

How Does External Financing Drive GDP Growth in Developing Countries?

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Abstract

This paper assesses the impact of capital inflows and their composition on the real exchange rate and economic growth in developing countries. Capital inflows can directly support economic growth by relaxing constraints on domestic resources but can also indirectly weaken growth through a real appreciation of the exchange rate. We use the Generalized Method of Moments (GMM) for dynamic panel data to deal with the endogeneity bias. Using a large sample of 77 low- and middle-income countries over the period 1980-2012, the main results are the following: i) a 10 percent increase in total net capital inflows appreciates the real exchange rate by 5 percent; ii) the appreciation effect of remittances is twice the effect of aid and ten times greater than the effect of FDI; iii) capital inflows are associated with higher economic growth; doubling capital inflows per capita would increase growth by about 50 percent; and iv) the direct effect alone represents a doubling of the annual growth rate (7.4 percent compared to 3.7 percent) observed over the period 1980-2012.

Keywords

Capital inflows, real exchange rate dynamics, economic growth

JEL classification

F3, F4, O4

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Introduction

After seven decades of studies related to development economics, evidence on the growth impact of capital inflows remains mixed (Kose et al. 2006). In standard neoclassical theory, assuming free capital markets and diminishing returns, capital should flow from capital-abundant countries (developed countries) to capital-scarce countries (developing countries) leading to the equalization of marginal returns to capital. This prediction is, however, weakly supported by facts as displayed by the “Lucas paradox” (e.g. Lucas, 1990). Many factors underlie this “paradox” including the fact that economic returns in developing economies are generally much lower when adjusted for risk. Lenders and creditors are reluctant to take on risk when information on potential debtors is not easy to appraise and/or when enforcing contracts and resolving insolvency raise doubts on the recovery of loans. However, market and institutional inefficiencies are not sufficient to convincingly explain why external capital does not necessarily flow to the developing countries with the highest growth, the so-called “allocation puzzle” (see Gourinchas and Jeanne, 2007, 2013).

When developing countries manage to attract capital inflows, it is not always a blessing as instability and potential “crowding out” effects can arise. Rather than stimulating growth by filling the investment-savings gap, external resources can substitute domestic financing for the most profitable projects, leaving unfunded projects of lower quality. The objective of this paper is to revisit the relationship between capital inflows and economic growth by considering a large sample of low- and middle-income countries. Several hypotheses are explored and tested.

First, we hypothesize that not only do net capital inflows matter, but also that their composition and possibly their fluctuations matter. For example, while short-term flows such as portfolio investments can be procyclical, private transfers can help smooth adverse economic shocks. Private transfers can, for instance, protect the economic welfare of households when credit and insurance markets are nonexistent or not available for all (see Thorbecke, 2013).

Second, beyond the direct positive impact of capital inflows, we also account for indirect effects channeled through the real exchange rate. The literature on the long-term determinants of the real exchange rate identifies capital inflows as one of the most robust determinants. According to this literature, capital inflows increase the level of domestic expenditure similarly to the effect of windfalls from natural resources (e.g. Corden and Neary, 1982). While the price of tradable goods is exogenous, the price of non-tradables is endogenous to the dynamics of the domestic economy. Excess demand pressures raise the relative price of non-tradable goods, weakening the competitiveness of the tradable sector. As capital inflows can be spent differently depending on their form (equity or debt, short-term or long-term), their impact on the real exchange rate can also vary according to their composition.

Third, the paper explores different sources of heterogeneity across our sample, including a country's level of development and the exchange rate regime. At first glance, the amount and composition of capital inflows would be expected to vary with the recipient country's level of development. For instance, low-income countries receive more per capita Official Development Assistance (ODA) and fewer portfolio investments due to their shallow domestic financial markets. While a fixed exchange rate can bring stability for long-term returns, it lacks the flexibility and ability to smooth out shocks that a floating or intermediate regime may provide.

Our main results illustrate that, as predicted, capital inflows affect economic growth through two channels. While they have a direct and positive impact on growth, they indirectly lower growth prospects by appreciating the real exchange rate and weakening the recipient country's competitiveness. Accounting for the real effective exchange rate, a doubling of the per capita net inflows increases the annual growth rate by about 50 percent, which means a gain of roughly 2 additional points over the 3.7 percent annual growth rate observed within the sample and over the whole period (1980-2012). The real appreciation stemming from remittances is two times larger than the effect of aid and ten times larger than the effect of FDI. The impact of remittances on growth is lower in low-income countries.

The rest of the paper is organized as follows. Section 1 briefly reviews the existing literature on the impact of capital inflows and their composition on economic growth. It covers both the direct impact on growth (higher savings-investment balance) as well as the indirect impact through the real exchange rate. Section 2 analyzes descriptive statistics and

defines our econometric strategy, including the estimation methodology and the treatment of endogeneity. Section 3 discusses our main results and Section 4 offers some concluding remarks.

Section 1: Capital inflows and their components: what are the expected direct and indirect effects?

The difficulty in reaching a non-ambiguous conclusion on the way external financial resources and their components affect economic growth is in relation with the different channels of influence from direct to indirect channels and from those that go through the savings-investment balance to those that affect the real exchange rate.

1.1 Direct implications on economic growth

Private transfers have become the second largest type of financial flow to developing countries, just after FDI. The cost-benefit analysis of these transfers that accompany migrants' remittances delivers mixed conclusions. Some authors such as Aggarwal et al (2011) identify a positive and robust econometric relationship while others argue that this effect is conditional on the quality of the recipient country's economic policies and institutions (Catrinescu *et al* 2009). The loss of productive capacities, especially skilled workers, means a "brain drain" for countries of origin. The magnitude of loss is, however, difficult to appraise and will depend on the opportunity cost of migrants working abroad and on the domestic unemployment rate. In addition, migration can be a source of new opportunities for the country of origin to export. It can contribute to domestic activity by increasing the permanent income of beneficiary households, sometimes stimulating "building booms". As Giuliano and Ruiz-Arranz (2009) establish, remittances boost economic growth by providing appropriate alternative means to release financial constraints on domestic investments.

Financial flows related to ODA have been discussed at length in prominent works dealing with the principles that govern aid allocation rules. Burnside and Dollar (2000)'s paper has been very influential in the academia and policy spheres. By using standard regression techniques from the economic growth literature, the authors explore the effect of foreign aid on domestic growth. They find a strong positive effect for low-income countries pursuing good policies but no tangible impacts for countries with severely distorted policy regimes. Accordingly, aid effectiveness is conditional on the orientation of resources to the most efficient countries. Overall, regression analyses do not provide clear conclusions.

Results vary according to the sample, to the specification of the econometric model and to how endogeneity biases are treated (see Doucouliagos and Paldam; 2008; Murinde, 2012).

One limitation of the impact of aid is the fact that it is associated with some human capital and infrastructural expenditures. These expenditures, which correspond to what Hirschman (1958) called “Social Overhead Capital” (SOC), are absolutely essential for the development process. However, if they are instantaneously associated to short-term-demand effects, their social profitability is likely to appear only in the long-run through “Directly Productive Activities” (DPA). Some recent publications have questioned the effect of aid, generating controversial debates. Rajan and Subramanian (2008) use different estimators on cross-section and panel datasets covering a large sample of developing countries. The authors do not find clear evidence to support a positive and robust impact of ODA. By using the same approach and the same data, Arndt, Jones and Tarp (2010) reach opposite conclusions. These authors confirm the positive effect of aid on growth when extending the analysis to other social welfare variables such as poverty alleviation or the provision of basic health care and primary education, in accordance with what the international community expects from the sustainable development goals (SDGs) (see Arndt, Jones and Tarp, 2015). The role of ODA is, therefore, ambiguous, and difficult to clarify beyond the current expenditure resulting from the building of human capital and infrastructural services (see Guillaumont, McGillivray and Wagner, 2013; Guillaumont and Kpodar, 2015).

The outcome of foreign direct investments (FDIs) greatly depends on what kind of activities is financially supported. If FDIs consist of “pure” transfers of assets from the public sector to the international private sector at the time of privatization operations, the impact can be limited. This will be the case if the cash amount to the government is used to reduce the level of international debt, the only predictable effect then being potential long-term improvement of firm productivity through a higher level of private technical efficiency. However, additional investments generally follow such an institutional change, increasing dynamic gains through additional investments. Greenfield projects related to Public Private Partnerships are probably the trickiest inflows that combine both SOC and DPA. The social benefit of investments in human resources or infrastructure may require a significant time lag before the supply side effects fully occur. In the Katanga region (DR Congo), investments in copper mining have, for example, been based on a very large social infrastructure before mining activities begin. Thus, FDI in different forms or in the same form but in different

national contexts is likely to affect economic growth differently. Pessimistic scenarios may occur, especially in low-income countries and countries rich in natural resources. Traditional exports can strengthen dependency on raw materials, hampering the diversification of the manufacturing sector through the exchange rate channel, which we will discuss further. With respect to the impacts of FDI, no clear-cut conclusion seems to emerge from the empirical literature. Some authors such as Borensztein et al. (1998) or De Mello (1999) find fairly strong positive impacts while others like De Vita and Kyaw (2009) support the idea that a positive outcome is conditional on the quality of a country's institutions and its human capital. The absence of a conclusive effect has been interpreted by Stiglitz (2008) as a possible failure to distinguish among different categories of FDIs. FDI impacts in the manufacturing sector are probably less difficult to analyze as they often bring some foreign know-how including more efficient technologies and technical or vocational training, which can directly influence growth. This direct influence on growth can potentially spread, especially if positive spillovers towards domestic firms occur.

The openness of the capital account to short term flows has been undoubtedly one of the most controversial subjects of the last decades. To a large extent, the pros and cons are reflected in Stiglitz (2008)'s critical views on IMF positions. In the historical context of the late 1990s, the liberalization of capital transactions has sometimes been perceived as an extension of free trade on goods. An open capital account offers an incentive to improve market discipline with promising expectations in terms of macroeconomic stability and additional financial resources. To this argument, Stiglitz (2008) opposes the idea that capital account liberalization stimulates economic fluctuations when associated flows do not cause them. Short-term resources are unlikely to be channeled to investments and can jeopardize the realization of social well-being objectives. When short-term resources are correlated with the domestic business cycle, they are also sensitive to changes in the external environment and to sudden slowdowns in private capital inflows (Calvo, 1998). Therefore, via a contagion effect, countries can be made more vulnerable to capital outflows, giving rise to economic crises unrelated to the domestic management of the affected countries.

1.2 Indirect implications on the real exchange rate

Beginning with the influential works of Edwards (1989) and Williamson (1983), there is now a very extensive strand of literature that deals with the specific relationship between

capital inflows and the real exchange rate equilibrium. This exchange rate equilibrium is determined by factors that affect both a country's internal and sustainable external situation. Net capital inflows are seen as one of the determinants that increase the demand and price of non-tradable goods. The relative price of non-tradables goes up and modifies the initial macroeconomic equilibrium. The question that arises here is whether the real exchange rate can be affected differently depending on the composition of capital inflows.

As mentioned earlier, remittances can act as a buffer to smooth consumption for example when the recipient economy is suffering an economic downturn (Lueth and Ruiz-Arranz, 2007; Chami et al., 2008). In this case, remittances help maintain stability by compensating for macroeconomic shocks and present only limited risks for a significant real exchange rate appreciation. Conversely, remittances can be connected to various investment projects. The risk for real exchange rate appreciation is particularly strong if resources are channeled to real estate (construction booms), while it seems negligible if they are spent on imported durable goods. On the whole, empirical results are mixed. Chami *et al.*, (2008), Izquierdo and Montiel (2006), and Rajan and Subramanian (2005) are not conclusive while in Rodrik (2009), competitive exchange rate policies were found difficult to promote in Jordan and Egypt because of the loss of competitiveness accompanying transfers from migrant workers in the Gulf countries. In a different context, Naceur et al (2015) share the same view, arguing that a long-term increase in remittances or aid devoted to poverty alleviation generate increased spending on non-tradables.

The impact of ODA greatly depends on how resources are used. Assuming that a significant part of official flows is targeted to enlarge a country's basic infrastructure, the relative contribution of domestic consumption to global expenditure should be considered as an important factor in analyzing the exchange rate evolution. When the recipient country suffers from supply constraints, capital inflows associated to consumption put more pressure on the relative price of domestic goods than those channeled to investments with a significant part of imported goods. Cerra, Tekin, and Turnovsky (2008), highlight the complexity of the issue. Foreign aid is expected to appreciate the real exchange rate if it stimulates productivity within the tradable sector, while depreciation is likely to occur if aid is channeled to improve productive capacity in the non-tradable sector.

The FDI impact on the price of non-tradables greatly varies according to the type of operation concerned. When FDI is related to imported machinery and equipment there is little risk of appreciation leading to exchange rate disequilibrium as these imports do not suffer from constraints in local supply capacity. A positive effect of FDI is even expected on the use of productive resources through transfers of technology, managerial know-how and other intangible assets (Agenor, 1998, Javorcik, 2004, Kinda, 2008, 2009). However, FDI may also consist of “pure” transfers of domestic assets between residents and non-residents, somewhat counterbalancing the argument on relative prices, as mentioned earlier. The once and for all revenues or bonanzas resulting from public enterprise selling can be channeled to permanent current expenditures, increasing the price of non-tradables. The number of studies that deal with the impact of private flows on the real exchange rate is limited and results are mixed, as evidenced by Athukorala and Rajapatirana (2003). Larrey (2007) and Saborowski (2009) find that FDI cause a real appreciation.

The role of short-term capital transactions remains a matter of debate. In low-income countries, commercial bank loans and international portfolio investments can be seen as temporary transactions. This is consistent with unit root tests, suggesting that short-term capital inflows are a stationary variable (Elbadawi and de Soto, 1998). However, for middle-income countries that have liberalized their capital account, these variables may have a stochastic trend or be part of a long-term cycle, generating the appreciation or depreciation of the real exchange rate. This effect potentially extends to all kind of short-term inflows as these transactions are more than FDI intermediated by domestic banks.

Section 2: Empirical methodology and net capital inflow statistics

2.1 The specification of the models

We first estimate the effect of net capital inflows on the real effective exchange rate and next on the economic growth. We use a dynamic specification given the potential inertia of both REER and GDP growth. More specifically, we estimate the following equations:

$$REER_{i,t} = \gamma + \omega REER_{i,t-1} + \tau TotalFlows_{i,t} + \pi Y'_{i,t} + \mu_i + \sigma_{i,t} \quad (1)$$

$$GDP\ Growth_{i,t} = \alpha + \delta GDP\ Growth_{i,t-1} + \beta TotalFlows_{i,t} + \theta X'_{i,t} + v_i + \varphi_t + \varepsilon_{i,t} \quad (2)$$

where $REER_{i,t}$ and $GDP\ Growth_{i,t}$ stand for the real effective exchange rate and the economic growth for country i in non-overlapping 5-year periods denoted t . For a country i the REER is

defined as follows, where CPI_j is the Consumer Price Index of the country's partner j ; e_j and w_j are the nominal bilateral exchange rate and the weight of the j -th partner in the total bilateral non-oil imports and exports of the country (i). The weighting pattern refers to the 10 largest trading partners over the period of 2000-2005.

$$\text{Log}(REER) = \sum_{i=1}^{i=10} [W_i * \text{Log}(e_i * (CPI/CPI_i))] \quad (3)$$

An increase in *REER* indicates a real appreciation in the exchange rate. For each of the 77 low- and middle-income countries (see Appendix 1 for the list of countries), seven observations are available for the periods of 1980-2012; averaged periods are considered to hinder short-term fluctuations¹.

Total Flows_{i,t} is a per capita net inflow consolidating Foreign Direct Investment (*FDI*), Foreign aid (*Aid*), *Remittances*, *Portfolio* investment and *Other Flows*. In an alternative specification, we test the impact of *Total Flows instability* captured by the Hodrick Prescott filter (See Appendix 2 , Table 1 for the definition of the variables and data sources and Table 2 for descriptive statistics). $Y'_{i,t}$ in equation (1), represents a vector of control variables including: trade openness (*Trade*) as defined by the ratio of imports plus exports over GDP, the standard *Terms of Trade*, the ratio of *Government Consumption* over GDP² and the *Balassa Index* defined by the ratio between the country's real per capita GDP and the weighted mean of the same variable for the 10 major trading partners considered for the REER. This last variable is devoted to capturing the impact of the increasing price of non-tradable goods over the development process within a sample where per capita GDP levels are quite heterogeneous. Hence, we control for most of the usual determinants of the real exchange rate (e.g. Devarajan, 1997; Combes et al., 2012). Trade openness promotes moderation in the rise of domestic prices and mitigates real appreciation. The impact of terms of trade is a priori ambiguous: when the terms of trade increase, REER can be appreciated if the income effect dominates the substitution effect. The Balassa Index is expected to be positively correlated with the real exchange rate. Finally, government consumption is supposed to fuel REER when the majority of public spending is oriented toward non-tradable goods and services.

¹ 1980-1984; 1985-1989; 1990-1994; 1995-1999; 2000-2004; 2005-2009; 2010-2012

² In order to get rid of the multicollinearity with total flows, government consumption has been orthogonalized.

In equation (2), $X'_{i,t}$ stands for the vector of control variables. This vector includes initial level of GDP per capita ($GDPPC$), as well as $Polity2$ to capture the degree of democracy, *Natural Rents*, trade openness and real effective exchange rate ($REER$). Trade openness (e.g. Wacziarg and Welch, 2008) and democracy (e.g. Acemoglu et al., 2015) are expected to promote economic growth. According to the convergence hypothesis, the level of economic development should reduce economic growth rate. The impact of natural rents is ambiguous (e.g. Sach and Warner, 1995; Brunnschweiler and Bulte, 2008). On the one hand, a “Dutch disease” phenomenon can impede growth, but on the other hand, the discovery and exploitation of raw materials can extend country endowment. Resulting additional income can contribute to an increase in domestic investments.

We include η_i and μ_i to control for unobserved time-invariant country-level characteristics that are potentially correlated with government revenue and ψ_i and ϕ_t for common time-varying shocks that affect all developing countries. $\sigma_{i,t}$ and $\varepsilon_{i,t}$ are idiosyncratic error terms³.

The Blundell and Bond (1998)’s system-GMM estimator for dynamic panel is implemented for two reasons. First, the OLS estimator is inconsistent since the lagged dependent variable is introduced beside country fixed-effects (Nickell 1981). Second, the GMM estimator controls for the potential endogeneity of the explanatory variables due to measurement errors, reverse causality or omission of pertinent variables. In fact, both GDP growth and net capital inflows can be affected by common shocks. For instance, a discovery of natural resources may attract foreign direct investment while affecting economic growth patterns. Furthermore, deteriorating economic and financial conditions could significantly reduce investor incomes and capital inflows, weakening the economic growth. Regarding reverse causality, high capital inflows may increase investments and boost economic growth, but sustained growth in a recipient country can send out positive signals about the country’s prosperity and attracts more capital inflows.

Equations (1) and (2) are taken in first difference to remove country fixed effects. Equations in levels and first differences are combined in a system and estimated with lagged differences and lagged levels of the explanatory variables as instruments. Therefore, the system-GMM estimator helps reduce the endogeneity issues given that the lagged values used

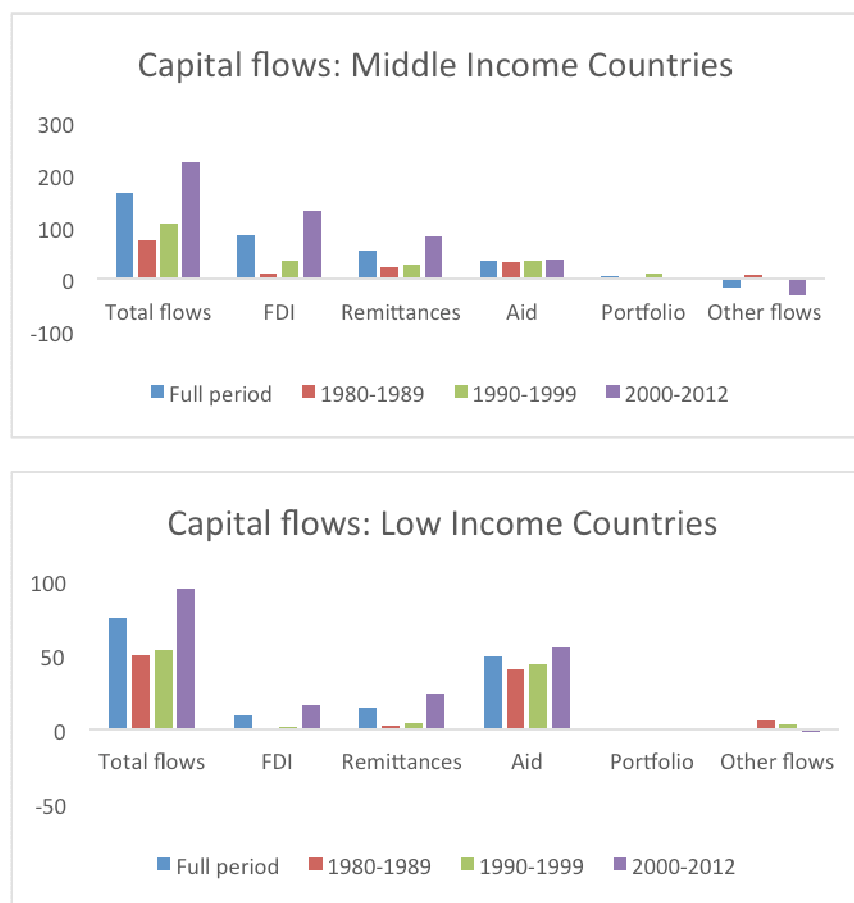
³ In order to reduce the number of instruments, time fixed effects have been omitted in equations where categories of capital inflows appear.

as instruments for capital flows are not affected by the contemporaneous levels of economic growth. The validity of the instruments is tested by the Sargan-Hansen over-identification test and by the second order serial correlation test AR (2); the null hypothesis indicates that the error term does not exhibit auto-correlation. Finally, to deal with the problem of instrument proliferation, the matrix of instruments is collapsed to ensure that the number of instruments does not exceed the number of countries (Roodman 2009). To deal with the problem of “weak instruments” and to augment the precision of the estimation, an external instrument capturing economic growth in developed countries has been added: the ten largest bilateral donors of each country have been considered and we have generated an average donor growth weighted by the amount of aid that a country receives from those particular donors (Tavares, 2003). This external instrument may affect the allocation of foreign aid and the other net capital inflows including FDI and remittances but does not directly affect economic growth in recipient countries.

2.2 Net capital inflow statistics

The aggregated net total of external financing is broken down into five broad categories or headings: private unilateral transfers; official development assistance (ODA); foreign direct investments (FDI); portfolio investments (corporate bonds and other private debt securities); and other inflows including liabilities to foreign banks. This sub-section presents an overview of the long-term evolution of the volume as well as the composition of net capital inflows over the period of 1980-2012. Statistics are provided separately for low and middle income countries, LIC and MIC, respectively, over the whole period and sub-periods. Per capita total and external financing by component are considered in percentages.

Chart 1: Per capita total net capital inflows and their structure (current U.S. dollars)

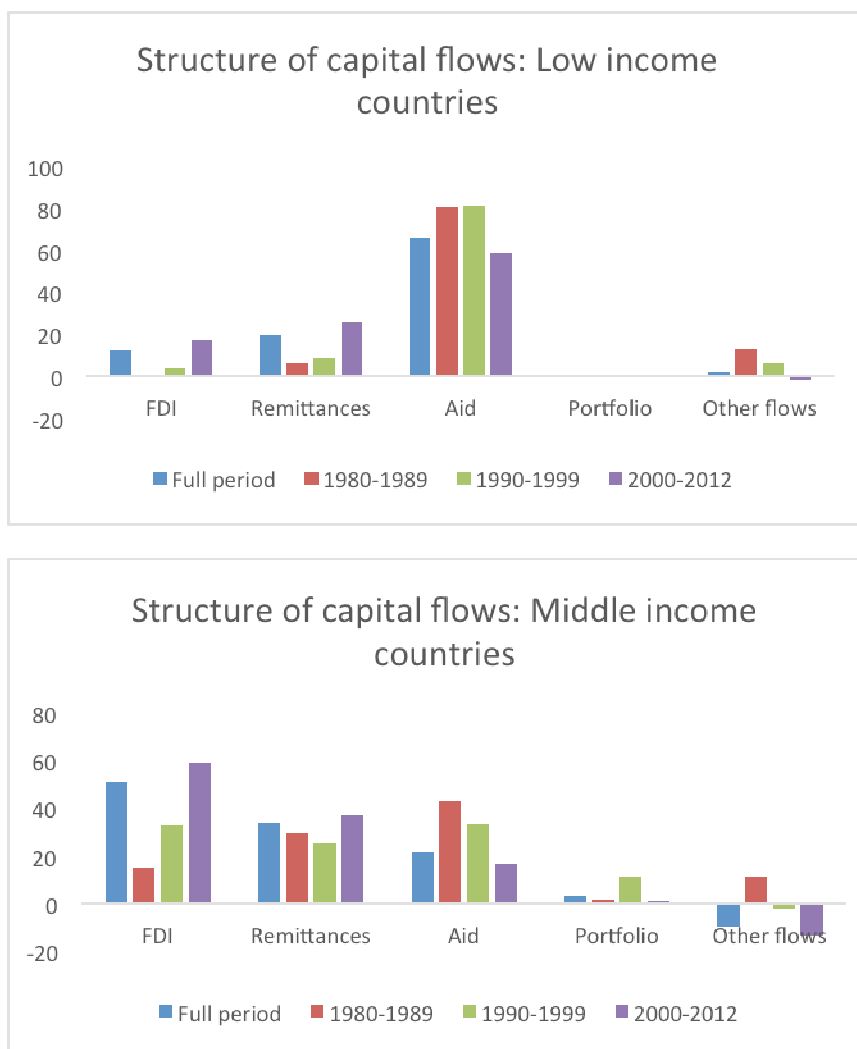


Source: IMF World Economic Outlook

Chart 1 shows that net capital inflows per capita have substantially increased over the last thirty years. For MICs, it has more than tripled, increasing from 74 U.S. dollars in the 1980s to 223 U.S. dollars over the sub-period beginning in 2000. This long-term evolution illustrates the financial integration of developing economies into the globalization process. Although the dynamic of net inflows is much less pronounced for LICs, it does nevertheless exist. Over the same sub-periods, total net inflows have almost doubled, from 50 to 95 U.S. dollars per capita and per annum. Similarly, the structural composition of external financing has greatly changed. In the beginning of the 1980s, regardless of the level of development, official aid constituted the bulk of the inflows. It accounted for about 40 percent of the total financing for the MICs and 80 percent for the LICs, outperforming remittances, the second largest category. In relation to the decreasing role of aid, the composition of ODA has also changed dramatically to an increasing number/percentage of grants versus loans. ODA flows are now focused primarily on LICs and on extending human capabilities, especially through

health or education expenditures, rather than directly supporting productive investments or hard infrastructure as was the case during the 1980s.

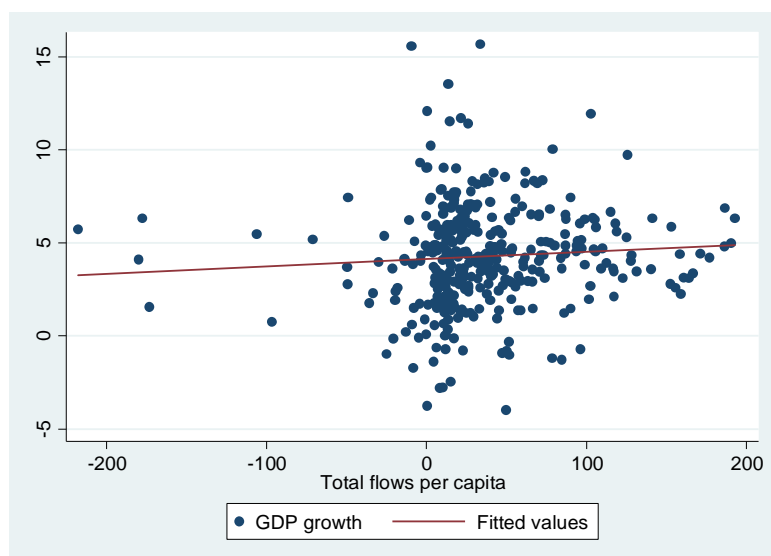
Chart 2 : Total net capital inflows and their structure (%)



Source: IMF World Economic Outlook

At the end of the period under review, FDIs represented the largest component of total external inflows for MICs, more than 50 percent. By comparison, FDI represented only 17 percent of inflows in LICs. In MICs, FDI inflows have been much more dominated by the purchase or creation of manufacturing firms with some expected virtuous upstream and downstream effects on economic growth. Accordingly, the size as well as the composition of financial inflows matter. Different kinds of external resources are likely to induce different impacts depending on the per capita income level. The complexity of the potential relations between growth and external capital inflows is reflected by the correlation and distribution of the dots (Chart 3).

Chart 3: Net capital inflows and economic growth (total sample)



Section 3: Regression results

Table 1 outlines the effect of capital inflows on the real exchange rate (REER). Statistical tests do not invalidate the econometric method. In other words, the null hypothesis of the *Sargan* and the *AR* (2) tests are not rejected. Moreover, the positive coefficient of the lagged dependent variable highlights an inertia effect that legitimates the dynamic panel specification. However, not only is the coefficient below 1 to catch the totality of the REER dynamic, but total capital inflows is associated with a real appreciation of the exchange (equation 1). A 10 percent increase in capital inflows appreciates the REER by roughly 5 percent. This result is robust to the introduction of government consumption and the instability of inflows: the first variable is significant (equations 3 and 4) while the second is not (equation 5). Equations 2 and 4 disentangle total capital inflows into their different components. In equation 2, FDI (0.03) and Aid (0.14) elasticities, contribute only moderately to the real appreciation, while *Portfolio* investments has a strong impact. The effect of *Remittances* is only significant in equation 4 where we control for government consumption. The positive contribution of this variable is approximately twice the effect of *Aid* and ten times larger than the impact of FDI.

With respect to the vector of control variables, the coefficients of the terms of trade, the Balassa Index and government consumption are statistically significant with positive signs, while an increase of trade openness is found to reduce the real appreciation.

Table 1: Net capital inflows and the real effective exchange rate (REER)

	(1)	(2)	(3)	(4)	(5)
Log(REER) (-1)	0.332*** (0.0289)	0.321*** (0.0381)	0.261*** (0.0452)	0.291*** (0.0412)	0.359*** (0.0390)
Log(FDI)		0.0267*** (0.00731)		0.0236*** (0.00745)	
Log(Remittances)		0.171 (0.115)		0.232** (0.114)	
Log(Aid)		0.141** (0.0574)		0.115** (0.0504)	
Log(Other flows)		0.00104 (0.0118)		0.0108 (0.00929)	
Log(Portfolio)		1.494*** (0.391)		2.036*** (0.316)	
Log(Total flows)	0.468*** (0.124)		0.344*** (0.120)		0.526*** (0.154)
Total flows instability					0.00120 (0.000785)
Trade	-0.00448*** (0.000261)	-0.00379*** (0.000891)	-0.00454*** (0.000861)	-0.00387*** (0.00110)	-0.00469*** (0.000944)
Terms of trade	0.000384** (0.000162)	0.000353 (0.000307)	0.000605** (0.000276)	0.000214 (0.000262)	0.000691** (0.000275)
Balassa index	0.00151*** (0.000461)	0.00135** (0.000524)	0.00122** (0.000491)	0.00153*** (0.000471)	0.00131** (0.000549)
Government consumption			0.0110*** (0.00349)	0.0137*** (0.00369)	
Constant	0.174 (0.795)	-9.139*** (2.777)	1.986** (0.820)	-13.09*** (2.164)	-0.333 (0.929)
Observations	273	271	255	257	272
Number of countries	64	63	62	62	64
Number of instruments	26	35	27	36	27
AR(1)	0.027	0.0307	0.0523	0.0262	0.0195
AR(2)	0.8957	0.5722	0.9479	0.5845	0.9696
Sargan	0.1012	0.1459	0.1864	0.1635	0.1125

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

In Table 2, the specificity of low-income countries (LIC) is captured through a multiplicative dummy variable associated with total capital inflows or capital components (equations 1 to 4). The impact of total inflows on the REER is higher in low-income countries (LICs) (equation 1) where the demand side outperforms the supply response, generating a real appreciation of the external value of the domestic currency. When the different categories of capital inflows are considered (equation 2), this appreciation effect of remittances proves to

be greater in LICs. Alternative specifications (equations 3 and 4) do not invalidate these regression results. Table 2 also displays the specific effect resulting from the exchange rate system. A dummy variable is introduced for countries with a peg regime. This variable, which is considered in a multiplicative way with the total capital inflows (equation 5) is obtained from Ilzetki, Reinhart and Rogoff (2010)'s classification: no separate legal tender, pre-announced peg (or currency board arrangement), pre-announced horizontal band that is narrower than or equal to ± 2 percent, or de facto peg. The sign is negative and significant, reflecting that the peg regime mitigates the appreciation effect that stems from capital inflows. One possible explanation is that a peg regime goes in hand with a more efficient monetary control due to some efforts deployed by monetary authorities to regulate domestic credit and prevent inflation pressures. In developing economies, a good example of this effect can be found in the Franc Zone where the fixed parity of the CFA franc has been maintained for several decades thanks to strong and efficient regulatory control of the money supply.

Table 2: Real exchange rate, net capital inflows and low income countries (LICs) : variation according to the exchange regime

	(1)	(2)	(3)	(4)	(5)
Log(REER) (-1)	0.314*** (0.0242)	0.322*** (0.0381)	0.311*** (0.0368)	0.304*** (0.0356)	0.310*** (0.0328)
Log(FDI)		0.0249*** (0.00729)		0.0233** (0.00914)	
Log(Remittances)		0.0970 (0.101)		0.0715 (0.105)	
Log(Aid)		0.118* (0.0622)		0.129* (0.0695)	
Log(Other flows)		-0.000192 (0.0109)		0.0101 (0.00900)	
Log(Portfolio)		1.253*** (0.403)		1.592*** (0.300)	
Log(FDI)*LIC		-0.0176 (0.269)		-0.114 (0.216)	
Log(Other flows)*LIC		0.180 (0.582)		-0.451 (0.886)	
Log(Portfolio)*LIC		-3.489 (3.166)		1.241 (4.793)	
Log(Remittances)*LIC		1.264*** (0.482)		1.061** (0.488)	
Log(Aid)*LIC		-0.122 (0.113)		-0.0869 (0.139)	
Log(Total flows)	0.345** (0.138)		0.155 (0.159)		0.413*** (0.122)
Log(Total flows)*LIC	1.001*** (0.254)		1.230*** (0.294)		
Log(Total flows)*peg regime					-0.0162*** (0.00620)
Trade	-0.00444*** (0.000680)	-0.00397*** (0.000887)	-0.00411*** (0.000689)	-0.00348*** (0.000918)	-0.00398*** (0.000805)
Terms of trade	0.000441* (0.000268)	0.000477* (0.000279)	0.000247 (0.000279)	0.000219 (0.000261)	0.000336 (0.000282)
Balassa index	0.00155*** (0.000586)	0.00148*** (0.000469)	0.00134** (0.000549)	0.00192*** (0.000399)	0.00130** (0.000522)
Government consumption			0.0144*** (0.00417)	0.0191*** (0.00355)	
Constant	-1.166 (0.764)	-0.685 (8.385)	0.242 (1.239)	-13.15 (12.19)	0.691 (0.741)
Observations	273	271	255	257	243
Number of countries	64	63	62	62	62
Number of instruments	30	44	31	45	30
AR(1)	0.028	0.0297	0.0478	0.0242	0.0465
AR(2)	0.8049	0.6502	0.8796	0.6233	0.5733
Sargan	0.1566	0.1259	0.197	0.1926	0.279

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1.

The GDP growth model is estimated in Table 3. The negative sign of the lagged endogenous variable could be interpreted as the consequence of a stop-and-go growth cycle. Trade openness and natural rents promote economic growth while the *Polity2* variable is not significant. It is worth mentioning that the positive impact of natural rents does not indicate the absence of negative long-run effects that we poorly capture with the model. Indeed, the presence of natural rents can be a source of the “Dutch disease” phenomenon with the accompanying perverse consequences for the implementation of the diversification process. Total capital inflows contribute positively to growth (equations 1, 3, 5, and 6), but their instability does not prove to be a relevant explanatory variable (equations 5 and 6). Coefficients are semi-elasticities which can be interpreted as follows: a doubling of the per capita total capital inflows leads to an increase of the average annual growth by about 50 percent (equation 1). The transmission channel can be more deeply explored by controlling for the real exchange rate impact (equations 3, 4 and 6) distinguishing the direct positive impact of inflows from the negative impact through the REER. Through this distinction we expect the coefficient of total capital inflows to be higher when the REER is incorporated in the econometric specification.

Results confirm our expectation: a 100 percent appreciation of the REER is associated with a 25 percent reduction in annual GDP growth (a loss of growth of one percentage point). Moreover, it is worth noting that the coefficient of total inflows varies significantly depending on the introduction (or not) of the REER: equation (1) versus equation (3). In equation (3), the coefficient of total capital inflows is roughly twice the coefficient of this variable in equation (1). Consequently the direct effect represents a doubling of the GDP growth rate.⁴

⁴ When particular capital inflows are considered (equations 2 and 4), it proves impossible to distinguish direct and indirect effects

Table 3: Effect of capital inflows on GDP growth

	(1)	(2)	(3)	(4)	(5)	(6)
GDP Growth (-1)	-0.0532** (0.0246)	-0.0706** (0.0339)	-0.0440* (0.0242)	-0.0760** (0.0351)	-0.0459* (0.0251)	-0.0406 (0.0255)
Log(FDI)		0.00534*** (0.00136)		0.00465*** (0.00117)		
Log(Remittances)		0.0715** (0.0293)		0.0871*** (0.0302)		
Log(Aid)		-0.0105 (0.00965)		-0.00610 (0.00850)		
Log(Other flows)		0.00413*** (0.000924)		0.00331*** (0.000768)		
Log(Portfolio)		0.165*** (0.0448)		0.195*** (0.0482)		
Log(Total flows)	0.0193*** (0.00727)		0.0365*** (0.00854)		0.0361** (0.0153)	0.0476** (0.0193)
Log(REER)			-0.0108* (0.00642)	-0.0164*** (0.00401)		-0.0131** (0.00635)
Total flows instability					6.51e-05 (7.77e-05)	4.77e-05 (9.06e-05)
Log(GDPPC)	-0.00303 (0.00591)	-0.00866 (0.00569)	-0.00745 (0.00658)	-0.00599 (0.00543)	-0.00666 (0.00589)	-0.0103 (0.00703)
Trade	0.0409*** (0.00647)	0.0318*** (0.0116)	0.0418*** (0.00685)	0.0266** (0.0114)	0.0446*** (0.00481)	0.0433*** (0.00624)
Polity2	0.000989** (0.000479)	0.000514 (0.000418)	0.000689 (0.000484)	0.000279 (0.000410)	0.000963** (0.000484)	0.000713 (0.000484)
Natural rents	0.000407* (0.000209)	0.000843*** (0.000223)	0.000294 (0.000218)	0.000598*** (0.000212)	0.000180 (0.000212)	0.000147 (0.000241)
Constant	-0.0824 (0.0642)	-1.539*** (0.360)	-0.109 (0.0694)	-1.789*** (0.408)	-0.163* (0.0940)	-0.147 (0.105)
Observations	310	311	309	310	310	309
Number of countries	69	70	69	70	69	69
Number of instruments	24	40	25	41	27	28
AR(1)	0.0221	0.0224	0.0197	0.0204	0.0224	0.02
AR(2)	0.2482	0.2727	0.2119	0.263	0.2094	0.1938
Sargan	0.3474	0.1414	0.3259	0.114	0.449	0.3765

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 4 : Effect of capital inflows on the LICs' economic growth

	(1)	(2)	(3)	(4)
GDP Growth (-1)	-0.0692** (0.0350)	-0.0956** (0.0427)	-0.0713** (0.0328)	-0.102** (0.0408)
Log(FDI)		0.00500*** (0.00139)		0.00430*** (0.00114)
Log(Remittances)		0.0636* (0.0326)		0.0791** (0.0326)
Log(Aid)		-0.0133 (0.0167)		-0.0181 (0.0149)
Log(Other flows)		0.00409*** (0.00109)		0.00328*** (0.000972)
Log(Portfolio)		0.152*** (0.0551)		0.186*** (0.0525)
Log(FDI)*LIC		0.0321 (0.0384)		0.0349 (0.0353)
Log(Other flows)*LIC		-0.0662 (0.186)		0.0164 (0.172)
Log(Portfolio)*LIC		0.221 (0.485)		0.148 (0.427)
Log(Remittances)*LIC		-0.104 (0.0665)		-0.134* (0.0689)
Log(Aid)*LIC		0.00875 (0.0212)		0.0166 (0.0198)
Log(Total flows)	0.0415*** (0.00839)		0.0601*** (0.0110)	
Log(Total flows)*LIC	-0.0346 (0.0330)		-0.0451 (0.0326)	
Log(REER)			-0.0117* (0.00633)	-0.0136*** (0.00388)
Log(GDPPC)	-0.00859 (0.00548)	-0.00183 (0.00549)	-0.0120** (0.00604)	-0.00119 (0.00534)
Trade	0.0446*** (0.00506)	0.0270** (0.0111)	0.0431*** (0.00623)	0.0267** (0.0113)
Polity2	0.000987** (0.000484)	0.000746* (0.000411)	0.000722 (0.000479)	0.000527 (0.000387)
Natural rents	0.000273 (0.000196)	0.000907*** (0.000247)	0.000205 (0.000218)	0.000711*** (0.000242)
Constant	-0.121* (0.0695)	-1.705 (1.056)	-0.134* (0.0692)	-1.939* (1.020)
Observations	310	311	309	310
Number of countries	69	70	69	70
Number of instruments	27	41	28	42
AR(1)	0.0247	0.0212	0.0244	0.022
AR(2)	0.2779	0.4055	0.2791	0.4356
Sargan	0.4661	0.0758	0.4608	0.0805

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

In Table 4, we test the presence of specificities for low-income countries (LICs) in the GDP growth model. The only conclusive result we get is with equation (4). The impact of remittances proves lower in LICs. A possible explanation for this result is that remittances are dedicated to consumption rather than to investments (Chami et al., 2012). In Table 5, the assumption that the impact of total inflows on economic growth could be conditional on the exchange rate regime is tested. No statistical difference is found across the different specifications, with or without the REER.

Table 5: Effect on GDP growth and the peg regime economies

	(1)	(2)	(3)
GDP Growth (-1)	-0.0683*	-0.0658	-0.0837*
	(0.0412)	(0.0419)	(0.0442)
Log(Total flows)	0.0334***	0.0390***	0.0452***
	(0.0109)	(0.0129)	(0.0133)
Log(Total flows)*peg regime	0.000559	0.000608	0.000937
	(0.000675)	(0.000703)	(0.000810)
Log(Total flows)*LIC			-0.0581
			(0.0391)
Log(Total flows)*LIC*peg regime			-0.00113
			(0.00144)
Log(REER)		-0.00891	-0.00719
		(0.00723)	(0.00723)
Log(GDPPC)	-0.00303	-0.00350	-0.00385
	(0.00561)	(0.00633)	(0.00641)
Trade	0.0406***	0.0362**	0.0366**
	(0.0139)	(0.0146)	(0.0142)
Polity2	0.000583	0.000430	0.000559
	(0.000483)	(0.000475)	(0.000465)
Natural rents	0.000802***	0.000841***	0.000905***
	(0.000299)	(0.000283)	(0.000284)
Constant	-0.175**	-0.164	-0.104
	(0.0817)	(0.101)	(0.103)
Observations	278	278	278
Number of countries	66	66	66
Number of instruments	27	28	30
AR(1)	0.0001	0.0001	0.0001
AR(2)	0.4399	0.4888	0.3706
Sargan	0.4895	0.4436	0.4907

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Section 4: Conclusion

After a sharp decline during the 1980s, net capital inflows to developing countries have significantly increased in the 2000s. This phenomenon is in line with the acceleration of globalization via the traditional channel of international trade but also through an increasing financial openness in developing economies. Globalization has also been accompanied by a pronounced modification of the composition of capital inflows. While public aid was initially the prevailing finance source and still remains so for low income countries, the role of ODA is now much smaller for middle income economies which depend mainly on FDIs and to a lesser extent on remittances. We found that the contribution of net capital inflows to the variation of the real effective exchange rate (REER) was significant and the impact was more pronounced for LICs. This effect can be related to the low supply-side capacity and the implication of net capital inflows in terms of appreciation of the non-tradable to tradable price ratio.

With respect to economic growth, we found a strongly positive and significant impact of net capital inflows on GDP growth, in accordance with the expected contribution of these external resources to fill the saving-investment gap. However, we did not detect a difference with respect to the level of development. On average, doubling net capital inflows would lead to a net increase of average growth of about 2 percent. Controlling for the indirect impact of the external financial capital inflows (their indirect and negative effect occurring through real exchange rate appreciation), we also found that these greater inflows would enhance a growth rate of 7.4 percent compared to the 3.7 percent observed over the long period (1980-2012). This result holds when other potential determinants of growth such as the presence of natural rents, trade openness, an institutional variable or the long run convergence effect are controlled for. A more extended econometric specification has rejected the hypothesis that instability of net capital inflows or their respective components could be relevant variables for the explanation of the REER or the GDP growth rate.

Developing countries should fully internalize the fact that capital inflows, while critical to finance development needs and to spurring economic growth, can also lead to significant REER appreciation and loss of competitiveness, thereby complicating macroeconomic management. Particular attention should be given to flows, such as private transfers, which have a considerable real appreciation effect compared to other types of capital flows such as FDI and aid.

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Appendices

Appendix 1 :

List of countries			
Code	Country	Code	Country
DZA	Algeria	LBN	Lebanon
AGO	Angola	LSO	Lesotho
ARG	Argentina	LBR	Liberia
BGD	Bangladesh	MDG	Madagascar
BEN	Benin	MWI	Malawi
BOL	Bolivia	MYS	Malaysia
BWA	Botswana	MLI	Mali
BRA	Brazil	MRT	Mauritania
BFA	Burkina Faso	MUS	Mauritius
BDI	Burundi	MEX	Mexico
KHM	Cambodia	MOZ	Mozambique
CMR	Cameroon	NAM	Namibia
CAF	Central African Rep.	NPL	Nepal
TCD	Chad	NER	Niger
CHN	China.P.R.: Mainland	NGA	Nigeria
COL	Colombia	PAK	Pakistan
COG	Congo. Republic of	PAN	Panama
CRI	Costa Rica	PRY	Paraguay
CIV	Côte d'Ivoire	PER	Peru
DJI	Djibouti	PHL	Philippines
DOM	Dominican Republic	RWA	Rwanda
ECU	Ecuador	SEN	Senegal
EGY	Egypt	SLE	Sierra Leone
SLV	El Salvador	ZAF	South Africa
GAB	Gabon	LKA	Sri Lanka
GMB	Gambia. The	SDN	Sudan
GHA	Ghana	SWZ	Swaziland
GTM	Guatemala	SYR	Syrian Arab Republic
GIN	Guinea	TZA	Tanzania
GNB	Guinea-Bissau	THA	Thailand
HTI	Haiti	TUN	Tunisia
IND	India	UGA	Uganda
IDN	Indonesia	VEN	Venezuela. Rep. Bol.
IRN	Iran. I.R. of	VNM	Vietnam
JAM	Jamaica	YEM	Yemen. Republic of
JOR	Jordan	ZMB	Zambia
KEN	Kenya		
LAO	Lao People's Dem.Rep		

Appendix 2 :

Table 1: Data sources		
Variables	Definition	Sources
GDP growth	Economic growth	IMF World Economic Outlook
FDI	Foreign direct investment per capita	IMF World Economic Outlook
Remittances	Migrant transfers per capita	IMF World Economic Outlook
Aid	Foreign aid per capita	OECD datasets
Portfolio	Portfolio flows per capita	IMF World Economic Outlook
Other flows	Non classified flows per capita	IMF World Economic Outlook
Trade	Imports plus exports over GDP	World Bank-World Development indicators (2014)
Natural rents	Natural resource rents over GDP	World Bank-World Development indicators (2014)
Polity2	Degree of democracy	Polity IV Project (Marshall and Jaggers 2002)
GDPPC	GDP per capita	IMF World Economic Outlook
Balassa index	Measure the degree of a country competitiveness	CERDI
REER	Real effective exchange rate	CERDI
Terms of trade	Terms of Trade	IMF World Economic Outlook
Peg regime	Dummy variable that takes the value of 1 if the exchange rate regime is pegged	Ilzetzki, Reinhart and Rogoff (2008)
LIC	Low income countries. Dummy variable that takes the value of 1 if the country belongs to the group of the IMF low income group classification	IMF World Economic Outlook
Government consumption	Government final consumption expenditures	World Bank-World Development indicators (2014)
Total flows instability	Standard deviation of the Hodrick Prescott filter's cyclical component.	Authors' calculation

Table 2: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Log((FDI)	549	5.591211	0.4215709	-1.839352	7.249561
Log(remittances)	550	6.191947	0.3486743	-0.8348733	7.161528
Log(aid)	598	4.292293	0.4454119	2.899052	6.153531
Log(other flows)	570	7.372105	0.358694	-0.8100761	7.780177
Log(portfolio)	558	6.993121	0.3951974	-2.199669	7.237709
Log(total flows)	567	6.27252	0.3398315	-0.3081539	7.184275
Log(REER)	552	4.787605	0.5994099	3.524452	11.83555
Total flows instability	557	9.326372	14.93246	0.0303224	123.5963
Trade	578	56.96595	38.99618	9.436654	510.855
Terms of trade	529	114.9497	49.55432	22.14194	488.4496
Balassa index	451	119.532	37.7183	72.18857	326.8341
Log(GDPPC)	570	6.918076	1.054014	4.450716	9.037553
Polity2	562	0.727847	6.130204	-9.8	10
Natural rents	580	11.10079	12.54401	0.000499	69.99982
Government consumption	556	14.14722	5.87593	2.80376	40.65649
GDP growth	574	3.7714	4.16064	-42.4511	33.347