | | [0.264] | [0.266] |
| EXTD^2 | | | | | | | -0.022 |
| | | | | | | | [0.007]*** |
| Country fixed effects | NO | YES | YES | YES | YES | YES | YES |
| Year dummies | NO | NO | YES | YES | YES | YES | YES |
| Observations | 1874 | 1874 | 1874 | 1861 | 1861 | 1861 | 1861 |
| R-squared | 0.08 | 0.16 | 0.20 | 0.21 | 0.17 | 0.17 | 0.17 |

*Notes*: the dependent variable (BP5) takes the value 1 if a reduction of a current account deficit of at least 5 percentage points of GDP and equal to at least half of the initial current account deficit occurs at time t, and zero otherwise. Robust standard errors in brackets. All explanatory variables are described in Table A1 and lagged one period. For the probit models we report the pseudo – $R^2$.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 4a**

**Base regression**
*(measure of current account reversals: ED4)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | probit | probit | probit | probit | linear | linear | linear |
| CA | -9.034 | -12.494 | -12.743 | -12.760 | -2.343 | -2.356 | -2.363 |
| | [0.755]*** | [1.040]*** | [1.110]*** | [1.113]*** | [0.155]*** | [0.154]*** | [0.156]*** |
| RES | 0.095 | -1.586 | -1.567 | -1.633 | -0.157 | -0.466 | -0.455 |
| | [0.475] | [0.905]* | [0.921]* | [0.979]* | [0.136] | [0.223]** | [0.223]** |
| EXTD | -0.038 | 0.375 | 0.350 | 0.322 | 0.080 | 0.078 | 0.109 |
| | [0.079] | [0.131]*** | [0.145]** | [0.159]** | [0.031]*** | [0.031]** | [0.049]** |
| SHORTD | 0.225 | 0.280 | 0.466 | 0.469 | -0.003 | -0.003 | -0.002 |
| | [0.411] | [0.602] | [0.635] | [0.665] | [0.124] | [0.123] | [0.124] |
| CREGRO | -0.005 | 0.001 | 0.002 | 0.001 | 0.000 | 0.000 | 0.000 |
| | [0.017] | [0.017] | [0.018] | [0.018] | [0.003] | [0.003] | [0.003] |
| PPPGDP | 0.037 | 0.168 | 0.160 | 0.122 | 0.013 | 0.009 | 0.010 |
| | [0.018]** | [0.084]** | [0.094]* | [0.104] | [0.017] | [0.017] | [0.017] |
| OPEN | | | | 0.347 | 0.097 | 0.126 | 0.126 |
| | | | | [0.443] | [0.072] | [0.075]* | [0.075]* |
| OT | | | | -0.514 | -0.114 | -0.099 | -0.123 |
| | | | | [1.455] | [0.296] | [0.293] | [0.296] |
| CONCD | | | | -0.292 | -0.084 | -0.076 | -0.069 |
| | | | | [0.593] | [0.095] | [0.094] | [0.095] |
| RES^2 | | | | | | 0.418 | 0.419 |
| | | | | | | [0.252]* | [0.253]* |
| EXTD^2 | | | | | | | -0.008 |
| | | | | | | | [0.009] |
| Country fixed effects | NO | YES | YES | YES | YES | YES | YES |
| Year dummies | NO | NO | YES | YES | YES | YES | YES |
| Observations | 1904 | 1904 | 1904 | 1890 | 1890 | 1890 | 1890 |
| R-squared | 0.17 | 0.26 | 0.29 | 0.29 | 0.26 | 0.26 | 0.26 |

*Notes*: the dependent variable (ED4) takes the value 1 if a reduction of a current account deficit of at least 4 percentage points of GDP occurs at time t, and zero otherwise. Robust standard errors in brackets. All explanatory variables are described in Table A1 and lagged one period. For the probit models we report the pseudo – $R^2$.
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 4b**

**Base regression**

*(measure of current account reversals: ED5)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | probit | probit | probit | probit | linear | linear | linear |
| CA | -8.910 | -11.592 | -11.621 | -11.594 | -2.028 | -2.034 | -2.036 |
| | [0.773]*** | [1.040]*** | [1.095]*** | [1.074]*** | [0.147]*** | [0.147]*** | [0.149]*** |
| RES | 0.304 | -1.107 | -0.947 | -1.014 | -0.074 | -0.219 | -0.216 |
| | [0.486] | [0.872] | [0.844] | [0.893] | [0.130] | [0.208] | [0.208] |
| EXTD | -0.028 | 0.303 | 0.291 | 0.228 | 0.056 | 0.055 | 0.063 |
| | [0.083] | [0.135]** | [0.150]* | [0.162] | [0.028]* | [0.028]* | [0.044] |
| SHORTD | -0.095 | 0.108 | 0.321 | 0.427 | -0.055 | -0.054 | -0.054 |
| | [0.446] | [0.631] | [0.669] | [0.703] | [0.090] | [0.090] | [0.090] |
| CREGRO | 0.006 | 0.010 | 0.014 | 0.013 | 0.002 | 0.002 | 0.002 |
| | [0.016] | [0.016] | [0.017] | [0.018] | [0.003] | [0.003] | [0.003] |
| PPPGDP | 0.056 | 0.158 | 0.151 | 0.113 | 0.011 | 0.009 | 0.010 |
| | [0.019]*** | [0.091]* | [0.104] | [0.114] | [0.016] | [0.016] | [0.016] |
| OPEN | | | | 0.513 | 0.102 | 0.116 | 0.116 |
| | | | | [0.467] | [0.067] | [0.070]* | [0.070]* |
| OT | | | | 0.431 | 0.019 | 0.026 | 0.020 |
| | | | | [1.406] | [0.276] | [0.275] | [0.277] |
| CONCD | | | | -0.165 | -0.045 | -0.041 | -0.039 |
| | | | | [0.662] | [0.082] | [0.082] | [0.082] |
| RES^2 | | | | | | 0.196 | 0.196 |
| | | | | | | [0.235] | [0.235] |
| EXTD^2 | | | | | | | -0.002 |
| | | | | | | | [0.009] |
| Country fixed effects | NO | YES | YES | YES | YES | YES | YES |
| Year dummies | NO | NO | YES | YES | YES | YES | YES |
| Observations | 1904 | 1904 | 1904 | 1890 | 1890 | 1890 | 1890 |
| R-squared | 0.19 | 0.26 | 0.29 | 0.29 | 0.26 | 0.26 | 0.26 |

*Notes*: the dependent variable (ED5) takes the value 1 if a reduction of a current account deficit of at least 5 percentage points of GDP occurs at time t, and zero otherwise. Robust standard errors in brackets. All explanatory variables are described in Table A1 and lagged one period. For the probit models we report the pseudo – $R^2$.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 5**

**Current account reversals and remittances**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | ED4 median | ED4 mean | ED4 75th pct | BP5 median | BP5 mean | BP5 75th pct |
| CA | -2.790 | -2.805 | -2.799 | -1.762 | -1.769 | -1.772 |
| | [0.229]*** | [0.228]*** | [0.227]*** | [0.213]*** | [0.213]*** | [0.212]*** |
| REM | -0.018 | 0.189 | 0.080 | 0.053 | 0.111 | 0.070 |
| | [0.490] | [0.502] | [0.522] | [0.420] | [0.427] | [0.433] |
| RES | -1.053 | -0.980 | -0.974 | -1.363 | -1.210 | -1.177 |
| | [0.452]** | [0.404]** | [0.391]** | [0.495]*** | [0.450]*** | [0.435]*** |
| EXTD | 0.162 | 0.201 | 0.199 | 0.151 | 0.173 | 0.180 |
| | [0.084]* | [0.084]** | [0.085]** | [0.066]** | [0.072]** | [0.072]** |
| SHORTD | -0.031 | -0.017 | -0.012 | -0.029 | -0.020 | -0.013 |
| | [0.144] | [0.144] | [0.145] | [0.107] | [0.108] | [0.108] |
| CREGRO | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.002] | [0.002] | [0.002] | [0.001] | [0.001] | [0.001] |
| PPPGDP | -0.018 | -0.018 | -0.018 | -0.007 | -0.008 | -0.009 |
| | [0.025] | [0.025] | [0.025] | [0.025] | [0.025] | [0.025] |
| OPEN | 0.188 | 0.206 | 0.203 | 0.220 | 0.234 | 0.234 |
| | [0.106]* | [0.106]* | [0.105]* | [0.095]** | [0.095]** | [0.095]** |
| OT | -0.692 | -0.733 | -0.740 | -0.476 | -0.490 | -0.513 |
| | [0.346]** | [0.347]** | [0.340]** | [0.302] | [0.304] | [0.294]* |
| CONCD | -0.013 | -0.012 | -0.012 | 0.026 | 0.014 | 0.023 |
| | [0.113] | [0.113] | [0.113] | [0.102] | [0.102] | [0.102] |
| RES^2 | 1.631 | 1.540 | 1.478 | 2.185 | 2.079 | 1.987 |
| | [0.832]* | [0.812]* | [0.795]* | [1.031]** | [1.018]** | [0.996]** |
| EXTD^2 | -0.027 | -0.038 | -0.038 | -0.036 | -0.044 | -0.046 |
| | [0.024] | [0.021]* | [0.021]* | [0.015]** | [0.016]*** | [0.016]*** |
| RES*DREM | 0.470 | 0.532 | 0.630 | 0.694 | 0.683 | 0.759 |
| | [0.316] | [0.312]* | [0.315]** | [0.303]** | [0.300]** | [0.303]** |
| EXTD*DREM | -0.038 | -0.096 | -0.097 | -0.041 | -0.071 | -0.087 |
| | [0.049] | [0.050]* | [0.051]* | [0.040] | [0.045] | [0.041]** |
| Observations | 1214 | 1214 | 1214 | 1191 | 1191 | 1191 |
| R-squared | 0.30 | 0.31 | 0.31 | 0.22 | 0.22 | 0.22 |

*Notes*: Estimation by linear probability model. Robust standard errors in brackets. All regressions contain country fixed effect and year dummies. The dependent variable ED4 takes the value 1 if a reduction of a current account deficit of at least 4 percentage points of GDP occurs at time t, and zero otherwise. The dependent variable BP5 takes the value 1 if a reduction of a current account deficit of at least 5 percentage points of GDP and equal to at least half of the initial current account deficit occurs at time t, and zero otherwise. DREM is a dummy variable that takes the value 1 if in a given year the level of workers' remittances over GDP of a country is above the median or mean or 75th percentile value (as specified at the top of each column) of that year's (cross-country) distribution. All other explanatory variables are described in Table A1 and lagged one period.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 6**

**Robustness: measure of remittances**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | ED4 median | ED4 mean | ED4 75th | BP5 median | BP5 mean | BP5 75th |
| CA | -2.798 | -2.797 | -2.785 | -1.772 | -1.765 | -1.763 |
| | [0.229]*** | [0.227]*** | [0.226]*** | [0.214]*** | [0.213]*** | [0.213]*** |
| REM | -0.181 | -0.326 | -0.620 | 0.076 | -0.097 | -0.311 |
| | [0.535] | [0.570] | [0.607] | [0.389] | [0.396] | [0.414] |
| RES | -0.966 | -1.053 | -0.971 | -1.242 | -1.216 | -1.155 |
| | [0.434]** | [0.395]*** | [0.382]** | [0.486]** | [0.442]*** | [0.426]*** |
| EXTD | 0.166 | 0.199 | 0.151 | 0.164 | 0.181 | 0.154 |
| | [0.085]* | [0.085]** | [0.090]* | [0.069]** | [0.072]** | [0.073]** |
| SHORTD | -0.024 | -0.001 | -0.009 | -0.021 | -0.001 | -0.003 |
| | [0.144] | [0.145] | [0.144] | [0.106] | [0.108] | [0.108] |
| CREGRO | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.001] | [0.001] |
| PPPGDP | -0.020 | -0.016 | -0.017 | -0.008 | -0.005 | -0.006 |
| | [0.026] | [0.026] | [0.026] | [0.025] | [0.026] | [0.026] |
| OPEN | 0.192 | 0.204 | 0.185 | 0.216 | 0.222 | 0.212 |
| | [0.107]* | [0.108]* | [0.107]* | [0.096]** | [0.097]** | [0.096]** |
| OT | -0.686 | -0.719 | -0.698 | -0.463 | -0.483 | -0.488 |
| | [0.349]** | [0.342]** | [0.348]** | [0.303] | [0.298] | [0.302] |
| CONCD | -0.011 | -0.003 | -0.010 | 0.026 | 0.034 | 0.032 |
| | [0.112] | [0.113] | [0.112] | [0.102] | [0.102] | [0.102] |
| RES^2 | 1.586 | 1.534 | 1.490 | 2.132 | 2.036 | 1.951 |
| | [0.826]* | [0.796]* | [0.796]* | [1.043]** | [1.015]** | [1.004]* |
| EXTD^2 | -0.027 | -0.038 | -0.029 | -0.036 | -0.046 | -0.041 |
| | [0.024] | [0.022]* | [0.025] | [0.015]** | [0.016]*** | [0.017]** |
| RES*DREM | 0.380 | 0.692 | 0.605 | 0.576 | 0.731 | 0.736 |
| | [0.317] | [0.316]** | [0.308]* | [0.305]* | [0.291]** | [0.293]** |
| EXTD*DREM | -0.053 | -0.077 | -0.001 | -0.072 | -0.072 | -0.029 |
| | [0.048] | [0.049] | [0.058] | [0.039]* | [0.041]* | [0.049] |
| Observations | 1214 | 1214 | 1214 | 1191 | 1191 | 1191 |
| R-squared | 0.30 | 0.31 | 0.30 | 0.22 | 0.22 | 0.22 |

*Notes*: see footnote to Table 5. Here remittances are given by the sum of workers' remittances and compensation of employees for all countries except Argentina, Azerbaijan, Barbados, Belize, Benin, Brazil, Cambodia, Cape Verde, China, Cote d'Ivoire, Dominican Republic, Ecuador, El Salvador, Guyana, Panama, Rwanda, Senegal, Seychelles, Turkey and Venezuela.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 7**

**Robustness: financial development and exchange rate arrangements**

*(dummy remittances: 75th percentile)*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ED4 financial development | ED4 exchange rate arrangements | BP5 financial development | BP5 exchange rate arrangements |
| CA | -2.852 | -2.807 | -1.791 | -1.792 |
| | [0.230]*** | [0.225]*** | [0.216]*** | [0.213]*** |
| REM | 0.743 | 0.091 | 0.530 | 0.110 |
| | [0.606] | [0.516] | [0.501] | [0.437] |
| RES | -0.570 | -0.763 | -1.264 | -1.052 |
| | [0.468] | [0.395]* | [0.466]*** | [0.442]** |
| EXTD | 0.162 | 0.213 | 0.163 | 0.199 |
| | [0.083]** | [0.092]** | [0.073]** | [0.082]** |
| SHORTD | -0.044 | -0.056 | -0.029 | -0.047 |
| | [0.150] | [0.146] | [0.111] | [0.108] |
| CREGRO | 0.000 | -0.001 | -0.000 | -0.002 |
| | [0.002] | [0.002] | [0.001] | [0.002] |
| PPPGDP | -0.016 | -0.015 | -0.011 | -0.006 |
| | [0.026] | [0.025] | [0.026] | [0.025] |
| OPEN | 0.183 | 0.219 | 0.204 | 0.245 |
| | [0.106]* | [0.107]** | [0.096]** | [0.097]** |
| OT | -0.631 | -0.733 | -0.449 | -0.518 |
| | [0.345]* | [0.345]** | [0.298] | [0.297]* |
| CONCD | 0.016 | -0.032 | 0.034 | 0.015 |
| | [0.117] | [0.113] | [0.106] | [0.102] |
| RES^2 | 1.564 | 1.211 | 1.997 | 1.820 |
| | [0.852]* | [0.766] | [0.997]** | [0.990]* |
| EXTD^2 | -0.044 | -0.035 | -0.050 | -0.045 |
| | [0.021]** | [0.022] | [0.017]*** | [0.018]** |
| RES*DREM | 0.572 | 0.604 | 0.794 | 0.759 |
| | [0.333]* | [0.317]* | [0.320]** | [0.307]** |
| EXTD*DREM | -0.111 | -0.089 | -0.097 | -0.085 |
| | [0.052]** | [0.051]* | [0.043]** | [0.042]** |
| RES*FD | -0.539 | | 0.140 | |
| | [0.354] | | [0.274] | |
| EXTD*FD | 0.117 | | 0.080 | |
| | [0.069]* | | [0.064] | |
| FD | -0.015 | | -0.061 | |
| | [0.062] | | [0.057] | |
| RES*ARR | | -0.533 | | -0.218 |
| | | [0.352] | | [0.327] |
| EXTD*ARR | | -0.049 | | -0.056 |
| | | [0.047] | | [0.041] |
| ARR | | 0.119 | | 0.096 |
| | | [0.043]*** | | [0.040]** |
| Observations | 1180 | 1214 | 1157 | 1191 |
| R-squared | 0.31 | 0.31 | 0.23 | 0.23 |

*Notes*: see note to Table 5. DREM is a dummy variable that takes the value 1 if in a given year the level of workers' remittances over GDP of a country is above the 75$^{th}$ percentile value of that year's (cross-country) distribution.

significant at 10%; ** significant at 5%; *** significant at 1%

**Table 8**

**Robustness: country features**
*(dummy remittances: 75th percentile)*

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | ED4 size | ED4 literacy rate | ED4 civil wars | BP5 small | BP5 literacy rate | BP5 civil wars |
| CA | -2.880 | -2.880 | -2.805 | -1.816 | -1.687 | -1.774 |
| | [0.227]*** | [0.256]*** | [0.226]*** | [0.215]*** | [0.245]*** | [0.212]*** |
| REM | 0.051 | -0.122 | 0.142 | 0.068 | 0.002 | 0.059 |
| | [0.520] | [0.622] | [0.531] | [0.433] | [0.513] | [0.438] |
| RES | -0.976 | -0.995 | -0.990 | -1.193 | -1.180 | -1.253 |
| | [0.397]** | [0.468]** | [0.410]** | [0.444]*** | [0.464]** | [0.462]*** |
| EXTD | 0.241 | 0.173 | 0.187 | 0.203 | 0.195 | 0.170 |
| | [0.085]*** | [0.105]* | [0.086]** | [0.073]*** | [0.092]** | [0.073]** |
| SHORTD | -0.002 | -0.034 | -0.006 | -0.008 | 0.011 | -0.015 |
| | [0.144] | [0.153] | [0.145] | [0.108] | [0.112] | [0.108] |
| CREGRO | -0.001 | -0.000 | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.001] | [0.002] |
| PPPGDP | -0.014 | -0.004 | -0.016 | -0.006 | 0.011 | -0.008 |
| | [0.026] | [0.030] | [0.025] | [0.026] | [0.028] | [0.025] |
| OPEN | 0.176 | 0.159 | 0.187 | 0.220 | 0.186 | 0.226 |
| | [0.104]* | [0.119] | [0.105]* | [0.095]** | [0.105]* | [0.096]** |
| OT | -0.690 | -0.837 | -0.707 | -0.488 | -0.443 | -0.489 |
| | [0.343]** | [0.369]** | [0.341]** | [0.296]* | [0.313] | [0.294]* |
| CONCD | -0.022 | 0.002 | -0.002 | 0.021 | 0.049 | 0.033 |
| | [0.113] | [0.125] | [0.114] | [0.104] | [0.112] | [0.103] |
| RES^2 | 1.528 | 1.649 | 1.553 | 2.042 | 1.938 | 2.121 |
| | [0.808]* | [0.899]* | [0.822]* | [1.013]** | [1.032]* | [1.043]** |
| EXTD^2 | -0.046 | -0.033 | -0.021 | -0.050 | -0.044 | -0.039 |
| | [0.021]** | [0.023] | [0.027] | [0.016]*** | [0.020]** | [0.022]* |
| RES*DREM | 0.609 | 0.738 | 0.602 | 0.731 | 0.884 | 0.737 |
| | [0.323]* | [0.392]* | [0.314]* | [0.317]** | [0.362]** | [0.303]** |
| EXDT*DREM | -0.102 | -0.094 | -0.093 | -0.089 | -0.080 | -0.082 |
| | [0.051]** | [0.053]* | [0.052]* | [0.041]** | [0.043]* | [0.041]** |
| RES*SMALL | 0.126 | | | 0.208 | | |
| | [0.723] | | | [0.643] | | |
| EXTD*SMALL | -1.140 | | | -0.593 | | |
| | [0.354]*** | | | [0.322]* | | |
| SMALL | 0.500 | | | 0.654 | | |
| | [0.291]* | | | [0.361]* | | |
| RES*LIT | | -0.135 | | | -0.143 | |
| | | [0.452] | | | [0.424] | |
| EXTD *LIT | | 0.023 | | | -0.027 | |
| | | [0.082] | | | [0.075] | |

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | ED4 size | ED4 literacy rate | ED4 civil wars | BP5 small | BP5 literacy rate | BP5 civil wars |
| LIT | | 0.088 | | | 0.072 | |
| | | [0.078] | | | [0.066] | |
| RES*WAR | | | 0.098 | | | 0.379 |
| | | | [0.473] | | | [0.498] |
| EXTD *WAR | | | -0.101 | | | -0.028 |
| | | | [0.096] | | | [0.087] |
| WAR | | | -0.439 | | | -0.419 |
| | | | [0.217]** | | | [0.212]** |
| Observations | 1214 | 1071 | 1214 | 1191 | 1065 | 1191 |
| R-squared | 0.31 | 0.29 | 0.31 | 0.23 | 0.21 | 0.22 |

*Notes*: see note to Table 5. DREM is a dummy variable that takes the value 1 if in a given year the level of workers' remittances over GDP of a country is above the 75th percentile value of that year's (cross-country) distribution.
* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 9**

**Robustness: geography**
*(dummy remittances: 75th percentile)*

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ED4 | ED4 | BP5 | BP5 |
| | Africa | Developing Asia | Africa | Developing Asia |
| CA | -2.800 | -2.790 | -1.771 | -1.765 |
| | [0.227]*** | [0.226]*** | [0.213]*** | [0.212]*** |
| REM | 0.098 | 0.097 | 0.037 | 0.081 |
| | [0.522] | [0.523] | [0.436] | [0.435] |
| RES | -0.993 | -0.942 | -1.176 | -1.227 |
| | [0.433]** | [0.406]** | [0.481]** | [0.463]*** |
| EXTD | 0.215 | 0.203 | 0.147 | 0.192 |
| | [0.102]** | [0.085]** | [0.090] | [0.073]*** |
| SHORTD | -0.010 | -0.019 | -0.017 | -0.004 |
| | [0.146] | [0.146] | [0.110] | [0.110] |
| CREGRO | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.002] | [0.002] | [0.001] | [0.001] |
| PPPGDP | -0.018 | -0.017 | -0.007 | -0.007 |
| | [0.025] | [0.025] | [0.025] | [0.025] |
| OPEN | 0.201 | 0.208 | 0.241 | 0.231 |
| | [0.108]* | [0.106]* | [0.098]** | [0.097]** |
| OT | -0.735 | -0.735 | -0.529 | -0.501 |
| | [0.344]** | [0.341]** | [0.297]* | [0.294]* |
| CONCD | -0.005 | -0.014 | 0.012 | 0.020 |
| | [0.115] | [0.113] | [0.105] | [0.102] |
| RES^2 | 1.510 | 1.445 | 1.943 | 2.088 |
| | [0.807]* | [0.803]* | [1.008]* | [1.042]** |
| EXTD^2 | -0.039 | -0.038 | -0.043 | -0.048 |
| | [0.021]* | [0.021]* | [0.017]** | [0.016]*** |
| RES*DREM | 0.638 | 0.615 | 0.742 | 0.772 |
| | [0.317]** | [0.319]* | [0.304]** | [0.307]** |
| EXTD *DREM | -0.100 | -0.098 | -0.083 | -0.089 |
| | [0.052]* | [0.051]* | [0.042]* | [0.041]** |
| RES*AFRICA | 0.025 | | 0.033 | |
| | [0.384] | | [0.377] | |
| EXTD *AFRICA | -0.023 | | 0.047 | |
| | [0.078] | | [0.071] | |
| AFRICA | 0.006 | | -0.417 | |
| | [0.176] | | [0.190]** | |
| RES*ASIA | | -0.173 | | 0.423 |
| | | [0.583] | | [0.414] |
| EXTD *ASIA | | -0.073 | | -0.227 |
| | | [0.145] | | [0.118]* |
| ASIA | | -0.190 | | -0.100 |
| | | [0.174] | | [0.191] |
| Observations | 1214 | 1214 | 1191 | 1191 |
| R-squared | 0.31 | 0.31 | 0.22 | 0.22 |

*Notes*: see note to Table 5. DREM is a dummy variable that takes the value 1 if in a given year the level of workers' remittances over GDP of a country is above the 75th percentile value of that year's (cross-country) distribution.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 10**

**Robustness: endogeneity**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | ED4 median | ED4 mean | ED4 75th | BP5 median | BP5 mean | BP5 75th |
| CA | -2.806 | -2.801 | -2.799 | -1.774 | -1.760 | -1.771 |
| | [0.228]*** | [0.231]*** | [0.227]*** | [0.213]*** | [0.214]*** | [0.212]*** |
| REM | 0.047 | 0.152 | 0.111 | 0.087 | 0.106 | 0.122 |
| | [0.485] | [0.497] | [0.513] | [0.416] | [0.428] | [0.429] |
| RES | -1.021 | -0.853 | -0.983 | -1.382 | -1.178 | -1.210 |
| | [0.456]** | [0.415]** | [0.399]** | [0.495]*** | [0.463]** | [0.441]*** |
| EXTD | 0.179 | 0.155 | 0.195 | 0.171 | 0.143 | 0.182 |
| | [0.086]** | [0.084]* | [0.085]** | [0.067]** | [0.066]** | [0.072]** |
| SHORTD | -0.022 | -0.029 | -0.013 | -0.016 | -0.030 | -0.013 |
| | [0.144] | [0.144] | [0.146] | [0.107] | [0.108] | [0.109] |
| CREGRO | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.001] | [0.001] |
| PPPGDP | -0.019 | -0.021 | -0.018 | -0.007 | -0.009 | -0.009 |
| | [0.025] | [0.025] | [0.025] | [0.025] | [0.025] | [0.025] |
| OPEN | 0.200 | 0.190 | 0.203 | 0.231 | 0.224 | 0.236 |
| | [0.106]* | [0.106]* | [0.106]* | [0.096]** | [0.095]** | [0.095]** |
| OT | -0.709 | -0.707 | -0.723 | -0.498 | -0.461 | -0.498 |
| | [0.348]** | [0.358]** | [0.344]** | [0.302]* | [0.309] | [0.299]* |
| CONCD | -0.008 | -0.015 | -0.018 | 0.035 | 0.007 | 0.013 |
| | [0.113] | [0.114] | [0.113] | [0.102] | [0.103] | [0.102] |
| RES^2 | 1.640 | 1.519 | 1.527 | 2.228 | 2.099 | 2.040 |
| | [0.836]* | [0.830]* | [0.806]* | [1.036]** | [1.036]** | [1.003]** |
| EXTD^2 | -0.026 | -0.024 | -0.036 | -0.036 | -0.034 | -0.046 |
| | [0.025] | [0.024] | [0.021]* | [0.015]** | [0.015]** | [0.017]*** |
| RES*DREMave | 0.441 | 0.267 | 0.570 | 0.727 | 0.563 | 0.744 |
| | [0.335] | [0.323] | [0.312]* | [0.321]** | [0.299]* | [0.299]** |
| EXTD*DREMave | -0.075 | -0.055 | -0.085 | -0.074 | -0.046 | -0.083 |
| | [0.045]* | [0.050] | [0.051]* | [0.039]* | [0.044] | [0.046]* |
| Observations | 1214 | 1214 | 1214 | 1191 | 1191 | 1191 |
| R-squared | 0.30 | 0.30 | 0.30 | 0.22 | 0.22 | 0.22 |

*Notes*: Estimation by linear probability model. Robust standard errors in brackets. All regressions contain country fixed effect and year dummies. The dependent variable BP5 takes the value 1 if a reduction of a current account deficit of at least 5 percentage points of GDP and equal to at least half of the initial current account deficit occurs at time t, and zero otherwise. DREMave is a dummy variable that takes the value 1 if the country mean of workers' remittances over GDP is above the median or mean or 75$^{th}$ percentile value (as specified at the top of each column) of the distribution of country means. All other explanatory variables are described in Table A1 and lagged one period.

* significant at 10%; ** significant at 5%; *** significant at 1%

**Table 11**

**Robustness: contractionary current account reversals**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Base regression | | | With remittances: linear probability model | | |
| | probit | linear | linear | median | mean | 75th |
| CA | -8.651 | -0.641 | -0.669 | -0.827 | -0.835 | -0.851 |
| | [1.138]*** | [0.107]*** | [0.108]*** | [0.181]*** | [0.180]*** | [0.180]*** |
| REM | | | | -0.327 | -0.356 | -0.077 |
| | | | | [0.321] | [0.331] | [0.314] |
| RES | -3.995 | -0.209 | -0.506 | -1.020 | -0.843 | -0.810 |
| | [1.948]** | [0.078]*** | [0.150]*** | [0.351]*** | [0.323]*** | [0.309]*** |
| EXTD | 0.401 | 0.030 | 0.095 | 0.104 | 0.109 | 0.149 |
| | [0.248] | [0.021] | [0.034]*** | [0.053]* | [0.059]* | [0.061]** |
| SHORTD | 1.549 | 0.145 | 0.145 | 0.068 | 0.068 | 0.084 |
| | [0.746]** | [0.100] | [0.100] | [0.104] | [0.106] | [0.106] |
| CREGRO | -0.070 | -0.001 | -0.001 | 0.001 | 0.000 | 0.000 |
| | [0.061] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| PPPGDP | 0.555 | 0.042 | 0.040 | 0.022 | 0.021 | 0.019 |
| | [0.243]** | [0.014]*** | [0.015]*** | [0.024] | [0.024] | [0.024] |
| OPEN | 0.705 | 0.020 | 0.050 | 0.063 | 0.067 | 0.079 |
| | [0.738] | [0.045] | [0.049] | [0.077] | [0.076] | [0.076] |
| OT | -5.507 | -0.152 | -0.191 | -0.358 | -0.345 | -0.403 |
| | [2.001]*** | [0.100] | [0.102]* | [0.176]** | [0.184]* | [0.173]** |
| CONCD | -0.219 | -0.000 | 0.025 | 0.015 | 0.001 | 0.016 |
| | [0.893] | [0.069] | [0.069] | [0.077] | [0.077] | [0.078] |
| RES^2 | | | 0.450 | 1.396 | 1.338 | 1.227 |
| | | | [0.155]*** | [0.613]** | [0.611]** | [0.585]** |
| EXTD^2 | | | -0.017 | -0.024 | -0.023 | -0.031 |
| | | | [0.006]*** | [0.011]** | [0.012]* | [0.012]** |
| RES*DREM | | | | 0.458 | 0.332 | 0.399 |
| | | | | [0.213]** | [0.204] | [0.194]** |
| EXTD*DREM | | | | 0.017 | 0.001 | -0.072 |
| | | | | [0.031] | [0.038] | [0.030]** |
| Observations | 1860 | 1860 | 1860 | 1190 | 1190 | 1190 |
| R-squared | 0.26 | 0.13 | 0.13 | 0.16 | 0.15 | 0.16 |

*Notes*: Estimation by probit and linear probability model. Robust standard errors in brackets. All regressions contain country fixed effect and year dummies. The dependent variable takes the value 1 if a reduction of a current account deficit of at least 4 percentage points of GDP and equal to at least half of the initial current account deficit and a contraction in the real per capita GDP occur at time t, and zero otherwise. DREM is a dummy variable that takes the value 1 if in a given year the level of workers' remittances over GDP of a country is above the median or mean or 75$^{th}$ percentile value (as specified at the top of each column) of that year's (cross-country) distribution. All other explanatory variables are described in Table A1 and lagged one period. For the probit models we report the pseudo – $R^2$.

* significant at 10%; ** significant at 5%; *** significant at 1%.

**Table A1**

**List of variables, acronyms and sources of data**

| Variable | Acronym | Data source |
|---|---|---|
| Current account balance, US dollars | | IMF, Balance of Payments Statistics |
| GDP, US dollars | | World Bank, World Development Indicators |
| Current account balance (% of GDP) | CA | |
| Workers' remittances (credit), US dollars | | IMF, Balance of Payments Statistics |
| Workers' remittances (% of GDP) | REM | |
| Workers' remittances: dummy equal to 1 if the country level of workers' remittances over GDP is above the median or mean or 75$^{th}$ percentile value of the yearly distribution | DREM | |
| Workers' remittances: dummy equal to 1 if the country mean of workers' remittances over GDP is above the median or mean or 75$^{th}$ percentile value of the distribution of country means. | DREMave | |
| International Reserves, US dollars | | World Bank, Global Development Finance |
| International Reserves (% of GDP) | RES | |
| External debt (% of GNI) | EXTD | World Bank, Global Development Finance |
| Short term debt (% of external debt) | SHORTD | World Bank, Global Development Finance |
| Domestic credit (Monetary Survey) | | IMF, International Financial Statistics |
| Domestic credit annual growth rate | CREGRO | |
| GDP per capita, PPP 1995 US dollars | PPPGDP | World Bank, World Development Indicators |
| Trade in goods (% of GDP) | OPEN | World Bank, World Development Indicators |
| Net official transfers, US dollars | OT | World Bank, Global Development Finance |
| Concessional debt (% of external debt) | CONCD | World Bank, Global Development Finance |
| Dummy equal to 1 if private credit over GDP is above median | FD | World Bank, Global Development Finance |
| Dummy for exchange rate arrangements | ARR | Rogoff and Reinhart (2002) |
| Dummy equal to 1 if population<500.000 | SMALL | World Bank, World Development Indicators |
| Dummy equal to 1 if the literacy rate is above the median | LIT | World Bank, World Development Indicators |
| Dummy equal to 1 if country-year with a civil conflict with more than 1000 battle deaths | WAR | Armed Conflict Database, International Peace Research Institute of Oslo (Norway) and the University of Uppsala |
| Dummy equal to 1 if country is located in Africa | AFRICA | |
| Dummy equal to 1 if country is located in Asia | ASIA | |

**Table A2**

**List of countries**

| | | |
|---|---|---|
| Albania | Algeria | Argentina |
| Armenia | Azerbaijan | Bangladesh |
| Barbados | Belarus | Belize |
| Benin | Bolivia | Bosnia & Herzegovina |
| Botswana | Brazil | Bulgaria* |
| Burkina Faso | Cambodia | Cameroon |
| Cape Verde | Central African Republic* | Chad |
| Chile* | China | Colombia |
| Comoros | Congo, Republic of | Costa Rica |
| Côte d'Ivoire | Croatia | Czech Republic* |
| Djibouti | Dominican Republic | Ecuador |
| Egypt | El Salvador | Estonia |
| Ethiopia | Fiji* | Gabon |
| Georgia | Ghana | Guatemala |
| Guinea | Guyana | Haiti |
| Honduras | Hungary | India |
| Indonesia | Jamaica | Jordan |
| Kazakhstan | Kenya* | Kyrgyz Republic |
| Lao People's Dem. Republic* | Latvia | Lesotho |
| Lithuania | Macedonia | Madagascar |
| Malawi | Malaysia* | Maldives |
| Mali | Mauritania | Mauritius* |
| Mexico | Moldova | Mongolia |
| Morocco | Mozambique | Myanmar* |
| Namibia | Nepal | Nicaragua |
| Niger | Nigeria | Oman |
| Pakistan | Panama | Paraguay |

| | | |
|---|---|---|
| Peru | Philippines | Poland |
| Romania | Russia | Rwanda |
| Senegal | Sierra Leone | Slovak Republic |
| Slovenia | Somalia | South Africa* |
| Sri Lanka | Sudan | Suriname |
| Swaziland* | Syrian Arab Republic* | Tanzania* |
| Thailand | Togo | Trinidad and Tobago |
| Tunisia | Turkey | Uganda |
| Ukraine | Vanuatu | Venezuela* |
| Yemen, Republic of | Zimbabwe | |

* An asterisk marks countries for which no workers' remittance data are available.

**Table A3**

**List of current account reversals***

| Country (year) | Current account (in % of GDP) at year t-1 | Current account (in % of GDP) at year t |
|---|---|---|
| Albania (1993) | -7.1 | 1.2 |
| Albania (1995) | -7.9 | -0.5 |
| Albania (1998) | -12.6 | -2.4 |
| Algeria (1979) | -13.4 | -4.9 |
| Algeria (1980) | -4.9 | 0.6 |
| Argentina (2002) | -1.4 | 9.0 |
| Azerbaijan (2000) | -13.1 | -3.2 |
| Barbados (1992) | -1.4 | 9.0 |
| Belarus (1999) | -6.7 | -1.6 |
| Belize (1985) | -2.5 | 4.3 |
| Belize (1990) | -5.2 | 3.8 |
| Benin (1979) | -9.7 | -4.4 |
| Benin (1983) | -29.8 | -12.3 |
| Benin (1984) | -12.3 | 5.4 |
| Benin (1989) | -6.5 | -0.9 |
| Benin (1992) | -11.5 | -4.5 |
| Benin (1996) | -8.0 | -1.9 |
| Bolivia (1982) | -16.2 | -5.8 |
| Bolivia (1994) | -8.8 | -1.5 |
| Burkina Faso (1989) | -1.7 | 3.7 |
| Colombia (1986) | -5.2 | 1.1 |
| Colombia (1999) | -4.9 | 0.8 |
| Comoros (1985) | -30.4 | -12.5 |
| Comoros (1988) | -10.9 | 3.1 |
| Comoros (1989) | -3.1 | 2.7 |
| Comoros (1993) | -5.1 | 3.4 |

| **Country (year)** | **Current account (in % of GDP) at year t-1** | **Current account (in % of GDP) at year t** |
|---|---|---|
| Congo, Republic of (1997) | -25.6 | -6.7 |
| Congo, Republic of (2000) | -9.8 | 20.1 |
| Croatia (1998) | -14.1 | -6.8 |
| Djibouti (1993) | -18.6 | -7.3 |
| Dominican Republic (1981) | -10.9 | -5.4 |
| Dominican Republic (1988) | -6.2 | -0.4 |
| Ecuador (1992) | -6.2 | -1.0 |
| Ecuador (1999) | -9.0 | 5.5 |
| Egypt (1980) | -8.3 | -1.9 |
| Egypt (1983) | -7.2 | -1.2 |
| Egypt (1990) | -3.3 | 5.4 |
| El Salvador (1979) | -8.9 | 0.9 |
| Ethiopia (2000) | -7.2 | 0.2 |
| Gabon (1987) | -31.1 | -13.7 |
| Gabon (1989) | -16.1 | -4.6 |
| Gabon (1999) | -12.9 | 9.0 |
| Ghana (1982) | -9.9 | -2.7 |
| Ghana (2002) | -6.1 | -0.5 |
| Indonesia (1984) | -7.4 | -2.1 |
| Indonesia (1998) | -2.3 | 4.3 |
| Jamaica (1977) | -8.9 | -0.4 |
| Jamaica (1986) | -12.9 | -0.6 |
| Jamaica (1988) | -3.8 | 1.2 |
| Jamaica (1992) | -5.8 | 0.8 |
| Jamaica (1994) | -4.1 | 1.8 |
| Jordan (1979) | -11.3 | -0.2 |
| Jordan (1980) | -0.2 | 9.4 |
| Jordan (1989) | -4.9 | 9.3 |

| **Country (year)** | **Current account (in % of GDP) at year t-1** | **Current account (in % of GDP) at year t** |
|---|---|---|
| Kyrgyz Republic (1997) | -23.2 | -7.8 |
| Kyrgyz Republic (2000) | -14.8 | -5.8 |
| Macedonia (1999) | -7.6 | -0.9 |
| Malawi (1995) | -15.3 | -5.5 |
| Malawi (1998) | -10.9 | -0.3 |
| Maldives (1984) | -41.8 | -14.9 |
| Maldives (1985) | -14.9 | -4.3 |
| Mali (1977) | -4.5 | 0.5 |
| Mali (2002) | -11.8 | -4.4 |
| Mauritania (1989) | -10.0 | -1.9 |
| Mauritania (1994) | -18.4 | -6.8 |
| Mauritania (1995) | -6.8 | 2.1 |
| Mexico (1983) | -3.4 | 3.9 |
| Mexico (1995) | -7.0 | -0.6 |
| Moldova (1999) | -19.7 | -5.8 |
| Morocco (1986) | -6.9 | -1.2 |
| Morocco (2001) | -1.4 | 4.8 |
| Nepal (1998) | -7.9 | -1.4 |
| Nepal (2002) | -3.0 | 3.9 |
| Nicaragua (2000) | -42.0 | -20.0 |
| Niger (1983) | -11.5 | -3.4 |
| Nigeria (1979) | -10.3 | 3.5 |
| Nigeria (1984) | -12.4 | 0.4 |
| Nigeria (1989) | -1.3 | 4.6 |
| Nigeria (1996) | -9.2 | 9.9 |
| Nigeria (1999) | -13.2 | 1.4 |
| Oman (1979) | -1.8 | 4.7 |
| Oman (1987) | -14.2 | 10.0 |

| **Country (year)** | **Current account (in % of GDP) at year t-1** | **Current account (in % of GDP) at year t** |
|---|---|---|
| Oman (1989) | -4.1 | 3.6 |
| Oman (1996) | -6.6 | 1.6 |
| Panama (1982) | -12.4 | -4.1 |
| Panama (1983) | -4.1 | 4.1 |
| Panama (1987) | -1.8 | 9.7 |
| Paraguay (2002) | -3.9 | 1.3 |
| Philippines (1998) | -5.3 | 2.4 |
| Rwanda (1979) | -5.5 | 4.8 |
| Sierra Leone (1997) | -16.0 | -6.5 |
| Sri Lanka (1984) | -9.0 | 0.0 |
| Sri Lanka (2001) | -6.4 | -1.4 |
| Sudan (1993) | -7.9 | -2.6 |
| Suriname (1978) | -0.4 | 6.3 |
| Suriname (2000) | -3.3 | 3.6 |
| Togo (1980) | -23.9 | -8.4 |
| Togo (1984) | -5.7 | 3.6 |
| Trinidad and Tobago (1980) | -0.4 | 5.7 |
| Trinidad and Tobago (1985) | -6.5 | -0.6 |
| Trinidad and Tobago (1990) | -0.9 | 9.1 |
| Trinidad and Tobago (1999) | -10.5 | 0.4 |
| Tunisia (1987) | -6.7 | -0.6 |
| Tunisia (1994) | -9.1 | -3.4 |
| Turkey (1994) | -3.6 | 2.0 |
| Turkey (2001) | -4.9 | 2.3 |
| Yemen, Republic of (1994) | -25.5 | 6.6 |
| Yemen, Republic of (1999) | -5.0 | 7.4 |

***** This list excludes country-year observations which do not enter in our econometric analysis because lagged workers' remittances data are not available.