Measuring and Explaining the Volatility of Capital Flows toward Emerging Countries*

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Abstract

This paper analyzes the determinants of the volatility of the different types of capital inflows toward emerging countries. After calculating a proxy of the volatility of FDI, portfolio and bank inflows, we use a panel data model to study their causality relations with a broad set of explanatory variables. Our results highlight the difficulties of policy-makers to stabilize capital flows given. Thus, we show that since 2000 the significance of global factors, beyond the control of emerging economies, has increased at the expense of that of country specific drivers. However, we identify some macroeconomic and financial domestic factors that appear to reduce the volatility of certain categories of capital flows without increasing that of others.

Keywords: Capital flows; Volatility; Panel data; Emerging markets.
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1 Introduction

In the last three decades the process of capital account liberalization has contributed to a greater integration of emerging economies in international financial markets. This development has motivated the development of an empirical literature aimed at identifying the drivers of the international allocation of capital. While most of these contributions have studied the determinants of the level of capital flows,[1] relatively few of them have focused on the sources of their volatility. This might be surprising, given the positive link between capital flows' stability and economic growth (Easterly et al., 2000; Ramey and Ramey, 1995). Besides, managing volatile international flows is especially challenging for emerging countries, where inflows are more volatile than in developed ones. This fact makes policies aimed at encouraging stable capital flows particularly important, especially given the role of inflows toward emerging economies as a major source of economic financing. This paper does precisely contribute to this literature, proposing an accurate measure of capital flows' volatility, identifying the main determinants of total inflows and its three different components (foreign direct investment -FDI onwards-, portfolio and bank inflows) and suggesting some policy recommendations from these results.

The existing empirical literature can be broadly classified into two strands.[2] First, some papers have focused on the analysis of the difference in volatility between the capital flows toward emerging and advanced economies. For instance, the results of the cross-country regressions of Broner and Rigobon (2005) show that the higher volatility in emerging markets is primarily due to these economies' propensity to build up mismatches, which generates more persistent shocks and a higher likelihood of international contagion. In a similar vein, Alfaro et al. (2007) emphasize the importance of domestic factors, such as institutional quality and the soundness of macroeconomic policies, to explain these volatility differentials. This distinct behavior of capital flows' volatility in emerging counties can also be characterized by type of investment. For instance, the gap between FDI and portfolio flows volatilities is found to be smaller in advanced economies (Goldstein and Razin, 2006), whereas in emerging countries the share of FDI in total capital inflows is higher (Albuquerque, 2003), as well as their portfolio flows' volatility (Tesar and Werner, 1995).

Other contributions, instead, have used panel data models to analyze the impact of financial integration on volatility. This is the case of Neumann et al. (2009), which show that financial integration tends to increase the volatility of FDI in emerging economies, while reducing that other debt flows in mature economies.[3] In turn, the IMF's 2007 Global Financial Stability Report -GFSR onwards- (IMF, 2007), conclude that financial openness and institutional quality are associated with more stable inflows both in developed and in emerging economies. Finally, Bekaert and Harvey (1997) focused on prices rather

[1] These empirical papers often distinguish between country-specific or 'pull' factors and global or 'push' factors. See Chuhan et al. (1998) or Calvo et al. (1996).

[2] The most relevant theoretical contributions on this issue have focused on the role of incomplete information (Bacchetta and van Wincoop, 1998), financial development (Aghion et al., 2004) or trade liberalization (Martin and Rey, 2006).

[3] These authors use the international financial liberalization index developed by Kaminsky and Schmukler (2003).

than volumes to conclude that financial liberalization reduces the volatility of stock market returns in emerging economies.

However, most of these contributions present serious drawbacks rooted in the methodology used to approximate volatility, the lack of disaggregation between types of flows and the limited number of potential explanatory factors considered. This paper overcomes these three limitations. First, we propose a new measure of volatility based on a recent work by Engle and Gonzalo Rangel (2008), which is the dependent variable of our model specification. We demonstrate that this approximation is more appropriate to characterize annual volatilities than previous proposals -mostly based on the standard deviation of capital flows over a rolling window or the estimated volatilities of a GARCH (1,1) model-. Thus, for instance, our measure generates volatilities with a lower serial correlation than the other proposals, which constitutes an advantage to characterize flows' uncertainty during times of crisis. Second, we draw a clear distinction between the three different categories of capital flows. Given that the literature on the level of capital flows has highlighted that FDI, portfolio and bank inflows have different drivers, it seems sensible to assume that their volatility will also be shaped by different factors. This may pose difficult dilemmas for policymakers to reach a virtuous cycle of stable flows as volatility dynamics is different by type of flow (BIS, 2009). Most of the previous contributions do not disentangle these different drivers across components and analyze total inflows (Broner and Rigobon ,2005 and GFSR, 2007) or just concentrate on one investment type -for instance, Alfaro et al., 2007 and Bekaert and Harvey, 1997 focus exclusively on equity flows-. Finally, we use a broad set of explanatory variables including not only macroeconomic and financial factors, but also global factors, which have received little attention in the literature.[4]

On top of solving the aforementioned technical limitations, our objective is twofold. First, we want to identify the determinants of capital flows' volatility in emerging countries by fitting a panel data model from 1980 to 2006. To account for possible structural breaks during the most recent wave of capital inflows toward emerging markets, we also fit the subsample from 2000 to 2006. Second, we try to infer policy recommendations from these results. Ideally, these policy options should allow these economies to hedge against the risks stemming from volatile capital inflows while maintaining their access to international finance. However, our results indicate that various explanatory variables have a differential and time-varying impact, which implies that few drivers appear to reduce the volatility of capital flows across the board.

Moreover, we show that over the last decade global factors have gained weight as volatility determinants of the three types of flows, especially for FDI (in line with Neumann et al., 2009). This outcome poses a challenge for policy-makers in emerging economies as it suggests that the scope for implementing policies that enhance flows stability is more limited than it used to be.

[4]Only Neumann et al. (2009) and GFSR (2007) include global factors in their explanatory variables: the former uses world interest rates and industrial production growth and the latter uses global liquidity and real interest rate spreads.

On the positive side, we identify some macroeconomic and financial domestic factors under the control of policy makers that reduce the volatility of specific types of flows without increasing that of others. As regards domestic macroeconomic drivers, we find that several variables, such as the GDP per capita, are relevant to shape the volatility of FDI and bank inflows, whereas portfolio flows don't have a significant relation with the macroeconomic performance. Overall flows might help to disentangle the total effect when certain factors have a conflicting impact on the volatility of specific types of flows. For instance, we show that the domestic macroeconomic variables, such as the GDP per capita and the degree of reserve accumulation, are relevant to shape the volatility of total flows, which is in line with Broner and Rigobon (2005) and contrary to GFSR (2007). Regarding domestic financial variables, we also find that some of them play an important role for FDI, portfolio, bank inflows and total volatilities. Most of these links are more significant in the most recent subsample. In particular, the development of the domestic financial system tends to reduce the volatility of portfolio and banking inflows, in line with Bekaert and Harvey (1997) and contrary to Alfaro et al. (2007).

The remainder of this paper is organized as follows. Section 2 introduces our data on capital flows and Section 3 compares previous approximations for capital flows' volatility with our proposed measure. In turn, Section 4 describes our set of explanatory variables and Section 5 presents the methodological approach used in this paper. Finally, Section 6 summarizes the main results of our empirical analysis and Section 7 concludes.

2 Data on capital flows

Relatively few papers have analyzed the dynamics and drivers of capital inflows across components. By type of flow, FDI has a rather long term nature (Lipsey, 1999), tends to be associated with increased domestic investment and growth (BIS, 2009) and, in general, is less volatile and more persistent than non-FDI inflows.[5] Consequently, FDI is more resilient during financial crises and contributes to the economic stability of the host country; see, for instance, Chuhan et al. (1996), Frankel and Rose (1996), Lipsey (2001) or Sarno and Taylor (1999). On the contrary, portfolio flows and bank inflows are considered to be highly volatile.[6] According to Mody and Taylor (2002), this higher instability might be favored by the sensitivity of these investments to domestic conditions in both emerging and developed countries.

Our data set on capital flows focuses exclusively on *capital inflows*, defined as the purchases by non-residents of domestic assets minus their sales of such assets -therefore, there can be negative figures-. We collect quarterly data on capital inflows from the IMF's International Financial Statistics (IFS) by component (FDI, portfolio flows -which include debt securities and equity- and bank inflows[7]), which will

[5] According to Albuquerque (2003), as some emerging countries are financially constrained, they should borrow relatively more through FDI as the default premium is lower than that of non-FDI flows.

[6] Kraay (1998) or Eichengreen (2001) relate this fact to the vulnerabilities of emerging countries with weak domestic financial systems after capital account liberalization.

[7] IFS defines our bank flow category as "Other investment flows". It is a residual item that mostly includes cross-border

allow us to examine the different nature of these flows. Finally, total inflows volatility is also analyzed to determine which factors dominate the dynamics of overall volatility.[8]

We obtain capital flows on GDP for 48 emerging and less developed economies (see Appendix A for the complete country list and some summary statistics at country level).[9] The sample is limited to countries with available information for the three types of capital flows for at least 10 years. We also include other emerging countries that do not meet these standards but we consider relevant economies for the study -such as Singapore and South Africa- and four additional African countries to obtain a more geographically balanced panel. The sample period goes from 1980 to 2006 as prior information is scarce. We also analyze separately the subsample from 2000 to 2006 to identify changes in the determinants of volatility during the last wave of capital flows.

Table 1 reports some summary statistics by type of flow and region. Total capital flows on GDP dried up during the 1980's debt crisis, and sharply recovered in the 1990's and thereafter, coinciding with the liberalization of the capital account in an increasing number of emerging countries. The evolution of inflows in our sample has different characteristics by type of investment. First, FDI represents around half of total flows throughout the sample period. Regarding volatility, in line with Lipsey (2001) or Sarno and Taylor (1999), the standard deviation of FDI and portfolio inflows is significantly lower than that of bank inflows. This evolution points at the stability and resilience of FDI flows even during financial crises. Nevertheless, in line with Goldstein and Razin (2006), from 1990 onwards FDI is more volatile than portfolio flows. In fact, as shown in Figure 1 -the share of each type of flow and region on total flows-, the proportion of FDI on total capital inflows tends to increase during turbulent phases, as other sources of finance dry up. Second, portfolio flows became an important source of finance during the 1990's, coinciding with the opening up of the capital accounts of most emerging countries. However, these flows quickly turned negative or insignificant in periods of financial turbulence such as the 1980's or during more recent crises. Finally, the largest swings correspond to bank inflows, which registered negative values during the second half of the 1980's as a result of the debt crisis, and at the turn of the century during the wave of emerging markets' crises. By region, Figure 1 shows that these swings affected especially Latin America and Europe during the 1980's and Latin America and Asia during the late 90's and early 00's.

bank lending. As far as these transactions are not included elsewhere in the balance of payments statistics, we use in this paper the term "bank inflows" .

[8]One alternative to analyze volatility across components could be to disentangle the more unstable short-term loans and portfolio flows from the longer-term flows, although this distinction is not feasible with our data set. Nevertheless, as noted by Claessens et al. (1995), long-term flows are often as volatile as short-term flows, so that the property of being more or less volatile is not inherent in the type of flow.

[9]Capital inflows data released by IFS for China are only available on a half-yearly basis.

3 How to measure capital flows volatility?

Approximating capital flows' volatility is not straightforward. Neumann et al. (2009) and GFSR (2007) used the standard deviation of capital flows over a rolling window of annual data. If capital inflows' volatility for country i in year t is denoted as σ_{it}, it can be expressed as

$$\sigma_{it} = \left(\frac{1}{n} \sum_{j=t-(n-1)}^{t} (flow_{ij} - \mu)^2 \right)^{\frac{1}{2}} \tag{1}$$

where $\mu = \frac{1}{n} \sum_{j=t-(n-1)}^{t} flow_{ij}$, and $flow_{ij}$ denotes the capital inflow. This measure is subject to at least three drawbacks. First, it entails a loss of observations at the beginning of the sample, which depends on the window's length. Second, σ_{it} strongly depends on previous periods, generating problems of endogeneity and serial correlation that may result in non-robust estimates. Finally, σ_{it} assigns the same weight to $flow_{ij-1}$ and $flow_{ij-(n-1)}$, which tends to over smooth the volatility processes. As a result, volatility tends to be underestimated when a shock takes place, and overestimated thereafter. This problem is especially acute with annual data, which were used in all previous empirical contributions.

A second alternative, in line with Bekaert and Harvey (1997), is to use the estimated volatilities of a GARCH (1,1) model (see Bollerslev, 1986). If we denote $y_t = \Delta flow_{it}$, the GARCH(1,1) process is defined as

$$\begin{aligned} y_t &= y_t^{\dagger} \sigma_t \\ \sigma_t^2 &= \alpha_0 + \alpha_1 y_{t-1}^2 + \alpha_2 \sigma_{t-1}^2, \end{aligned} \tag{2}$$

where $y_t^{\dagger}$ is a Gaussian white noise process and σ_t^2 is the corresponding conditional variance, and parameters α_0, α_1 and α_2 satisfy the usual conditions to guarantee the positivity and stationarity of σ_t^2. In our context this second alternative also entails serious caveats, as the GARCH estimation procedure leads to convergence errors resulting from data scarcity, especially at the beginning of the sample and for portfolio flows. Besides, ML estimates for small samples entail considerable biases (Hwang and Valls Pereira, 2006).

To overcome the drawbacks of these two methods, we propose a volatility measure based on Engle and Gonzalo Rangel (2008). To account for the uncertainty of macroeconomic variables, whose frequency is lower than that of financial variables, these authors model each variable and then obtain their measure of volatility from the residuals. Analogously, we first fit a suitable ARIMA model for every country i and type of capital flow on a quarterly basis.[10] We then approximate the annual variance of capital flows as the yearly average of the absolute value of quarterly residuals, v_{itj}, that is

$$\sigma_{it}^2 = \frac{1}{4} \sum_{j=1}^{4} |v_{itj}| \tag{3}$$

[10] We fit each series by the automatic procedure of TSW of Caporello and Maravall (2004).

where $j = 1, ..., 4$ denotes each quarter of year t.

As an illustration, Figure 2 compares the performance of the three alternative measures of volatility for bank inflows in Thailand. We chose this example for two reasons. First, Thailand experienced a financial crisis in 1997 and, therefore, illustrates the dynamics of the three alternative measures during financial distress. Second, the convergence of the GARCH (1,1) model allows for the availability of this approximation.

As a more formal comparison for the full panel data set, Table 2 reports some summary statistics of the three volatility measures.[11] Apart from the loss of data at the beginning of the sample, the approximation based on a rolling window masks the effects of the largest outliers, as shown by its lower kurtosis. This means that in crisis times our measure would perform better. This drawback would not apply to the GARCH(1,1) measure, as it generates the biggest kurtosis among the three approximations. Besides, the autocorrelations of order 1, $\rho(1)$, show that a stronger correlation structure is generated by the standard deviation over a rolling window. These statistics for the GARCH(1,1) measure are also bigger than for our proposed measure -except for portfolio-, which reflects its convergence problems.

Table 3 presents summary statistics of the volatility of FDI, portfolio and bank inflows using our chosen volatility measure. In line with the summary statistics of Table 1, the mean volatility suggests that bank inflows displayed the highest volatility throughout the complete sample, followed by portfolio, and FDI flows. However, volatility has increased over time for all types of investments, with both FDI and portfolio flows presenting larger increases than bank inflows since the early nineties. By regions, Asia displays the highest volatility from 1980 to 2006 for bank inflows, FDI and total flows, followed by Eastern Europe, Latin America and Africa. Regarding temporal patterns, FDI volatility has increased over time in all regions, whereas portfolio uncertainty increased over time in all regions but in Latin America, where this flow stabilized at the end of the sample. In turn, bank inflows volatility increased globally during the nineties and stabilized since the beginning of the century in all regions but Asia, where it increased further. This region registered the sharpest increase of total flows' volatility during the last decade.

[11] Table 2 only reports the summary of those volatilities estimated from GARCH(1,1) models with no convergence problems. They are reported only for illustrative reasons, as they are not directly comparable. Thus, we only consider those volatilities estimated from models where $\widehat{\alpha}_0$, $\widehat{\alpha}_1$ and $\widehat{\alpha}_2$ are greater than zero and $\widehat{\alpha}_1 + \widehat{\alpha}_2 < 1$. From the 48 countries of our sample, these conditions are fulfilled only in 12 and 8 countries for FDI and portfolio flows, respectively, and 16 countries for bank and total inflows. We estimate volatilities on a quarterly basis and transformed these into annual figures using the yearly average of quarterly estimates of σ_{it}. GARCH (1, 1) estimates are available upon request.

4 Volatility determinants

We use a large set of explanatory factors, which can be grouped in three categories: domestic macroeconomic, domestic financial and global variables. [12] See the Appendix B for a summary of variables and sources.

We use five global factors: the rate of growth of world GDP, a measure of global liquidity and three variables that portray conditions in the US economy (inflation, the 3-months T-bill rate and the value of the Standard & Poor's 500 stock exchange index).[13] Most of these variables have been identified by the relevant literature as 'push' determinants of the levels of capital flows in one or the other direction. However, their relationship with capital flows volatility is ambiguous. As global factors alter investors' risk aversion, they can affect capital flows' volatility. For instance, a decrease in world GDP growth and global liquidity or a rise in the US T-bills rate are likely to spark a flight to quality.

The domestic macroeconomic variables considered are per capita GDP and its rate of growth to capture both the level of economic development and dynamism of our sample countries; inflation, to approximate the 'quality' of macroeconomic policies; the stock of foreign exchange reserves in months of imports as a measure of vulnerability to balance of payment crises; and trade openness to assess their level of integration into global goods markets.

A priori, less developed countries are likely to display lower levels of volatility, as they rely primarily on official flows. However, this could also be expected from more stable advanced economies.[14] Consequently, we expect a non-linear relationship between economic development and capital flows' volatility. In turn, we expect capital flows to be more volatile in countries with higher inflation rates, as a result of erratic and distortionary monetary conditions. The stock of foreign exchange reserves can affect flows' volatility through various channels. On the one hand, low reserves may lead to liquidity crises and, therefore, higher volatility. On the other hand, larger stocks of foreign exchange reserves may reflect precisely countries' need to self-insure. Consequently, countries with larger reserves may display higher volatility. Following Martin and Rey (2006), we expect trade openness to correlate negatively with volatility. However, countries more reliant on international trade may be more vulnerable to changes in global conditions, especially if their export base is narrow, as in many of the commodities' exporters in

[12] We also regressed our volatility measure on a set of geopolitical and institutional factors that might be of relevance to explain the behavior of international capital flows. Nevertheless, the small sample size of this data set -around 150 observations for 28 countries- prevents a comparable joint estimation with the remaining explanatory factors, so that these variables are used in an alternative specification. The results, that show that institutional factors have some explanatory power, are available upon request. Given the relative time invariant character of our indicators we are confident that such variation is already captured by our country dummies.

[13] Global liquidity is measured as an index representing developments of a GDP-weighted sum of M2 measures for more than 50 countries. See Erce (2008) for details.

[14] More dynamic countries might attract more stable capital flows. It may also be that volatile capital flows are a hindrance to growth, which means that we cannot rule out the possibility that causality is running in the opposite direction (see Ferreira and Laux, 2009)

our sample. Hence, trade openness may be associated with higher volatility.

Finally, greater availability of financial data has allowed us to include six variables related to our sample countries' financial systems. A first set of factors focuses on domestic banking systems: ratios of commercial banks' assets, private credit and financial system's deposits to GDP, and interest rate spreads (the gap between the interest rates on deposits and loans). While higher asset, credit and deposit ratios should portray more developed domestic banking systems, high levels of domestic credit could signal episodes of economic overheating and lead to an increase in volatility. In turn, lower interest rate spreads should reflect more competitive systems. A second set of drivers focuses on equity markets: the ratio of stock market capitalization to GDP, and the stock market turnover ratio. A higher value for both variables should indicate more developed and liquid equity markets. Aghion et al. (2004) point at a non-linear relationship between the development of financial systems and capital flows' volatility. According to them, economies at an intermediate stage of financial development display higher volatility.

5 Methodology

5.1 The model

Our approach is similar to Neumann et al. (2009) and GFSR (2007) in the sense that once we obtain the dynamic volatility measure for all countries and types of capital flows, we construct a panel data set to analyze which factors explain the observed volatility patterns. The estimated equation follows this expression,

$$\sigma_{it} = x'_{it-1}\beta + \varepsilon_{it}, \qquad \forall i = 1, ..., N, \quad t = 1, ..., T, \tag{4}$$

where x_{it-1} is a $(J+1) \times 1$ vector of independent variables and β is a $(J+1) \times 1$ vector of unknown coefficients, $\beta = (\beta_0, ..., \beta_J)'$. In the estimation we include fixed country effects,

$$\varepsilon_{it} = \eta_i + \omega_{it} \tag{5}$$

where η_i is a country fixed effect and ω_{it} is an error term that can be serially and spatially correlated. The matrix $\mathbf{x_i} = (x'_{i1}, ..., x'_{iT})'$ contains the volatility determinants. All estimations were performed using lagged explanatory variables to minimize problems of endogeneity and match the estimator requirement of exogeneity.

Most of the previous dynamic studies on the sources of volatility have tried to overcome the problems posed by the existence of serially correlated errors. As with the rolling window approach, our procedure to approximate volatility implies that the residuals might have a moving average component, that is $cov(\omega_{it}, \omega_{it-k}) \neq 0$ for some $k \neq 0$. This is why a correction of the standard errors is required. Besides, due to contagion effects, the residuals could suffer from spatial (cross-sectional) correlation, $cov(\omega_{it}, \omega_{jt}) \neq 0$ for some $j \neq k$, which would again bias the estimated standard errors.[15] To cope with

[15] We used the cross-section dependence (CD) test by Pesaran (2004) to check for this possibility by analyzing the errors

both drawbacks we use the Driscoll and Kraay's (1998) correction for the covariance matrix estimator, which handles not only the usual serial correlation and heteroskedasticity problems, but also spatially correlated errors.[16]

5.2 Statistical inference

Before interpreting these results by type of determinant, we performed along the empirical exercise some tests that indicate that the three different factors have a time-variant and flow-specific impact on volatility.

First, to formally test if there is a different impact of certain volatility drivers in the last years of the sample, we perform a set of hypothesis tests for all types of capital flows and explanatory variables categories. Namely, we define a dummy variable, δ_t, which takes value 1 from 2000 onwards, that is, $\delta_t = I(t \geq 2000)$, where I is the indicator function.[17] If we denote $\beta^* = (\beta_0^*, ..., \beta_J^*)$ the shift coefficients, we can test for the null of structural break in 2000 estimating this equation

$$\sigma_{it} = x'_{it-1}\beta^1 + (\delta_t x_{it-1})'\beta^* + \varepsilon_{it}, \qquad \forall i = 1, ..., N, \quad t = 1, ..., T, \tag{6}$$

where, $\forall j = 1, ..., J$, β_j^1 are the coefficients for the subsample from 1980 to 1999, and β_j^* are the shift coefficients, in such a way that $\beta_j^2 = \beta_j^1 + \beta_j^*$ denote the parameters of the second subsample. If the break in volatility determinants does not exist and the overall regressors are structurally stable over the sample period, that is, $\beta_j^* = 0$ for all the explanatory variables, expression (6) simplifies to (4). The null of no structural break, $H_0 : \beta^* = 0$, can be tested by a Wald-type F test of this restriction.[18] The test statistics reported in Table 4 show that the null of stability is rejected for all types of capital flows and drivers, except for the effect of macroeconomic variables on portfolio flows volatilities.

Finally, we also perform a battery of tests to analyze whether the three categories of explanatory factors -global, macroeconomic or financial- have a differential effect on each type of flow. First, we compare the three types of flows pairwise. Then, we run the same regressions as in (4) but considering the difference in estimated volatilities as the dependent variable, that is,

$$\sigma_{it}^j - \sigma_{it}^k = x'_{it-1}\alpha + \nu_{it}, \qquad \forall i = 1, ..., N, \quad t = 1, ..., T, \quad j \neq k \tag{7}$$

where the super-index j and k in the volatility σ_{it} denotes the type of flow -FDI, portfolio or bank inflows-, so that a test for the null of $H_0 : \alpha = 0$ is equivalent to a test for $H_0 : \beta^j = \beta^k$. We also estimate a system of simultaneous equations, namely a SURE model, and performed Wald-type tests to

obtained from standard fixed effects estimation. The results showed that, indeed, the errors where spatially correlated and a correction was required.

[16] Estimation was performed with the Stata program `xtscc` (Hoechle, 2007). The estimator was allowed to identify the order of serial correlation.

[17] To simplify the analysis the breakpoint date is considered as exogenous.

[18] Joint test statistics performed for each category of explanatory variables and each capital flows' type, as well as statistics for the individual hypothesis of $H_0 : \beta_j^* = 0$ are available upon request.

jointly compare the coefficients of the three types of flows.[19] All these tests are reported in Table 5, which shows that all types of factors tend to have an impact that differs significantly across categories, with the relevant exception of global factors which appear to have a similar effect for FDI and portfolio flows. Joint tests provide further support for the idea of a similar impact of global factors across categories.

The interpretation of the tests in Table 4 and Table 5 are examined in more detail in the next discussion subsections.

6 Results and discussion

Tables 6, 7 and 8 report the estimates for FDI, portfolio and bank inflows' volatilities, whereas the results for overall flows can be found in Table 9.

6.1 Global factors

Our results confirm that over the last years global drivers have gained weight in shaping the volatility of the three types of flows. Thus, global factors appear to have a limited role in shaping the volatility of FDI flows for the full sample, but not from 2000 to 2006, as confirmed by the stability tests in Table 4. This may indicate that the forces triggered by globalization have intensified in recent years, which might partially offset its higher relation with the macroeconomic variables. For instance, the coefficients of US interest rates and inflation are found to be significant only from 2000 to 2006: higher interest rates in the US reduce the volatility of FDI flows, which coincides with the results in Neumann et al. (2009), and US inflation is linked to higher FDI volatility. World GDP growth is also associated with less volatile FDI flows, especially after 2000. Finally, global liquidity seems to increase the volatility of FDI flows for the full sample, and to reduce it during the period from 2000 to 2006.

Global factors also show some correlation with the volatility of portfolio flows, specially with US interest rates, S&P and global liquidity index. Nevertheless, this relation differs from that for FDI (see Table 5). On the other hand, the global variables that seem to be more closely related to the volatility of bank flows are the S&P index, US inflation, and global liquidity. While a higher S&P index appears to be associated with higher volatility, the opposite holds true for US inflation. In turn, global liquidity is associated with less volatile bank flows. However, this result is found not significant from 2000 onwards.

Finally, to complement our analysis we study the determinants of the volatility of total inflows, which is probably the most relevant variable for policy-makers. This allows us to assess the extent to which knowledge on the drivers of each type of flow can convey information on the determinants of total capital flows volatility. Nevertheless, the analysis for total flows should be interpreted with caution, as information about the behavior of specific categories of capital flows does not necessarily provide a useful

[19] Estimation of SURE models does not allow for the standard errors correction performed in the rest of the analysis, so that these last results should be interpreted cautiously.

forecast on the behavior of overall flows (see Claessens et al., 1995). In particular, global variables that seem to be more closely related with the volatility of total flows are the S&P index and US inflation. These results are in line with those for the disaggregated flows. Contrary to GFSR (2007), which finds a negative relation between volatility of overall inflows and global liquidity, our estimates do not find a significant relation between this two variables.

6.2 Domestic macroeconomic drivers

FDI volatility exhibit a high degree of association with macroeconomic variables. First, we find a significant non-linear relation between economic development, as measured by the GDP pc, and FDI, which means that richer countries tend to display more volatile flows. This finding is consistent with Aghion et al. (2004) and contrary to Neumann et al. (2009) and GFSR (2007). GDP pc is also a significant driver of bank inflows' volatility. We also find a negative link between reserves and volatility, whereas trade openness is less significant across regressions for the full sample.

Contrary to FDI, the volatility of portfolio flows is weakly correlated with domestic macroeconomic factors. The tests in Table 5 evidence more formally this different impact of macroeconomic factors on the volatility of FDI and portfolio flows. Regarding bank inflows, as in the case of FDI, there is also evidence of a non-linear relation between GDP per capita and the volatility of bank flows, as shown in Table 8. In line with Neumann et al. (2009), more dynamic economies display more volatile bank inflows. As opposed to FDI and portfolio flows' volatility, we find a robust link between high inflation and bank flows volatility. Finally, trade openness and reserves tend to reduce the volatility of bank flows, although this result is weakly significant.

Analogous to bank inflows, we find a non-linear relation between total flows' volatility and GDP per capita which is particularly strong for the full sample. Total flows replicate the robust link with reserve accumulation that was observed for FDI, but this correlation is present only for the whole sample period. We also find a weak negative relation between total flows volatility and inflation in the last sample period. However, these were years of unprecedented low inflation in developing and emerging economies, which suggests that this result should be read with caution. It might be that, in recent years, rather than capturing the high quality of macroeconomic policies, low inflation reflects a lack of dynamism in some of our sample countries.

6.3 Domestic financial drivers

Domestic financial factors do play an important role in shaping portfolio flows. This relationship has intensified over the years, as suggested by the structural breaks tests in Table 4 and has a differential impact on the volatility of portfolio and FDI flows (see Table 5). In line with Aghion et al. (2004), the volatility of portfolio flows has a non-linear relation with the development of stock markets. While relatively small stock markets seem to go hand in hand with higher volatility, as stock markets develop

portfolio flows become more stable. Interestingly, this non-linear relation reverses from 2000 to 2006. This result may be pointing at a rise in speculative activity after 2000. Deposits are positively associated with higher levels of volatility for the full sample. Probably, countries that have a bank-oriented funding approach are likely to experience more volatile portfolio flows as they rely less on stock market financing. However, from 2000 to 2006, higher levels of credit and deposits turn out to be related to less volatile portfolio flows. Contrary to FDI, the interest rate spread is not significant neither for the full sample nor for the most recent period. All in all, our results for the domestic financial variables are in contrast with those of Neumann et al. (2009), where no significant correlation is found with the exception of their indicator on financial openness.

As well as macroeconomic drivers, various domestic financial variables are found to have a significant relation with the volatility of FDI. First, the ratio of bank's assets to GDP is negatively associated with the volatility of FDI flows. Second, the positive coefficient of private credit to GDP could reflect the instability linked to overheating processes. Finally, for the full sample, interest rate spreads exhibit a positive relation with volatility, indicating that less competitive bank sectors could be associated with larger FDI swings. Converse to Broner and Rigobon (2005) and GFSR (2007), we find a positive relation between stock market development and FDI volatility, although this effect is not present from 2000 to 2006.

Regarding bank inflows, we find a negative relation between the size of the banking system and the volatility of bank flows. The higher the volume of private credit, the more volatile bank inflows are. In addition, we find a negative correlation between interest rate spreads and the volatility of bank flows, meaning that less competition reduces volatility. For the period 2000 to 2006 the relation between stock market development and bank inflows' volatility is significant across regressions, suggesting that, over the years, the development of domestic stock markets has gained importance as a determinant of the volatility of bank flows although this last result is not confirmed by the stability tests.

Finally, various domestic financial variables are found to have a significant relation with the volatility of total flows across different estimations. First, similar to FDI, we find that the ratio of deposit money bank's assets to GDP is negatively associated with the volatility of total flows and, for the full sample, the sign of the coefficient of private credit to GDP is also positive. Finally, from 2000 to 2006, interest rate spreads exhibit a positive relation with volatility, which indicates that less competitive banking sectors could be associated with larger swings in total flows.

7 Conclusions

In this paper we present evidence on the factors underlying the observed pattern of volatility for FDI, portfolio and bank inflows in emerging economies. From a technical point of view this work extends previous literature in two directions. First, we propose a proxy for capital flows' volatility based on the

measure developed by Engle and Gonzalo Rangel (2008) for macroeconomic variables. This enables us to overcome some serious weighting problems associated with other measures of volatility used in this literature. Second, we apply the panel data version of the Driscoll and Kraay's (1998) correction of the standard errors, which addresses not only heteroscedasticity and serial correlation, but also the spatial correlation of standard errors that could arise from contagion effects.

The conclusions reached in our empirical analysis illustrate some of the challenges facing policy-makers in their attempt to overcome the difficulties posed by volatile capital flows, given their different behavior across types. First of all, the forces unleashed by globalization have reduced the relative importance of country-specific factors in favor of global factors that are beyond the control of emerging economies. Indeed, our results show that global drivers have gained importance as determinants of capital flows' volatility in recent years.

This growing importance of global determinants in all types of flows is compounded by the conflicting impact on the volatility of the different types of capital flows of various domestic factors that may be targeted by policy-makers, in line with results found in the literature. For instance, trade openness reduces the volatility of portfolio and banking flows while increasing that of FDI, and less competition in domestic banking systems increases FDI's volatility at the expense of that of bank flows. Hence, it is not easy to identify a single policy track to reduce volatility across the board which, together with the increasing importance of global factors, could explain why some emerging economies have opted to "hedge" against the risk posed by the effects of volatility rather than addressing its roots.

On a more positive note, due precisely to the different dynamics of the three types of capital flows, our paper does identify some domestic determinants that can reduce the volatility of a given category of capital flows without increasing that of others. For instance, we find that domestic macroeconomic factors seem to be relevant to shape the volatility of FDI. In addition, our results show that even when a given factor has no impact or the opposite effect on the volatility of the different types of flows, one effect may dominate resulting in a reduction in the volatility of total flows. For instance, regarding domestic financial drivers, competition in the banking system reduces the volatility of total flows -beyond its conflicting effect on the volatility of FDI and bank flows-. In the search for financial and macroeconomic stability, when trying to foster the stability of the capital account, policy-makers should try to take advantage of these facts.

Appendix A: Quarterly capital flows by country

	FDI		Portfolio		Bank			FDI		Portfolio		Bank	
Country	Mean	SD	Mean	SD	Mean	SD	**Country**	Mean	SD	Mean	SD	Mean	SD
Albania	0.008	0.004	0.000	0.000	0.003	0.030	Lithuania	0.033	0.032	0.017	0.036	0.054	0.057
Argentina	0.004	0.006	0.001	0.014	-0.005	0.028	Malaysia	0.108	0.061	0.021	0.169	0.002	0.158
Bahamas	0.005	0.008	0.000	0.000	0.092	1.522	Mexico	0.005	0.003	0.002	0.008	0.002	0.010
Bangladesh	0.484	0.891	0.002	0.305	5.417	3.869	Moldova	0.011	0.009	-0.001	0.006	0.010	0.020
Bolivia	0.043	0.047	0.000	0.000	0.023	0.040	Morocco	0.036	0.041	0.002	0.011	-0.029	0.030
Brazil	0.016	0.015	0.013	0.060	-0.015	0.056	Myanmar	0.001	0.001	0.000	0.000	0.003	0.006
Bulgaria	0.059	0.064	0.007	0.036	0.022	0.092	Nepal	0.001	0.000	0.000	0.000	0.007	0.010
Cambodia	11.987	6.343	0.000	0.000	8.542	14.150	Nicaragua	0.011	0.007	0.000	0.003	-0.024	0.036
Chile	0.055	0.043	0.016	0.020	0.017	0.037	Pakistan	0.002	0.002	0.001	0.003	0.003	0.008
China	0.091	0.024	0.008	0.013	0.017	0.031	Peru	0.031	0.029	0.008	0.018	0.001	0.032
Colombia	0.036	0.030	0.010	0.021	0.002	0.026	Philippines	0.012	0.013	0.012	0.030	0.020	0.049
Croatia	0.046	0.041	0.018	0.041	0.059	0.090	Poland	0.035	0.020	0.023	0.034	0.006	0.025
Ecuador	0.043	0.022	-0.032	0.186	0.005	0.066	Czech Republic	0.056	0.046	0.020	0.029	0.041	0.066
Estonia	0.085	0.073	0.020	0.090	0.079	0.076	Romania	0.033	0.033	0.003	0.018	0.035	0.042
Ethiopia	0.004	0.005	0.000	0.000	0.003	0.011	Russia	0.014	0.014	0.003	0.031	0.002	0.049
Guatemala	0.003	0.005	0.000	0.005	0.005	0.011	Singapore	0.145	0.079	0.019	0.032	0.123	0.208
Hong Kong	0.159	0.138	0.099	0.167	-0.045	0.437	South Africa	0.001	0.006	0.004	0.010	0.001	0.006
Hungary	0.059	0.051	0.033	0.057	0.012	0.049	Sri Lanka	0.003	0.002	-0.001	0.002	0.011	0.013
India	0.004	0.006	0.004	0.007	0.013	0.011	Sudan	0.012	0.009	0.000	0.000	0.003	0.011
Indonesia	0.006	0.015	0.003	0.027	0.008	0.036	Thailand	0.023	0.018	0.011	0.019	0.008	0.083
Korea	0.005	0.006	0.014	0.020	0.014	0.043	Turkey	0.010	0.016	0.012	0.032	0.016	0.049
Lao PDR	0.007	0.010	0.000	0.000	-0.003	0.007	Ukraine	0.189	0.765	0.004	0.042	0.904	2.929
Latvia	0.046	0.029	0.009	0.021	0.119	0.098	Uruguay	0.009	0.005	0.007	0.016	-0.005	0.061
Lesotho	0.026	0.027	0.000	0.000	0.009	0.019	Venezuela	0.007	0.007	0.000	0.008	-0.002	0.006

SD: Standard deviation; Bank: Bank inflows.

Summary statistics of quarterly data on capital inflows over GDP expressed on a per unit basis by country and flows' types.

Appendix B: Variables and data sources

Capital inflows: Purchases by non-residents of domestic assets minus their sales of such assets. Source: International Financial Statistics (IFS), IMF. The series correspond to codes 78bed (Direct investment in reporting economy n.i.e.); 78bmd (Equity securities liabilities); 78bnd (Debt securities liabilities) and

78bid (Other investment liabilities); **GDP:** Annual percentage growth rate of GDP at market prices based on constant local currency. Source: IFS, IMF; **GDP pc:** GDP per capita (constant 2000 US$). Source: World Development Indicators (WDI), World Bank; **Inflation:** National consumer prices, (annual %). Source: WDI, World Bank; **Openness:** Degree of trade openness measured by the ratio of total trade to GDP. Total trade volume is the sum of goods exports (f.o.b.) and goods imports (c.i.f.). Source: WDI, World Bank; **Reserves:** Reserves in months of imports. Source: WDI, World Bank; **Bank Assets:** Deposit Money Bank Assets to GDP. Source: Financial Structure Database (FSD), World Bank; **Bank Credit:** Private Credit by Deposit Money Banks to GDP. Source: FSD, World Bank; **Bank Deposits:** Financial System Deposits to GDP. Source: FSD, World Bank; **Interest rate spread:** Lending rate minus deposit rate (%). WDI, World Bank; **Capitalization:** Stock Market Capitalization. Source: FSD, World Bank; **Turnover Ratio:** Stock Market Turnover Ratio. Source: FSD, World Bank; **3 months US T-Bill rate:** Source: Datastream; **S&P:** S&P 500 Index. Source: Datastream; **US Inflation:** US Inflation rate (annual %). Source: WDI, World Bank; **World GDP growth:** Source: WDI, World Bank; **Global Liquidity:** Index based on the aggregation of money and quasi-money (M2) over GDP for over 50 countries. Source: Erce (2008).

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		FDI					Portfolio					Bank inflows					Total				
		LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs
1980-2006	Mean	0.020	0.024	0.030	0.025	0.024	0.005	0.007	0.008	0.003	0.006	0.024	0.019	0.024	0.016	0.021	0.014	0.050	0.064	0.031	0.053
	SD	0.022	0.042	0.032	0.059	0.037	0.033	0.027	0.021	0.015	0.027	0.750	0.082	0.050	0.035	0.426	0.173	0.098	0.074	0.040	0.121
1980-1990	Mean	0.007	0.014	0.0005	0.003	0.008	0.003	0.003	0.001	−0.002	0.002	−0.029	0.034	0.0021	0.030	0.005	−0.011	0.052	0.003	0.033	0.016
	SD	0.009	0.029	0.001	0.008	0.019	0.033	0.008	0.003	0.001	0.021	0.247	0.043	0.051	0.039	0.158	0.244	0.063	0.052	0.045	0.157
1991-2000	Mean	0.029	0.030	0.031	0.043	0.031	0.008	0.009	0.008	0.010	0.009	0.074	0.009	0.022	0.012	0.032	0.033	0.047	0.063	0.030	0.070
	SD	0.025	0.047	0.026	0.089	0.043	0.038	0.041	0.020	0.024	0.034	0.598	0.110	0.046	0.028	0.331	0.086	0.116	0.063	0.037	0.090
2001-2006	Mean	0.032	0.032	0.048	0.047	0.039	0.002	0.010	0.014	0.003	0.008	0.042	0.008	0.044	−0.008	0.027	0.035	0.050	0.108	0.026	0.073
	SD	0.021	0.048	0.037	0.043	0.038	0.018	0.018	0.028	0.011	0.022	1.464	0.069	0.050	0.022	0.765	0.065	0.117	0.074	0.029	0.091

SD: standard deviation; LatAm: Latin America; Asia: Emerging Asia; Europe: Eastern Europe; EMEs: Aggregate of the four regions.

Table 1: Flows over GDP. Summary statistics.

	FDI			**Portfolio**			**Bank inflows**			**Total**		
	Vol_EG	Vol_RW	Vol_GARCH[1]	Vol_EG	Vol_RW	Vol_GARCH	Vol_EG	Vol_RW	Vol_GARCH	Vol_EG	Vol_RW	Vol_GARCH
Mean	0.118	0.009	0.010	0.104	0.009	0.0373	0.224	0.053	0.058	0.256	0.032	0.050
SD	0.248	0.013	0.011	0.079	0.019	0.0531	0.429	0.263	0.232	0.462	0.054	0.070
SK	0.653	0.846	1.145	0.253	0.785	1.1691	0.553	0.695	1.191	0.577	0.787	1.403
κ	3.027	2.922	3.934	2.450	2.741	3.7927	3.144	2.982	4.1432	3.007	2.859	5.144
$\rho(1)$	0.356	0.594	0.601	0.372	0.611	0.3338	0.271	0.552	0.453	0.257	0.520	0.395
Minimum	0	0	0.001	0	0	0.001	0.002	0	0	0.005	0	0
Maximumn	2.797	0.140	0.060	0.468	0.168	0.4749	4.134	5.853	3.181	4.215	1.192	0.723

Vol_EG: Volatility calculated with the measure based on Engle and Gonzalo Rangel (2008); Vol_RW: Volatility based on an annual rolling window; Vol_GARCH: Annual mean of the volatilities estimated by a quarterly GARCH (1,1) model; SD: Standard Deviation; SK: Skewness; κ: Kurtosis; $\rho(1)$: Autocorrelation of order 1.

[1]Vol_GARCH is calculated only for those quarterly series where converge of the GARCH(1,1) model is achieved. These conditions suit only in in 12 countries for FDI, 8 countries for portfolio flows and 16 countries for bank and total inflows.

Table 2: Volatility of capital flows measured by the procedure based on Engle and Gonzalo Rangel (2008), by an annual rolling window and by a GARCH(1,1) model estimation. Summary statistics.

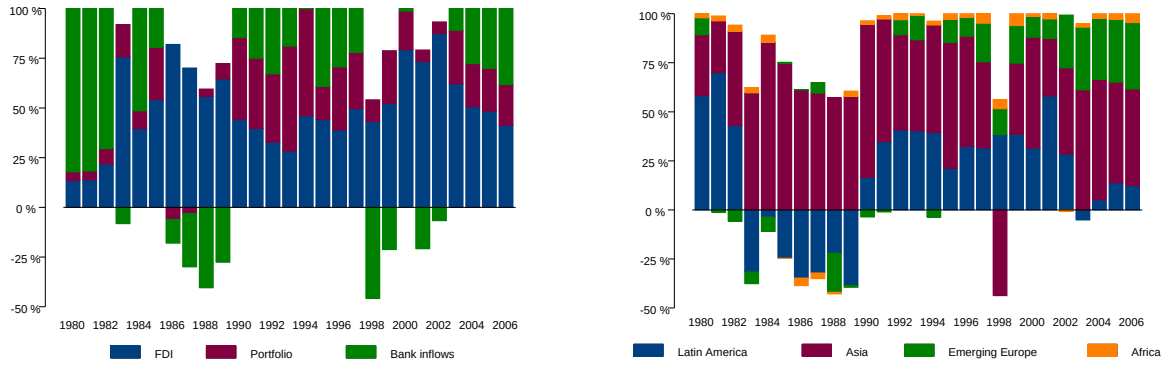

Figure 1: Capital inflows by type of flow and region.

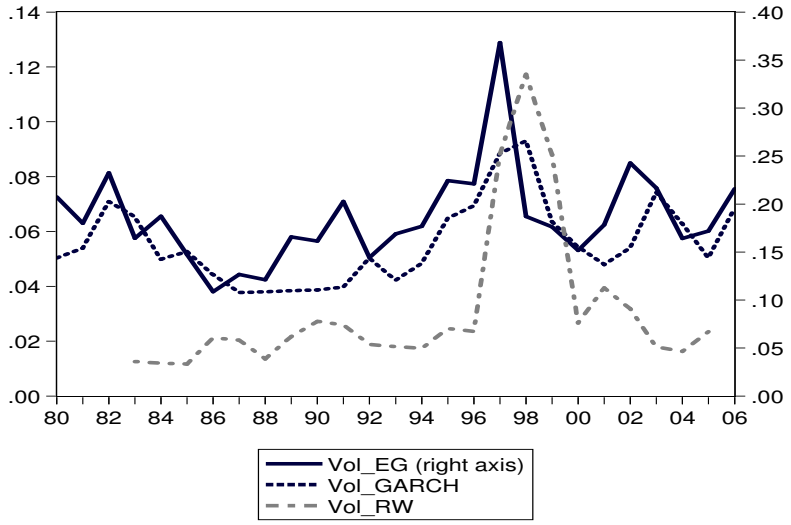

Figure 2: Thailand: Volatility of banking inflows over GDP. Comparison of volatility measures based on a rolling window (Vol_RW), a quarterly GARCH(1,1) model (Vol_GARCH) and the measure based on Engle and Gonzalo Rangel(2008) (Vol_EG).

	FDI					Portfolio					Bank inflows					Total				
	LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs	LatAm	Asia	Europe	Africa	EMEs
1980-2006	0.048	0.043	0.045	0.037	0.045	0.029	0.063	0.086	0.057	0.051	0.143	0.209	0.126	0.066	0.164	0.145	0.231	0.130	0.081	0.179
1980-1990	0.074	0.192	0.115	0.053	0.127	0.095	0.111	0.133	0.073	0.112	0.197	0.328	0.232	0.071	0.236	0.221	0.405	0.247	0.097	0.275
1991-2000	0.089	0.226	0.142	0.075	0.149	0.093	0.140	0.139	0.096	0.124	0.205	0.416	0.212	0.066	0.257	0.238	0.472	0.207	0.101	0.289
2001-2006	0.073	0.159	0.125	0.059	0.118	0.079	0.107	0.135	0.077	0.105	0.187	0.306	0.221	0.068	0.224	0.208	0.364	0.227	0.093	0.257

LatAm: Latin America; Asia: Emerging Asia; Europe: Eastern Europe; EMEs: Aggregate of the four regions.

Table 3: Summary statistics for the volatility of FDI, portfolio, bank inflows and total inflows over GDP calculated with the measure based on Engle and Gonzalo Rangel (2008).

	FDI	**Portfolio**	**Bank**	**Total**
Global	20.04^{***}	139.83^{***}	268.32^{***}	105.67^{***}
Macro	3.29^{**}	1.80	17.65^{***}	8.98^{***}
Financial	37.00^{***}	0.181	25.92^{***}	32.68^{***}

***. ** and *: Significant at 1%, 5% and 10%; F-statistic test for the null of stability after 2000 (H_0:$\beta^{*}= 0$).

Table 4: Stability tests for the null hypothesis that volatility drivers have not changed across time (exogenous breakpoint fixed at $t = 2000$).

	[1] H_0: FDI=PF=OTHER	[2] H_0: FDI=PF	[3] H_0: FDI=OTHER	[4] H_0: PF=OTHER
Global	0.072	0.293	0.000	0.000
Macroeconomic	0.000	0.000	0.000	0.001
Financial	0.084	0.000	0.001	0.000

p-values associated with their corresponding Wald-type tests; Column [1]: Joint tests computed from a SURE model; Columns [2] to [4]: Individual tests from a model for the difference in volatilities between each pair of flows' types.

Table 5: Tests for the null hypothesis that the effects of the drivers of volatilities are equal across capital flows' types.

	Macro		Financial		Global		Macro-Financial		Macro-Global		Domestic-Global	
	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006
GDP pc$_{t-1}$	$2.99E-05$	$5.19E-05$					$1.51E-05$	$3.64E-05$	$1.67E-05$	$3.95E-05$	$1.62E-05$	$2.82E-05$
	[3.87]***	[12.86]***					[2.02]*	[16.80]***	[3.02]***	[6.16]***	[5.79]***	[4.56]***
(GDP pc)$^2_{t-1}$	$-1.42E-09$	$-1.67E-09$					$-5.07E-10$	$-9.63E-10$	$-7.37E-10$	$-1.37E-09$	$-4.72E-10$	$-7.46E-10$
	[3.45]***	[3.70]***					[1.36]	[5.92]***	[3.80]***	[8.07]***	[3.29]***	[4.67]***
GDP pc growth$_{t-1}$	0.0002	0.0002					0.00013	0.0002	0.00072	0.0004	0.00097	0.0011
	[0.62]	[0.43]					[0.26]	[0.46]	[1.90]*	[1.03]	[3.11]***	[2.18]**
Inflation$_{t-1}$	$-1.37E-07$	$2.30E-06$					$-8.39E-06$	$1.88E-05$	$6.69E-06$	$6.72E-06$	$2.03E-06$	$2.46E-05$
	[0.10]	[0.23]					[1.10]	[1.61]	[5.10]***	[0.68]	[1.21]	[2.79]***
Openness$_{t-1}$	0.0004	0.0010					0.00012	$5.01E-05$	0.00019	0.0009	0.00022	0.0009
	[2.61]**	[2.59]**					[0.77]	[0.21]	[1.07]	[2.60]**	[0.92]	[2.32]**
Reserves$_{t-1}$	0.0005	−0.0014					−0.00398	−0.0068	−0.00335	−0.0027	−0.00297	−0.0058
	[0.55]	[1.07]					[3.49]***	[4.31]***	[2.25]**	[2.74]***	[1.67]	[4.04]***
Bank assets$_{t-1}$			−0.106	−0.1275			−0.0391	−0.0690			−0.0672	−0.0626
			[2.88]***	[6.15]***			[1.47]	[1.40]			[2.51]**	[3.93]***
Bank credit$_{t-1}$			0.1478	0.1418			0.0805	0.0888			0.142	0.148
			[5.32]***	[7.48]***			[3.43]***	[2.35]**			[7.54]***	[14.76]***
Bank deposits$_{t-1}$			−0.0057	−0.0526			−0.0199	0.0280			−0.0770	−0.130
			[0.29]	[3.90]***			[0.92]	[1.40]			[2.19]**	[5.19]***
Interest rate spread$_{t-1}$			$4.50E-05$	−0.0003			$6.19E-05$	−0.0004			$4.20E-05$	0.0002
			[13.07]***	[2.81]***			[2.64]**	[4.01]***			[5.71]***	[1.74]*
Capitalization$_{t-1}$			0.0559	0.0119			0.0460	0.0092				
			[3.43]***	[0.88]			[1.76]*	[0.63]				
(Capitalization)$^2_{t-1}$			−0.0115	−0.0121			−0.0108	−0.0048				
			[1.92]*	[2.37]**			[1.30]	[0.77]				
Turnover Ratio$_{t-1}$			0.0027	0.0037								
			[0.77]	[0.99]								
US 3 month T-Bill$_{t-1}$					−0.0021	−0.0030			0.0003	−0.0081	−0.0016	−0.0099
					[1.19]	[2.84]***			[0.14]	[6.40]***	[0.99]	[3.53]***
S&P$_{t-1}$					$-1.22E-05$	$4.45E-07$			$-7.30E-06$	$7.61E-07$	$1.09E-05$	$2.72E-05$
					[1.79]*	[0.34]			[0.78]	[0.31]	[1.71]*	[9.45]***
US inflation$_{t-1}$					0.0025	0.006			−0.0026	0.0064	−0.0012	0.0047
					[1.07]	[5.93]***			[1.27]	[4.83]***	[0.50]	[1.55]
World GDP growth$_{t-1}$					0.0012	−0.008			−0.0032	−0.0089	−0.0070	−0.0115
					[0.26]	[8.51]***			[1.34]	[7.05]***	[2.63]**	[5.17]***
Global liquidity$_{t-1}$					0.0006	−0.0003			0.0006	−0.0013	0.0002	−0.0014
					[2.90]***	[1.62]			[2.97]***	[6.22]***	[0.73]	[3.52]***
Constant	0.0172	−0.0393	0.0926	0.1649	0.0748	0.213	0.0643	0.0332	0.0246	0.256	0.105	0.317
	[1.32]	[1.55]	[11.54]***	[16.07]***	[2.23]**	[7.23]***	[4.60]***	[1.83]*	[1.03]	[5.84]***	[4.71]***	[4.68]***
Observations	557	247	333	212	549	308	324	208	472	286	353	232
Number of groups	44	42	33	33	47	47	33	33	45	45	38	38

DMB: Deposit money banks; FSD: Financial system deposits; SMC: Stock market capitalization; ***, ** and *: Significant at 1%, 5% and 10%

Table 6: Volatility of FDI flows on GDP. Regression results for the full sample and for 2000 to 2006.

	Macro		Financial		Global		Macro-Financial		Macro-Global		Domestic-Global	
	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006
GDP pc$_{t-1}$	$-2.74E-06$	$8.69E-06$					$2.15E-06$	$1.64E-06$	$5.68E-06$	$-3.43E-06$	$-2.27E-06$	$-2.11E-05$
	[0.37]	[0.69]					[0.29]	[0.35]	[0.85]	[1.14]	[0.39]	[4.12]***
(GDP pc)$^2_{t-1}$	$1.02E-09$	$1.07E-10$					$-2.15E-10$	$-1.84E-10$	$-1.48E-10$	$-1.05E-10$	$5.37E-11$	$5.29E-10$
	[1.81]*	[0.11]					[0.56]	[0.57]	[0.82]	[0.81]	[0.16]	[2.39]**
GDP pc growth$_{t-1}$	-0.0004	-0.0010					0.0001	-0.0002	-0.0006	$-3.04E-06$	$2.50E-05$	0.0003
	[0.94]	[3.57]***					[0.37]	[0.85]	[3.18]***	[0.01]	[0.09]	[1.02]
Inflation$_{t-1}$	$1.52E-05$	$-1.37E-05$					$-1.05E-05$	$-1.86E-05$	$9.39E-06$	$1.25E-05$	$9.69E-06$	$3.61E-06$
	[4.10]***	[0.77]					[2.48]**	[1.40]	[7.59]***	[0.83]	[1.06]	[0.24]
Openness$_{t-1}$	0.0004	-0.0002					$-6.21E-05$	0.0002	-0.0002	$7.55E-05$	-0.0004	-0.0001
	[1.59]	[1.46]					[0.27]	[1.04]	[0.92]	[0.44]	[2.04]**	[0.70]
Reserves$_{t-1}$	0.0045	-0.0007					-0.0005	-0.0009	0.0015	-0.0019	0.0001	-0.0004
	[2.40]**	[0.46]					[0.30]	[0.24]	[1.13]	[0.92]	[0.07]	[0.11]
Bank assets$_{t-1}$			0.1279	0.1651			0.0445	0.102			-0.0221	-0.0019
			[1.29]	[2.76]***			[0.46]	[1.25]			[0.41]	[0.04]
Bank credit$_{t-1}$			-0.1519	-0.1926			-0.124	-0.146			-0.0252	-0.0266
			[2.01]*	[4.33]***			[2.04]*	[2.37]**			[0.78]	[0.68]
Bank deposits$_{t-1}$			0.0471	-0.1185			0.151	-0.0298			0.0187	-0.111
			[1.62]	[5.75]***			[2.83]***	[1.38]			[0.61]	[6.50]***
Interest rate spread$_{t-1}$			$-5.20E-06$	$-1.27E-05$			$2.81E-05$	$7.13E-05$			$-3.25E-05$	0.0006
			[0.86]	[0.06]			[1.86]*	[0.34]			[0.90]	[2.76]***
Capitalization$_{t-1}$			0.0966	-0.0421			0.0653	-0.0570			-0.0149	-0.0600
			[3.51]***	[8.25]***			[2.12]**	[10.49]***			[0.89]	[10.70]***
(Capitalization)$^2_{t-1}$			-0.0305	0.0025			-0.0180	0.0095			0.0007	0.0095
			[4.59]***	[1.07]			[2.14]**	[1.90]*			[0.13]	[1.72]*
Turnover Ratio$_{t-1}$			0.0033	-0.0006								
			[0.89]	[0.14]								
US 3 month T-Bill$_{t-1}$					-0.0053	-0.0066			-0.0044	-0.0069	-0.0031	-0.0035
					[4.29]***	[2.92]***			[3.35]***	[2.33]**	[1.99]*	[1.22]
S&P$_{t-1}$					$-2.70E-06$	$1.03E-05$			$2.25E-06$	$1.71E-05$	$1.35E-05$	$3.11E-05$
					[0.34]	[3.07]***			[0.33]	[5.34]***	[2.43]**	[7.49]***
US inflation$_{t-1}$					0.0014	0.0051			0.0050	0.0040	-0.0010	0.0011
					[1.47]	[1.93]*			[3.59]*	[1.12]	[0.61]	[0.55]
World GDP growth$_{t-1}$					0.0033	-0.0008			0.0005	-0.0011	-0.0003	-0.0025
					[1.56]	[0.26]			[0.16]	[0.28]	[0.12]	[0.68]
Global liquidity$_{t-1}$					0.0002	-0.0004			$2.31E-05$	-0.0004	0.0002	0.0004
					[0.97]	[1.05]			[0.14]	[0.74]	[1.92]*	[1.36]
Constant	0.0498	0.1121	0.077	0.2031	0.114	0.201	0.0741	0.159	0.114	0.203	0.150	0.194
	[2.18]**	[5.37]***	[5.08]***	[22.22]***	[5.41]***	[2.81]***	[3.43]***	[8.23]***	[4.55]***	[2.75]***	[8.51]***	[3.94]***
Observations	471	216	316	199	439	254	306	195	400	247	267	195
Number of groups	37	36	31	31	38	38	31	31	38	38	31	31

DMB: Deposit money banks; FSD: Financial system deposits; SMC: Stock market capitalization; ***, ** and *: Significant at 1%, 5% and 10%

Table 7: Volatility of portfolio flows on GDP. Regression results for the full sample and for 2000 to 2006.

	Macro		Financial		Global		Macro-Financial		Macro-Global		Domestic-Global	
	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006
GDP pc$_{t-1}$	-0.0001	$-8.77E-06$					$-1.20E-05$	$4.54E-06$	$-7.23E-06$	$3.46E-06$	$-1.11E-05$	$-3.79E-06$
	[3.25]***	[0.18]					[2.37]**	[0.76]	[1.18]	[0.22]	[0.96]	[0.09]
(GDP pc)$^2_{t-1}$	$1.26E-08$	$2.53E-09$					$1.07E-09$	$7.06E-10$	$1.03E-09$	$8.03E-10$	$1.15E-09$	$9.01E-10$
	[3.54]***	[0.37]					[4.08]***	[1.79]*	[4.39]***	[2.46]**	[3.58]***	[0.88]
GDP pc growth$_{t-1}$	$8.16E-05$	0.0025					0.0012	0.0005	0.0008	0.0026	0.0023	0.0034
	[0.11]	[2.83]***					[3.05]***	[0.65]	[1.25]	[3.64]***	[2.62]**	[1.95]*
Inflation$_{t-1}$	$2.88E-06$	$7.46E-05$					$1.44E-05$	$7.30E-05$	$6.65E-06$	$9.07E-05$	$9.95E-06$	0.0001
	[1.37]	[3.37]***					[1.85]*	[6.43]***	[1.48]	[3.76]***	[1.73]*	[4.59]***
Openness$_{t-1}$	0.0004	-0.0008					$5.89E-05$	-0.0003	-0.0004	-0.0008	-0.0008	-0.0011
	[0.85]	[0.46]					[0.39]	[1.70]*	[0.87]	[0.55]	[0.92]	[0.63]
Reserves$_{t-1}$	0.0027	0.0055					-0.0002	-0.0001	-0.0058	0.0015	-0.0028	0.0009
	[1.05]	[1.45]					[0.12]	[0.06]	[2.72]***	[0.98]	[1.04]	[0.21]
Bank assets$_{t-1}$			-0.1557	-0.2618			-0.0915	-0.192			0.0253	-0.0395
			[2.06]**	[5.20]***			[2.43]**	[3.09]***			[0.39]	[0.89]
Bank credit$_{t-1}$			0.1476	0.2378			0.170	0.210			0.0301	0.0468
			[3.29]***	[8.40]***			[7.45]***	[8.51]***			[0.83]	[0.38]
Bank deposits$_{t-1}$			0.0058	0.1511			-0.0346	0.0385			0.0265	0.0938
			[0.12]	[3.61]***			[1.10]	[1.37]			[0.27]	[0.32]
Interest rate spread$_{t-1}$			$-9.67E-06$	-0.0008			$-4.64E-05$	-0.0012			$-3.10E-05$	-0.0009
			[2.14]**	[7.93]***			[2.12]**	[6.26]***			[1.47]	[0.54]
Capitalization$_{t-1}$			-0.0099	-0.1107			-0.0032	-0.104				
			[0.23]	[3.80]***			[0.09]	[3.25]***				
(Capitalization)$^2_{t-1}$			0.0027	0.0254			-0.0053	$1.38E-02$				
			[0.23]	[2.90]***			[0.54]	[1.07]				
Turnover Ratio$_{t-1}$			0.0272	0.0377								
			[2.50]**	[3.13]***								
US 3 month T-Bill$_{t-1}$					0.0132	-0.0020			0.00387	-0.0028	0.00195	-0.0042
					[3.63]***	[0.33]			[1.16]	[0.42]	[0.41]	[0.39]
S&P$_{t-1}$					$2.84E-05$	$7.14E-05$			$3.85E-05$	$7.71E-05$	$5.34E-05$	$8.86E-05$
					[1.33]	[6.67]***			[2.07]**	[7.01]***	[2.42]**	[3.03]***
US inflation$_{t-1}$					-0.0172	-0.026			-0.0162	-0.0229	-0.0238	-0.0296
					[3.46]***	[2.84]***			[4.32]***	[3.16]***	[5.78]***	[2.67]**
World GDP growth$_{t-1}$					0.0005	0.0093			0.0016	0.0059	-0.0004	0.0070
					[0.09]	[0.84]			[0.28]	[0.56]	[0.05]	[0.40]
Global liquidity$_{t-1}$					-0.0005	-0.0013			-0.0011	-0.0015	-0.0019	-0.0020
					[0.94]	[0.91]			[2.29]**	[0.88]	[3.76]***	[1.01]
Constant	0.2935	0.2239	0.1855	0.1828	0.290	0.427	0.173	0.208	0.431	0.463	0.560	0.588
	[8.82]***	[1.35]	[16.60]***	[14.14]***	[3.22]***	[1.74]*	[9.32]***	[9.15]***	[6.98]***	[1.74]*	[8.93]***	[1.67]
Observations	629	252	342	210	577	312	332	206	495	291	368	236
Number of groups	45	43	33	33	48	47	33	33	46	45	39	38

DMB: Deposit money banks; FSD: Financial system deposits; SMC: Stock market capitalization; ***, ** and *: Significant at 1%, 5% and 10%

Table 8: Volatility of bank inflows on GDP. Regression results for the full sample and for 2000 to 2006.

	Macro		Financial		Global		Macro-Financial		Macro-Global		Domestic-Global	
	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006
GDP pc$_{t-1}$	$-1.24E-04$	$3.90E-05$					$-1.81E-05$	$9.50E-06$	$-1.77E-05$	$-1.34E-05$	$-1.78E-05$	$1.38E-05$
	[3.00]***	[1.72]*					[3.79]***	[1.70]*	[3.20]***	[1.63]	[2.78]***	[2.68]**
(GDP pc)$^2_{t-1}$	$1.19E-08$	$-3.16E-09$					$5.98E-10$	$2.19E-10$	$1.13E-09$	$7.76E-10$	$8.43E-10$	$1.04E-10$
	[3.39]***	[1.40]					[3.27]***	[0.93]	[5.11]***	[2.54]**	[4.57]***	[0.52]
GDP pc growth$_{t-1}$	$3.28E-04$	0.0023					0.0018	-0.0002	0.0012	0.0017	0.0018	$7.36E-05$
	[0.36]	[3.19]***					[2.92]***	[0.66]	[2.63]**	[3.44]***	[2.81]**	[0.16]
Inflation$_{t-1}$	$2.96E-06$	$-4.89E-06$					$7.51E-06$	$-3.13E-05$	$1.46E-05$	$-1.22E-05$	$1.61E-05$	$-3.16E-05$
	[0.57]	[0.41]					[1.30]	[3.34]***	[9.42]***	[1.66]	[1.03]	[2.42]***
Openness$_{t-1}$	0.0006	0.0008					$-2.83E-04$	-0.0004	$-8.28E-05$	0.0011	-0.0004	-0.0004
	[1.54]	[0.81]					[0.87]	[0.98]	[0.25]	[1.57]	[1.32]	[0.83]
Reserves$_{t-1}$	0.0035	0.0051					-0.0039	-0.0007	-0.0051	0.0016	-0.0054	-0.0008
	[1.93]*	[1.38]					[2.09]**	[0.45]	[2.80]***	[1.43]	[2.76]***	[0.49]
Bank assets$_{t-1}$			-0.239	-0.3077			-0.207	-0.289			-0.219	-0.251
			[3.20]***	[3.48]***			[3.87]***	[4.03]***			[4.61]***	[2.70]**
Bank credit$_{t-1}$			0.1632	0.1441			0.150	0.105			0.122	0.0620
			[2.78]***	[2.24]**			[3.38]***	[1.99]*			[2.44]**	[0.88]
Bank deposits$_{t-1}$			0.1528	0.2128			0.226	0.205			0.192	0.231
			[5.36]***	[6.85]***			[5.29]***	[2.03]*			[3.45]***	[2.27]**
Interest rate spread$_{t-1}$			$2.95E-05$	0.0011			$8.69E-06$	$9.03E-04$			$-2.19E-05$	0.0009
			[6.02]***	[7.60]***			[0.43]	[10.09]***			[0.42]	[10.41]***
Capitalization$_{t-1}$			0.0257	-0.017			0.0345	-0.001				
			[1.00]	[1.64]			[1.45]	[0.10]				
(Capitalization)$^2_{t-1}$			-0.0063	-0.0038			-0.0101	0.0045				
			[1.10]	[0.73]			[1.26]	[0.82]				
Turnover Ratio$_{t-1}$			-0.0083	-0.0045								
			[0.78]	[0.74]								
US 3 month T-Bill$_{t-1}$					0.0078	-0.0025			-0.0025	0.0023	-0.0025	0.0094
					[2.01]*	[1.30]			[1.22]	[1.26]	[1.22]	[7.17]***
S&P$_{t-1}$					$4.00E-05$	$5.56E-05$			$3.28E-05$	$3.6E-05$	$3.28E-05$	$-6.80E-06$
					[2.98]***	[11.61]***			[3.66]***	[7.20]***	[3.66]***	[2.78]***
US inflation$_{t-1}$					-0.0088	-0.0149			-0.0082	-0.0113	-0.0082	-0.0037
					[3.07]***	[3.43]***			[2.29]**	[4.15]***	[2.29]**	[6.29]***
World GDP growth$_{t-1}$					-0.0061	-0.0008			0.0034	-0.0011	0.0034	-0.0095
					[1.22]	[0.16]			[0.82]	[0.24]	[0.82]	[21.48]***
Global liquidity$_{t-1}$					-0.0009	-0.0011			-0.0007	-0.0005	-0.0007	0.0001
					[2.61]**	[1.68]*			[1.97]*	[0.71]	[1.97]*	[0.72]
Constant	0.2938	0.0921	0.1959	0.2324	0.390	0.462	0.228	0.225	0.404	0.263	0.404	0.174
	[7.86]***	[1.28]	[21.00]***	[13.97]***	[8.17]***	[3.97]***	[10.47]***	[25.10]***	[9.20]***	[2.57]**	[9.20]***	[7.03]***
Observations	586	250	333	211	577	312	323	207	476	290	280	207
Number of groups	45	43	33	33	48	47	33	33	46	45	33	38

DMB: Deposit money banks; FSD: Financial system deposits; SMC: Stock market capitalization; ***, ** and *: Significant at 1%, 5% and 10%

Table 9: Volatility of total inflows on GDP. Regression results for the full sample and for 2000 to 2006.