MEASURING AND EXPLAINING THE VOLATILITY OF CAPITAL FLOWS TOWARDS EMERGING COUNTRIES

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Abstract

This paper analyzes the determinants of the volatility of different types of capital inflows to emerging countries. After calculating a variable that proxies capital flows volatility, we study its possible causality relations with a set of explanatory variables by type of flow through a panel data model. We show that in recent years the significance of global factors, beyond the control of emerging economies, has increased at the expense of that of country specific factors. In addition, various factors exhibit a non-robust effect on the volatility of the three different categories of capital flows, which poses additional challenges for policy-makers.

Keywords: Capital flows, volatility, panel data, emerging markets.

JEL classification: F21, F36, C22, C23

Introduction

Over the last decades, several emerging and developing economies have engaged in a far-reaching process of capital account liberalization. To a large extent, this process has been aimed at attracting foreign capital flows to spur economic development. However, due to a combination of policy failures and exogenous abrupt shifts in investors' appetite for risk, the world economy has witnessed recurrent sudden reversals in the direction of capital flows towards these economies. Such episodes have all too often triggered financial crises with sometimes devastating consequences for the real economy. As a result, the volatility of capital flows has increasingly become a source of concern for policy-makers. Consequently, a number of countries have tried to hedge against this risk through 'self-insurance', namely the accumulation of an unprecedented volume of foreign exchange reserves. However, this is a costly process both for reserve accumulators and for the global economy, which calls for the identification of other policy options to reduce the volatility of capital flows towards developing countries.

An ample body of the literature has tried to identify the determinants of the levels of capital flows. It distinguishes between pull factors, namely country-specific characteristics reflecting domestic fundamentals and investment opportunities and push factors that capture conditions in international financial markets[1]. In contrast, relatively few empirical papers have tried to identify the factors that shape capital flows volatility. Furthermore, these contributions present various drawbacks rooted in the methodology used to calculate capital flows volatility, the lack of disaggregation between types of capital flows and the limited number of potential explanatory factors considered.

Thus, the objective of this paper is to analyze the determinants of capital flows' volatility for a panel of emerging countries. Once volatility is measured through an accurate procedure for each type of capital flows (foreign direct investment -FDI onwards-, portfolio and other capital flows), we fit a panel data model for a sample of 48 emerging and developing countries for the period between 1980 and 2006 and also for the subsample from 2000 to 2006 to account for possible characteristic features of the most recent wave of capital flows towards emerging markets. The explanatory variables consists of a set of domestic macroeconomic and financial

[1] See Díaz-Cassou et al. (2006) for a comprehensive review on the determinants of the level of capital flows.

factors, as well as global, institutional and geopolitical factors.

From a methodological point of view, a first contribution relative to previous empirical literature is the proposed measure of capital flows' volatility. Rather than calculating the standard deviation of capital flows over a rolling window of annual data as in Neumann et al. (2006) or estimating a GARCH (1,1) model as in Bekaert and Harvey (1997), we propose a measure based on recent work by Engel and Gonzalo Rangel (2008) to approximate the volatility of macroeconomic variables.

The empirical results show that global factors have gained weight for the three types flows in the last decade, especially for FDI. This outcome further reduces the scope for policy-makers in emerging economies to implement policies aimed at reducing the volatility of capital inflows. Furthermore, various explanatory factors have a differential and time-varying impact on the volatility of each type of capital flows, which poses a challenge for policy-makers given that few variables appear to reduce the volatility of capital flows across the board.

The remainder of this paper is organized as follows. Section 1 briefly reviews the literature on the determinants of capital flows' volatility. Sections 2 and 3 introduce the data on capital flows and the explanatory variables, respectively. Section 4 describes the methodology of the paper and section 5 summarizes the main results of the empirical analysis. Finally, section 6 concludes.

1 Literature review

As mentioned above, previous literature on the determinants of the volatility of capital flows is rather scarce[2]. For instance, Broner and Rigobon (2005) analyze a sample of 58 countries to explore the reasons of the higher volatility of capital flows towards emerging countries than towards advanced economies. After fitting cross-country regressions, they conclude that the differences in the persistence of shocks to capital flows together with the likelihood of contagion turns out to explain most of the volatility differential. In a similar fashion, Alfaro et al. (2005) pool data from advanced and emerging economies and fit a series of cross-country regressions focused on total equity flows. To measure volatility they divide the

[2] Among the theoretical contributions it is worth highlighting the work by Bacchetta and van Wincoop (1998), Aghion et al. (2004) and Martin and Rey (2006).

standard deviations of total equity inflows per capita by the gross mean for the sample period. Their results point at the importance of institutional quality and sound macroeconomic policies to contain capital flows' volatility. Instead, bank credit tends to increase volatility.

Neumann et al. (2006) focus on the impact of financial liberalization on capital flows' volatility, measured as the standard deviation of capital flows on GDP within a five-year rolling window for FDI, portfolio and other debt flows. By means of a panel data analysis, they conclude that financial integration into global markets tends to increase the volatility of FDI in emerging economies, whereas it seems to reduce the volatility of other flows in mature economies. More recently, the Global Financial Stability Report (IMF, September 2007) uses a similar approach for a sample of developed and emerging countries. They conclude that financial openness and institutional quality are negatively correlated with the volatility of capital inflows. Alternatively, Bekaert and Harvey (1997) focus on prices rather than quantities and construct a panel where the independent variable is the estimated volatility obtained through a GARCH type estimation, rather than a rolling window. After a country-specific analysis on the determinants of stock markets volatility for 20 countries, they conclude that financial liberalization has tended to reduce the volatility of stock market returns. Their model specification uses a generalized least squares correction for both group-wise heteroskedasticity and serial correlation.

All in all, the relatively few existing empirical contributions use procedures to calculate capital flows' volatility which present serious caveats. Besides, not all studies disaggregate by type of flow and a limited number of explanatory variables is generally considered.

2 Data on capital flows and volatility measures

We collect quarterly data on capital inflows from the IMF's International Financial Statistics (IFS) for 48 emerging and less developed economies (see Appendix for the list of countries). As prior information is scarce, our sample period starts in 1980 and finishes in 2006. The sample is limited to countries with available information for the three types of capital flows for at least 10 years. However, we also include other countries that do not meet this standard for considering them

relatively important emerging markets (such as Singapore and South Africa) and some African countries (such as Lesotho or Ethiopia) in order to have a more geographically balanced sample.

Given that the literature on the levels of capital flows has highlighted differences in the determinants of the various types of investments[3], volatility dynamics for each category of capital flow may also turn out to be shaped by different determinants. Therefore, data for FDI, portfolio flows (which include debt securities and equity) and other flows (which include mostly cross-border bank lending) are collected[4].

Some stylized facts

As shown in Table 1, capital flows towards our sample countries dried up during the 1980's debt crisis, and recovered in the 1990's and thereafter. In spite of the growing importance of portfolio flows FDI is the most important category of capital flows, representing about half of total flows throughout our sample period. A preliminary analysis shows important variations and differences in the standard deviation of the various categories of capital flows. Indeed, the standard deviation of FDI and portfolio flows is significantly lower than that of other flows. This points at the stability and resilience of FDI flows even during financial crises, in line with the results of Lipsey (2001) or Sarno and Taylor (1999). Furthermore, from 1990 onwards the standard deviation of FDI is slightly larger than the corresponding standard deviation of portfolio flows. Finally, total capital flows on GDP exhibit excess skewness and kurtosis with respect to the normal distribution, suggesting the possibility of nonlinearities in the series under study.

Figure 1 shows the composition of net capital flows throughout the sample period by type of flow and region. The largest swings correspond to net other flows, 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, these swings were particularly pronounced in Latin America and Europe during the 1980's and in Latin America and Asia during the

[3] Goldstein and Razin (2006) explain formally some empirical regularities of FDI and portfolio inflows, such as the greater volatility of FDI relative to portfolio.

[4] In particular, the IFS series codes analyzed correspond to "Direct investment in reporting economy n.i.e."(78bed); "Equity securities liabilities"(78bmd); "Debt securities liabilities"(78bnd) and "Other investment liabilities"(78bid).

late 90's and early 00's. 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. This trend was especially clear in Latin America and Africa. However, net portfolio flows quickly turn negative or insignificant in periods of financial turbulence such as the 1980's or during more recent crises. In turn, FDI displays a more stable pattern. Its relative weight in total net capital flows tends to increase precisely during turbulent phases, as other sources of finance dry up.

How to measure capital flows volatility?

Measuring capital flows' volatility is not straightforward. Most existing papers have used the standard deviation of capital flows over a rolling window[5]. If capital inflows' volatility for country i in period t is denoted as vol_{it}, the standard deviation measure of volatility can be expressed as

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

with $\mu = \frac{1}{n} \sum_{j=t-(n-1)}^{t} flow_{ij}$, and $flow_{ij}$ is time j-country i capital inflow.

This measure is subject to at least three main drawbacks. First, it entails a loss of observations at the beginning of the sample, depending on the window's length. Second, as the dynamics of vol_{it} strongly depend on previous periods, it generates problems of endogeneity and serial correlation, which may result in non-robust estimates. Finally, the computation of vol_{it} assigns the same weight to $flow_{ij-1}$ and $flow_{ij-(n-1)}$ which gives an unrealistic measure of persistence in volatility dynamics, as it tends to smoothen processes. As a result, volatility tends to be under-estimated in the years in which a shock takes place, and over-estimated thereafter. This problem is especially acute with annual data, as in all previous empirical contributions. As mentioned in Section 1, Bekaert and Harvey (1997) suggested another measure based on fitting a GARCH (1,1) model to the rates of return in emerging equity markets. Nevertheless, this alternative procedure of volatility estimation also entails several caveats in our context. These are due to convergence problems of the GARCH estimation procedure resulting from data scarcity in many countries, particularly for portfolio flows. Nevertheless, for the

[5] Neumann et al. (2006) and GFSR (2007) use a five-year window. Alternative measures are based on the standard deviation around a simple time trend or a forecasted trend.

sake of robustness we also tried this measure[6].

To overcome these drawbacks, we use a measure of volatility based on the proxy proposed by Engel and Gonzalo Rangel (2008) to account for the uncertainty of macroeconomic variables, whose frequency is much lower than that of financial variables. Thus, we compute the absolute value of the residuals, v_{it}, from a suitable ARIMA model estimated for every country i and type of capital flow on a quarterly basis. We then obtain a proxy of the variance of capital flows following the expression:

$$\sigma_{it}^2 = \frac{1}{4} \sum_{j=t-2}^{t+1} |v_{ij}| \tag{2}$$

where the residuals are obtained from ARIMA models estimated by the automatic procedure of TSW of Caporello and Maravall (2004) after filtering out outliers greater than five standard deviations. As an illustration of the performance of the three alternative measures, Figure 2 compares them for FDI in Argentina.

Table 2 presents some summary statistics of the volatility of FDI, portfolio and other flows calculated with this measure. In line with the statistics of the rough data in Table 1, the mean volatility suggests that other investment flows displayed the highest level of volatility throughout the complete sample, followed by FDI and portfolio flows. However, volatility has increased over time for all types of flows, with both FDI and portfolio flows presenting larger increases than other flows since the early nineties. By regions, Asia displays the highest volatility for other flows and FDI, followed by Asia, Latin America and Africa. As regards temporal patterns, FDI volatility has increased over time in all regions, whereas portfolio volatility increased over time in all regions but Latin America, where they have stabilized at the end of the sample. As regards other flows volatility, it increased during the nineties globally and stabilized since the beginning of the century in Latin America and Asia. All these temporal patterns are also reflected in the standard deviation of volatility, which gives an idea of its dispersion across years and countries.

3 Volatility determinants

Contrary to the existing literature on the determinants of the volatility of capital flows, we use a large set of explanatory factors. These factors can be grouped in four broad categories: domestic (both macroeconomic and financial), global, legal

[6] Results of the GARCH(1,1) estimates are presented in Broto et al. (2008).

and institutional, and geopolitical. See Appendix for a summary of variables and sources.

Domestic factors

We distinguish between domestic macroeconomic and financial factors. The domestic macroeconomic variables considered are per capita GDP in levels and rates of growth to reflect both the level of economic development and dynamism of our sample countries; inflation and public deficits to capture the 'quality' of macroeconomic policies; the stock of foreign exchange reserves in months of imports as a measure of vulnerability to a balance of payment crisis; and, finally, trade openness to measure the level of integration into global goods markets.

A priori, less developed countries are likely to display low levels of volatility, as they rely primarily on official flows. However, low volatility could also be expected from advanced economies, as their economic outlook tends to be more stable. Consequently, we would expect the relationship between economic development and capital flows' volatility to be non-linear[7]. As regards the quality of macroeconomic policies, we would expect capital flows to be more volatile in countries with higher inflation rates and public deficits. Indeed, the former reflects erratic and distortionary monetary conditions and the latter increases the probability of undergoing a debt crisis. The stock of foreign exchange reserves in months of imports can affect flows' volatility through various channels. On the one hand, countries with low reserves are prone to suffer liquidity crises and, therefore, display more volatility. On the other hand, higher volumes of foreign exchange reserves may reflect, precisely, countries' need to self-insure against sudden stops. Consequently, and given that we are capturing correlations rather than causality, countries with larger reserves may display higher volatility[8]. Following Martin and Rey (2006), we expect trade openness to correlate negatively with capital flows' volatility. However, countries relying more heavily 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 included in our sample. In this context, if foreign investment

[7] Broner and Rigobon (2005) find a negative relation between per capita GDP and the volatility of total capital flows.

[8] In addition, the stock of foreign exchange reserves can give an idea on countries' level of currency interventionism. The relationship between interventionist practices and capital flows' volatility is, however, ambiguous and goes beyond the scope of this paper.

is directed mainly to the export sectors, trade openness may correlate with higher volatility.

Greater availability of financial data has allowed for a broadening of the traditional focus on macroeconomic factors as determinants of capital flows. In this sense, we include various measures to capture the main features of our sample countries' financial systems[9]. A first set of factors focus on the domestic banking systems: the 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). A second set of factors focus on equity markets: the ratio of stock market capitalization to GDP, and the stock market turnover ratio. While higher asset, credit and deposit ratios should portray more developed domestic banking systems, it is also true that high levels of domestic credit could signal episodes of over-heating which could increase volatility. In turn, lower interest rate spreads should reflect more competitive systems. As regards the second set of factors, a higher value for both indicators should indicate more developed and liquid equity markets. Aghion et al. (2004) point at a non-linear relationship between the level of development of domestic financial systems and capital flows' volatility. According to them, economies at an intermediate stage of financial development display a higher volatility.

Global factors

Surprisingly, global factors have received little attention in previous studies on the determinants of capital flows' volatility[10]. Conversely, we use two sets of global factors. In the first one we include both the rate of growth of world GDP and a measure of global liquidity and, in the second, we portray conditions in the US economy, including inflation, the 3-months T-bill rate and the value of the Standard & Poor's stock exchange index[11].

Most of these variables have been identified by the relevant literature as push

[9] A number of financial factors used in our analysis are shared with previous contributions. Broner and Rigobon (2005) use variables that capture the size of banks' domestic credit, while GFSR (2007) and Bekaert and Harvey (1997) use equity markets' turnover and capitalization.

[10] Only Neumann et al. (2006) and GFSR (2007), which use world interest rates and industrial production growth, and global liquidity and real interest rate spreads, respectively, include global factors.

[11] 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.

determinants of the levels of capital flows in one or the other direction. However, their relationship with capital flows volatility is ambiguous. This is so because global factors altering investors' risk aversion in one or the other direction tends to generate 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, while the opposite should hold true for a movement of these variables in the other direction.

Institutional and geopolitical factors

Most of the existing literature has considered institutional factors in the analysis. On top of the usual institutional variables, we include a series of geopolitical variables that may be of relevance to explain the behaviour of international capital flows.

We use the following institutional and legal variables: an average of the Freedom House country scores on economic and political liberties, the mean value of the International Country Risk Guide ratings for 'corruption', 'law and order' and 'bureaucracy quality', and dummy variables capturing the legal system's origin (English or French).

Drawing from Reynaud and Vauday (2007), we incorporate geopolitical factors in our regressions: a variable which adds up the volume of oil and gas reserves and the length of pipelines and a variable capturing countries' nuclear capacity for both civil and military purposes. In addition, we include our sample countries' IMF quotas. Although geopolitical considerations have recently gained weight as determinants of the allocation of international capital flows, no previous studies have assessed their impact on the volatility of capital flows.

In principle, we expect capital flows to be more volatile in countries with lesser levels of institutional quality. This would be consistent with previous studies. The link between capital flows' volatility and the origin of the legal system is unclear[12].

[12] Alfaro et al. (2005) find this variable to be non-significant.

4 Methodology

The first empirical contributions were cross-section OLS regressions with corrections for the standard errors. More recent studies such as Neumann et al. (2006) performed a dynamic panel data analysis of volatility with a two-step GMM estimator to account for the serial correlation resulting from the measure based on the rolling window. In a similar way, GFSR (2007) presents estimates obtained by GMM. This framework, which allows for cross-section fixed effects with a 2SLS instrument weighting matrix, uses lags of the independent variables as instruments. On the other hand, Bekaert and Harvey (1997) fit a GARCH model to measure volatility. Then, they employ both pooled-OLS and fixed effects (FE) estimators. In their more sophisticated specifications, Generalized Least Squares (GLS) are used, as they correct for group-wise heteroskedasticity and serial correlation.

The estimation approach in this paper is similar to that on Bekaert and Harvey (1997). Once we obtain our dynamic volatility measure based on Engle and Gonzalo Rangel (2008) for all countries and types of capital flows, we construct a panel data set to analyze the different types of explanatory factors of the observed patterns of volatility. The estimated equation is presented below,

$$\sigma_{it} = \Gamma X_{it} + \varepsilon_{it}. \tag{3}$$

In the estimation we included fixed country effects,

$$\varepsilon_{it} = \eta_i + \omega_{it} \tag{4}$$

where η_i represents the fixed effect and ω_{it} is an error term that as explained below can be serially and spatially correlated. The matrix X contains the various sets of factors aimed at explaining cross country differences.

As mentioned above, 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, both GARCH-based and ARIMA-based methods to calculate our dependent variables imply that the residuals will 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 on the standard errors is required.

There can be, however, an additional econometric problem. A priori it seems very plausible that, due for instance to contagion effects, the residuals can 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. Using the cross-section dependence (CD) test proposed by Pesaran (2004) we tested for this hypothesis and analyzed the errors obtained from standard fixed effects estimation. The results showed that, indeed, the errors where spatially correlated and a correction was required[13].

To cope with 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[14].

Finally, all estimations were performed using lagged variables for the explanatory variables, so as to minimize the possibility of suffering problems of endogeneity and matching the estimator requirement of exogeneity.

5 Results and discussion

For the sake of comprehensiveness, we perform a number of estimations using the four categories of explanatory variables. After modelling volatility by type of flow with respect to each group of explanatory variables individually, subsequent estimations combine different groups of factors. Due to the small number of observations on the institutional and geopolitical explanatory variables, these are used in an alternative specification. We obtain all the results for the full sample period and also for the subsample from 2000 to 2006 in order to disentangle possible differential characteristics of the determinants of the volatility during the most recent wave of capital flows.

FDI

Table 3 shows the results for the analysis on FDI flows' volatility for the full sample and for the period 2000 to 2006 respectively. Estimations for all groups of factors contain significant variables to explain the volatility of FDI flows. However, this significance changes when all factors are combined.

Regarding domestic macroeconomic factors, we find a significant non-linear relation between economic development, as measured by the GDP pc, and the volatility of FDI flows. This is consistent with Aghion et al. (2004) and contrary to Neumann et al. (2006) and GFSR (2007). Such an "inverted-U" shaped relation

[13] Results for these tests are not presented on the text.

[14] The estimator was allowed to identify the order of serial correlation.

implies that volatility tends to be higher in countries where GDP pc is around the average of the sample. Besides, there is also a negative relation between "self-insurance", as measured by reserves in months of imports, and the volatility of FDI flows. Furthermore, this negative correlation appears to be have intensified in recent years, suggesting that the accumulation of foreign exchange reserves by emerging economies has paid off in terms of less volatile FDI flows. The coefficients associated with trade openness are less significant across regressions for the full sample. However, there is some evidence that in between 2000 and 2006 more trade openness was associated with more volatile FDI flows. Results on inflation are inconclusive. Nevertheless, consistent with Alfaro et al. (2005), in the estimations in which inflation is found to be significant, its coefficient is positive.

Various domestic financial variables are found to have a significant relation with the volatility of FDI flows across different estimations. First, we find that the ratio of deposit money bank's assets to GDP, an indicator of the size of the banking system, is negatively associated with the volatility of FDI flows. Second, the positive sign of the coefficient of private credit to GDP could reflect the instability that may be associated with overheating processes. Finally, for the full sample, interest rate spreads exhibits a positive relation with volatility, indicating that less competitive banking sectors could be associated with larger swings in FDI flows. However, this coefficient changes sign for the period between 2000 and 2006. 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 for the period 2000 to 2006.

Finally, global factors appear to have a limited role in shaping the volatility of FDI flows for the full sample, but not for the period 2000 to 2006. This may indicate that the forces triggered by globalization have intensified in recent years. We find a positive non-robust relation with the S&P index. Interestingly, the coefficients associated with US interest rates and US inflation are found to be significant only for the period 2000 to 2006: higher interest rates in the US reduce the volatility of FDI flows, while inflation in the US is associated with a higher volatility of such flows. World GDP growth is also associated with less volatile FDI flows, especially in recent years. Finally, global liquidity seems to increase the volatility of FDI flows for the full sample, and to reduce it during the period 2000 to 2006. These outcomes, and especially those for the most recent part of our sample, tend to coincide with the findings in Neumann et al (2006), where a negative correlation

with US short term interest rate is found, and GFSR (2007) which finds a negative relation between volatility and global liquidity for total inflows.

Portfolio

Table 4 summarizes the estimates for the volatility of portfolio flows. The volatility of portfolio flows appears to be weakly correlated with domestic macroeconomic factors. More dynamic (as proxied by GDP pc growth) and open economies tend to have more stable portfolio flows, although this relation is rather weak. The results for domestic inflation, instead, are inconclusive as coefficients change sign across estimations for the full sample, and are found not significant for the period 2000 to 2006. As opposed to our results for FDI flows, the coefficient for self-insurance (reserves to imports) is not significant.

Domestic financial factors do play a stronger role in shaping the volatility of portfolio flows, especially for the most recent part of the sample. The volatility of portfolio flows has a non-linear relation with the development of stock markets, coinciding with Aghion et al. (2004). While relatively small stock markets seem to go hand in hand with a higher volatility, as the stock market develops (grows in size) it is associated with more stable portfolio flows. Interestingly, this result changes for the period between 2000 and 2006: although a non-linear relation between stock market development and volatility is still found for that period, it reverses, meaning that larger stock markets are associated with higher volatility. This may be pointing at a rise in speculative activity over recent years. Financial system deposits appear to be positively (albeit weakly) associated with higher levels of volatility for the full sample. A possible explanation may be that 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, when restricting the analysis to the period between 2000 and 2006, higher levels of credit and deposits turn out to be associated with less volatile portfolio flows. Converse to our findings for FDI, the interest rate spread (banking sector competition) is not significant neither for the full sample nor for the most recent period covered in our analysis.

Global factors show some correlation with the volatility of portfolio flows. As shown in columns 4, 7, and 8 higher interest rates in the USA are associated with lower levels of volatility. On the contrary, a rising S&P seems to be associated with more volatile flows, although this relation is not very robust. On the other hand, a

rise in global liquidity seems to be weakly associated with larger volatility, perhaps reflecting the role of speculative activity. This correlation, however, is found not significant for the most recent period covered in our analysis. All in all, these results are in contrast with those of Neumann et al. (2006), where no significant correlation is found with the exception of their indicator on financial openness.

Other Flows

As shown in Table 5, there is evidence of a non-linear relation between GDP per capita and the volatility of other flows. A robust result across estimations is that richer countries tend to display more volatile flows. Consistent with Neumann et al. (2006), more dynamic economies in terms of GDP pc growth also display a higher volatility of other flows. As opposed to our results for FDI and portfolio flows, we find a robust link between high inflation and more volatile other flows. Finally, trade openness and self-insurance (reserves in months of imports) tend to reduce the volatility of other flows, although this result is found not significant in most of the estimations.

Regarding domestic financial variables, we find a negative relation between the size (assets) of the banking system and the volatility of other flows. However, the coefficient associated with deposits is found not significant. Conversely, the higher the volume of private credit, the higher the volatility of other flows. In addition, we find a negative correlation between interest spreads (our measure of banking competition) and the volatility of other flows, meaning that less competition reduces volatility. There is only weak evidence of a relation between stock market development and the volatility of other flows for the full sample. However, for the period 2000 to 2006 this relation appears consistently across estimations, suggesting that, over the years, the development of domestic stock markets has gained importance as a determinant of the volatility of other flows.

The global variables that seem to be more closely related with the volatility of other flows are the S&P index, US inflation, and global liquidity. While a higher S&P index appears to be associated with a higher volatility, the opposite holds true for US inflation. In turn, global liquidity is associated with less volatile other flows. However, this result is found not significant for the period 2000 to 2006.

Geopolitical and Institutional factors

Table 6 summarizes the results on institutional and geopolitical factors both for the full sample and for the period from 2000 to 2006. For the full sample, economic and political stability appears to reduce the volatility of portfolio flows and to increase the volatility of other flows. However, both results disappear from 2000 to 2006. Surprisingly, the coefficient associated with the quality of governance is not found significant neither for FDI (in line with GFRS (2007)(b)) nor for portfolio or other flows. Our results point at more stable FDI flows in countries with better infrastructure to channel natural resources (proxied by the length of pipelines). The availability of oil and gas reserves reduces the volatility of portfolio flows. Conversely, FDI flows are more volatile in countries with abundant natural resources, at least when the full sample is considered. We find that nuclear power tends to reduce the volatility of FDI and portfolio flows, but not that of other flows. Finally, we also find a significant negative relation between IMF country quotas and the volatility of other flows during the period 2000 to 2006. This may be due to the fact that the size of quotas determines the amount of resources that countries can draw from the IMF, which certain investors may take into account when deciding on their exposures to emerging economies.

6 Conclusions

In this paper we present evidence on the factors underlying the observed pattern of volatility for FDI, portfolio and other flows in emerging economies. From a technical point of view this paper extends previous work in two directions: first, we propose the measure of capital flows' volatility based on Engel and Gonzalo Rangel (2008), which allows to overcome some serious weighting problems associated with previous measures; and second, we apply the panel data version (Hoechle (2006)) of the Driscoll and Kraay's (1998) correction of the standard errors, which addresses not only heteroskedasticity and serial correlation, but also the spatial correlation of standard errors that could arise from contagion effects.

A number of conclusions can be extracted from our empirical analysis. We show that various types of factors have a differential and time-varying impact on the volatility of the different categories of capital flows. In fact, no single factor appears to reduce capital flows' volatility across the board. Furthermore, some

factors have a conflicting impact on various types of flows. For instance, economic and political stability appears to reduce the volatility of portfolio flows but increases that of other flows; less competition in domestic banking systems increases FDI's volatility while reducing that of other flows. In addition, global factors -as measured by S&P stock index, US interest rates, US inflation and world growth- seem to have gained importance over time as determinants of flows' volatility. All of the above poses a serious challenge for policy-makers in emerging economies trying to stabilize capital inflows. Indeed, our results suggest that, not only is it difficult to find a single policy track effective to reduce the volatility of all types of flows simultaneously, but the forces of globalization have reduced the relative importance of country-specific factors in favour of global factors that are beyond their control.

However, we do find some specific factors that could be effective in reducing the volatility of certain flows without increasing that of others: inflation is robustly and positively related with the volatility of other flows; a higher volume of reserves tends to reduce the volatility of FDI; the size of the banking system in terms of assets reduces the volatility of FDI and other flows. An interesting result is the non-linear relationship between the development of domestic stock markets and the volatility of portfolio flows, which for the full sample suggests that portfolio flows tend to be more volatile in countries at an intermediate level of financial development. The sign of this correlation, however, has changed over time, and countries with a larger stock market have displayed a higher level of volatility more recently, which may reflect a rise in speculative activity and, therefore, may be linked to global conditions.

All in all, despite the increasing importance of global factors to explain the volatility of capital flows, domestic policies can still help reducing their volatility, in particular sound monetary policies and those directed to reinforce the depth and soundness of domestic financial system.

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Appendix: Sample countries and data sources

Sample countries		Data sources	
		Variable	**Source**
Albania	Lithuania	Capital flows	IFS
Argentina	Malaysia	GDP	IFS
Bahamas	Mexico	GDP per capita	WDI
Bangladesh	Moldova	Inflation	WDI
Bolivia	Morocco	Trade openness	WDI
Brazil	Myanmar	Reserves in months of imports	WDI
Bulgaria	Nepal	Public Deficit	IFS
Cambodia	Nicaragua	Deposit Money Bank Assets	FSD[2]
Chile	Pakistan	Private Credit by Deposit Money Banks	FSD
China	Peru	Financial System Deposits	FSD
Colombia	Philippines	Interest rate spread[1]	WDI
Croatia	Poland	Stock Market Capitalization	FSD
Ecuador	Czech Republic	Stock Market Turnover Ratio	FSD
Estonia	Romania	Quality of Governance	ICRG[3]
Ethiopia	Russia	Legal Origin	LLSV[4]
Guatemala	Singapore	Economic and Political Stability Index	Freedom House
Hong Kong	South Africa	Oil and Gas: Pipelines	RV[5]
Hungary	Sri Lanka	Oil and Gas: Reserves	RV[5]
India	Sudan	Nuclear Power	RV[5]
Indonesia	Thailand	IMF Quota	RV[5]
Korea	Turkey	3 months US T-Bill rate	Datastream
Lao PDR	Ukraine	S&P 500 Price Index	Datastream
Latvia	Uruguay	US Inflation rate	WDI
Lesotho	Venezuela	World GDP growth	WDI
		Global Liquidity	Erce (2008)

[1] Lending rate minus deposit rate

[2] Financial Structure Database (World Bank)

[3] International Country Risk Guide

[4] La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998)

[5] Reynaud and Vauday (2007)

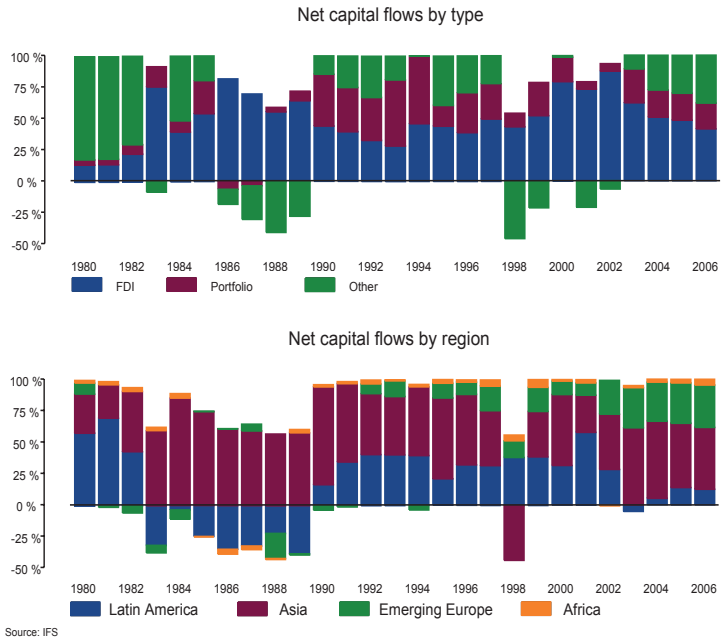

Figure 1: Net capital flows by type of flow and region.

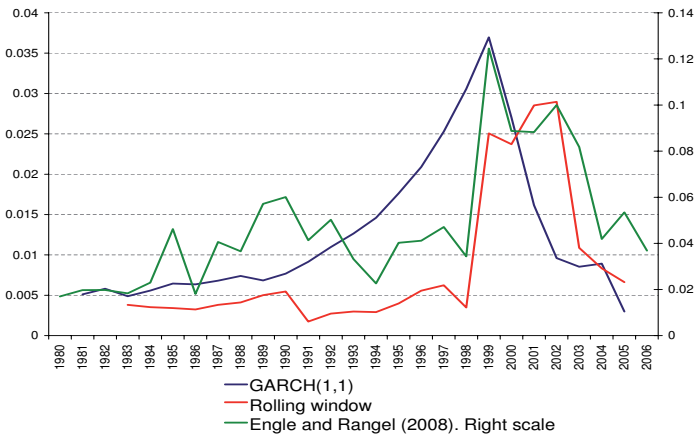

Figure 2: Argentine: Volatility of FDI over GDP. Comparison of different volatility measures.

	1980 − 2007				1980 − 1990				1991 − 2000				2001 − 2007			
Flow type	Mean	SD	SK	κ	Mean	SD	SK	κ	Mean	SD	SK	κ	Mean	SD	SK	κ
Portfolio	0.006	0.027	3.810*	100.7*	0.002	0.021	15.829*	284.103*	0.009	0.034	1.360*	67.337*	0.008	0.022	0.058	8.275*
Latin America	0.005	0.033	1.005*	91.577*	0.003	0.033	10.555*	119.541*	0.008	0.038	−5.996*	62.510*	0.002	0.018	−1.425*	6.515*
Asia	0.007	0.027	8.910*	102.303*	0.003	0.008	3.605*	20.079*	0.009	0.041	6.696*	52.665*	0.010	0.018	1.371*	4.989*
East Europe	0.008	0.021	0.769*	9.113*	0.001	0.003	3.916*	18.349*	0.008	0.020	1.353*	7.434*	0.014	0.028	−0.260*	7.141*
Africa	0.003	0.015	4.456*	25.329*	−0.002	0.001	−3.890*	20.049*	0.010	0.024	2.700*	9.346*	0.003	0.011	0.631*	5.579*
FDI	0.024	0.037	3.52*	21.94*	0.008	0.019	4.497*	26.592*	0.031	0.043	3.741*	22.848*	0.039	0.038	2.026*	8.271*
Latin America	0.020	0.022	1.597*	6.155*	0.007	0.009	1.920*	7.977*	0.029	0.025	1.439*	5.177*	0.032	0.021	0.411*	3.884*
Asia	0.024	0.042	3.293*	18.538*	0.014	0.029	2.974*	11.511*	0.030	0.047	3.565*	21.672*	0.032	0.048	2.243*	7.286*
East Europe	0.030	0.032	1.850*	9.013*	0.0005	0.001	2.969*	11.785*	0.031	0.026	0.991*	3.278	0.048	0.037	2.161*	9.755*
Africa	0.025	0.059	3.386*	14.602*	0.003	0.008	2.974*	12.954*	0.043	0.089	2.228*	6.368*	0.047	0.043	0.745	2.729
Other	0.021	0.426	−2.3*	213.7*	0.005	0.158	−14.403*	249.085*	0.032	0.331	4.719*	69.767*	0.027	0.765	−2.448*	90.204*
Latin America	0.024	0.750	−1.364*	70.387*	−0.029	0.247	−9.632*	105.407*	0.074	0.598	2.573*	21.698*	0.042	1.464	−1.325*	25.101*
Asia	0.019	0.082	−4.598*	56.908*	0.034	0.043	1.970*	9.752*	0.009	0.110	−4.725*	40.814*	0.008	0.069	1.131*	12.759*
East Europe	0.024	0.050	0.043*	6.044*	0.0021	0.051	−0.456	5.378*	0.022	0.046	−0.416*	6.523*	0.044	0.050	1.084*	5.044*
Africa	0.016	0.035	0.856*	3.361	0.030	0.039	0.714*	2.424	0.012	0.028	0.438	2.215	−0.008	0.022	−0.070	2.468
Total	0.053	0.121	−12.5*	290.5*	0.016	0.157	−14.618*	259.143*	0.070	0.090	−2.337*	31.888*	0.073	0.091	1.337*	9.532*
Latin America	0.014	0.173	−13.120*	208.001*	−0.011	0.244	−10.362*	116.617*	0.033	0.086	−3.078*	13.811*	0.035	0.065	−2.632*	14.551*
Asia	0.050	0.098	−0.440*	28.179*	0.052	0.063	2.378*	10.230*	0.047	0.116	−2.135*	29.975*	0.050	0.117	2.396*	9.399*
East Europe	0.064	0.074	0.374*	4.098*	0.003	0.052	−0.477	5.184*	0.063	0.063	0.154	4.500*	0.108	0.074	0.520	3.482
Africa	0.031	0.040	0.657*	2.917	0.033	0.045	0.812*	2.568	0.030	0.037	0.250	2.587	0.026	0.029	−0.651	2.558

* Significant at 5%; SK: Skewness; κ: Kurtosis

Table 1: Flows as percentage of GDP. Summary statistics.

		FDI					Portfolio					Other				
		Latin America	Asia	Europe	Africa	Total	Latin America	Asia	Europe	Africa	Total	Latin America	Asia	Europe	Africa	Total
1980-1990	Mean	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
	SD	0.023	0.036	0.009	0.016	0.031	0.015	0.068	0.021	0.008	0.054	0.211	0.411	0.024	0.030	0.326
	obs	56	88	4	10	158	43	61	4	6	114	55	123	4	42	224
1991-2000	Mean	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
	SD	0.043	0.468	0.059	0.032	0.288	0.057	0.106	0.063	0.037	0.081	0.242	0.641	0.207	0.042	0.420
	obs	108	131	102	23	364	75	97	84	10	266	109	140	101	50	400
2001-2006	Mean	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
	SD	0.049	0.429	0.058	0.050	0.254	0.043	0.103	0.064	0.013	0.076	0.305	0.835	0.137	0.034	0.507
	obs	74	86	83	21	264	64	69	78	9	220	73	82	83	29	267
1980-2006	Mean	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
	SD	0.044	0.389	0.061	0.040	0.248	0.053	0.100	0.063	0.028	0.079	0.257	0.630	0.177	0.036	0.429
	obs	238	305	189	54	786	182	227	166	25	600	237	345	188	121	891

Table 2: Summary statistics for the volatility of FDI, portfolio and other investment flows calculated with the measure based on Engle and Gonzalo Rangel (2008).

	Macro		Financial		Financial 2		Global		Macro-Financial		Macro-Financial		Macro-Global		Total	
	1980-2006	2000-2006	1980-2006	2000-2006	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	$2.99E-05$	$5.19E-05$							$1.76E-05$	$4.32E-05$	$1.51E-05$	$3.64E-05$	$1.67E-05$	$3.95E-05$	$1.62E-05$	$2.82E-05$
	$[3.87]^{***}$	$[12.86]^{***}$							$[3.92]^{***}$	$[9.83]^{***}$	$[2.02]^{*}$	$[16.80]^{***}$	$[3.02]^{***}$	$[6.16]^{***}$	$[5.79]^{***}$	$[4.56]^{***}$
(GDP pc)^2	$-1.42E-09$	$-1.67E-09$							$-7.40E-10$	$-1.26E-09$	$-5.07E-10$	$-9.63E-10$	$-7.37E-10$	$-1.37E-09$	$-4.72E-10$	$-7.46E-10$
	$[3.45]^{***}$	$[3.70]^{***}$							$[4.09]^{***}$	$[9.09]^{***}$	[1.36]	$[5.92]^{***}$	$[3.80]^{***}$	$[8.07]^{***}$	$[3.29]^{***}$	$[4.67]^{***}$
GDP pc growth	0.0002	0.0002							0.0006	0.0002	0.00013	0.0002	0.00072	0.0004	0.00097	0.0011
	[0.62]	[0.43]							$[2.20]^{**}$	[0.39]	[0.26]	[0.46]	$[1.90]^{*}$	[1.03]	$[3.11]^{***}$	$[2.18]^{**}$
Inflation	$-1.37E-07$	$2.30E-06$							$2.85E-07$	$3.88E-07$	$-8.39E-06$	$1.88E-05$	$6.69E-06$	$6.72E-06$	$2.03E-06$	$2.46E-05$
	[0.10]	[0.23]							[0.19]	[0.02]	[1.10]	[1.61]	$[5.10]^{***}$	[0.68]	[1.21]	$[2.79]^{***}$
Trade openness	0.0004	0.0010							0.00035	0.0010	0.00012	$5.01E-05$	0.00019	0.0009	0.00022	0.0009
	$[2.61]^{**}$	$[2.59]^{**}$							$[1.71]^{*}$	$[2.23]^{**}$	[0.77]	[0.21]	[1.07]	$[2.60]^{**}$	[0.92]	$[2.32]^{**}$
Reserves to imports	0.0005	−0.0014							−0.0010	−0.0048	−0.00398	−0.0068	−0.00335	−0.0027	−0.00297	−0.0058
	[0.55]	[1.07]							[0.66]	$[2.77]^{***}$	$[3.49]^{***}$	$[4.31]^{***}$	$[2.25]^{**}$	$[2.74]^{***}$	[1.67]	$[4.04]^{***}$
DMB assets/GDP			−0.0384	−0.0745	−0.106	−0.1275			−0.0740	−0.0292	−0.0391	−0.0690			−0.0672	−0.0626
			[1.28]	$[2.42]^{**}$	$[2.88]^{***}$	$[6.15]^{***}$			$[3.99]^{***}$	[1.66]	[1.47]	[1.40]			$[2.51]^{**}$	$[3.93]^{***}$
Private credit (DMB)/GDP			0.1201	0.1424	0.1478	0.1418			0.151	0.0886	0.0805	0.0888			0.142	0.148
			$[5.58]^{***}$	$[9.01]^{***}$	$[5.32]^{***}$	$[7.48]^{***}$			$[6.51]^{***}$	$[3.54]^{***}$	$[3.43]^{***}$	$[2.35]^{**}$			$[7.54]^{***}$	$[14.76]^{***}$
FSD/GDP			−0.0015	−0.0984	−0.0057	−0.0526			−0.0268	−0.0567	−0.0199	0.0280			−0.0770	−0.130
			[0.06]	$[3.47]^{***}$	[0.29]	$[3.90]^{***}$			[0.94]	$[1.85]^{*}$	[0.92]	[1.40]			$[2.19]^{**}$	$[5.19]^{***}$
Interest rate spread			$4.37E-05$	−0.0003	$4.50E-05$	−0.0003			$4.41E-05$	$-5.41E-05$	$6.19E-05$	−0.0004			$4.20E-05$	0.0002
			$[11.89]^{***}$	$[2.45]^{**}$	$[13.07]^{***}$	$[2.81]^{***}$			$[8.20]^{***}$	[0.71]	$[2.64]^{**}$	$[4.01]^{***}$			$[5.71]^{***}$	$[1.74]^{*}$
SMC/GDP					0.0559	0.0119					0.0460	0.0092				
					$[3.43]^{***}$	[0.88]					$[1.76]^{*}$	[0.63]				
Squared (SMC/GDP)					−0.0115	−0.0121					−0.0108	−0.0048				
					$[1.92]^{*}$	$[2.37]^{**}$					[1.30]	[0.77]				
Stock Market					0.0027	0.0037										
Turnover Ratio					[0.77]	[0.99]										
US 3 month T-Bill							−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 Index							$-1.22E-05$	$4.45E-07$					$-7.30E-06$	$7.61E-07$	$1.09E-05$	$2.72E-05$
							$[1.79]^{*}$	[0.34]					[0.78]	[0.31]	$[1.71]^{*}$	$[9.45]^{***}$
US inflation rate							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							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							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	0.101	0.186	0.0926	0.1649	0.0748	0.213	0.0557	−0.0072	0.0643	0.0332	0.0246	0.256	0.105	0.317
	[1.32]	[1.55]	$[11.18]^{***}$	$[23.03]^{***}$	$[11.54]^{***}$	$[16.07]^{***}$	$[2.23]^{**}$	$[7.23]^{***}$	$[3.93]^{***}$	[0.24]	$[4.60]^{***}$	$[1.83]^{*}$	[1.03]	$[5.84]^{***}$	$[4.71]^{***}$	$[4.68]^{***}$
Observations	557	247	481	252	333	212	549	308	441	232	324	208	472	286	353	232
Number of groups	44	42	40	40	33	33	47	47	39	38	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 3: Volatility of FDI flows on GDP. Regression results for the full sample and for 2000 to 2006.

	Macro		Financial		Financial 2		Global		Macro-Financial		Macro-Financial		Macro-Global		Total	
	1980-2006	2000-2006	1980-2006	2000-2006	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	$-2.74E-06$	$8.69E-06$							$6.33E-06$	$1.93E-05$	$2.15E-06$	$1.64E-06$	$5.68E-06$	$-3.43E-06$	$-2.27E-06$	$-2.11E-05$
	[0.37]	[0.69]							[1.35]	[6.41]***	[0.29]	[0.35]	[0.85]	[1.14]	[0.39]	[4.12]***
(GDP pc)^2	$1.02E-09$	$1.07E-10$							$-5.01E-10$	$-6.37E-10$	$-2.15E-10$	$-1.84E-10$	$-1.48E-10$	$-1.05E-10$	$5.37E-11$	$5.29E-10$
	[1.81]*	[0.11]							[2.22]**	[4.18]***	[0.56]	[0.57]	[0.82]	[0.81]	[0.16]	[2.39]**
GDP pc growth	−0.0004	−0.0010							0.0001	−0.0010	0.0001	−0.0002	−0.0006	$-3.04E-06$	$2.50E-05$	0.0003
	[0.94]	[3.57]***							[0.33]	[2.88]***	[0.37]	[0.85]	[3.18]***	[0.01]	[0.09]	[1.02]
Inflation	$1.52E-05$	$-1.37E-05$							$-9.76E-06$	$-1.75E-05$	$-1.05E-05$	$-1.86E-05$	$9.39E-06$	$1.25E-05$	$9.69E-06$	$3.61E-06$
	[4.10]***	[0.77]							[1.93]*	[1.26]	[2.48]**	[1.40]	[7.59]***	[0.83]	[1.06]	[0.24]
Trade openness	0.0004	−0.0002							$8.08E-05$	0.0002	$-6.21E-05$	0.0002	−0.0002	$7.55E-05$	−0.0004	−0.0001
	[1.59]	[1.46]							[0.33]	[1.25]	[0.27]	[1.04]	[0.92]	[0.44]	[2.04]**	[0.70]
Reserves to imports	0.0045	−0.0007							0.0010	−0.0012	−0.0005	−0.0009	0.0015	−0.0019	0.0001	−0.0004
	[2.40]**	[0.46]							[0.67]	[0.39]	[0.30]	[0.24]	[1.13]	[0.92]	[0.07]	[0.11]
DMB assets/GDP			0.0673	0.1542	0.1279	0.1651			0.0277	0.0528	0.0445	0.102			−0.0221	−0.0019
			[0.94]	[3.28]***	[1.29]	[2.76]***			[0.42]	[0.68]	[0.46]	[1.25]			[0.41]	[0.04]
Private credit (DMB)/GDP			−0.045	−0.1677	−0.1519	−0.1926			−0.0768	−0.134	−0.124	−0.146			−0.0252	−0.0266
			[0.75]	[4.61]***	[2.01]*	[4.33]***			[1.57]	[2.63]**	[2.04]*	[2.37]**			[0.78]	[0.68]
FSD/GDP			0.0508	−0.1176	0.0471	−0.1185			0.144	−0.0079	0.151	−0.0298			0.0187	−0.111
			[1.21]	[10.59]***	[1.62]	[5.75]***			[2.52]**	[0.35]	[2.83]***	[1.38]			[0.61]	[6.50]***
Interest rate spread			$-9.17E-06$	0.0001	$-5.20E-06$	$-1.27E-05$			$2.70E-05$	0.0002	$2.81E-05$	$7.13E-05$			$-3.25E-05$	0.0006
			[1.46]	[1.11]	[0.86]	[0.06]			[1.89]*	[0.84]	[1.86]*	[0.34]			[0.90]	[2.76]***
SMC/GDP					0.0966	−0.0421					0.0653	−0.0570			−0.0149	−0.0600
					[3.51]***	[8.25]***					[2.12]**	[10.49]***			[0.89]	[10.70]***
(SMC/GDP)^2					−0.0305	0.0025					−0.0180	0.0095			0.0007	0.0095
					[4.59]***	[1.07]					[2.14]**	[1.90]*			[0.13]	[1.72]*
Stock Market					0.0033	−0.0006										
Turnover Ratio					[0.89]	[0.14]										
US 3 month T-Bill							−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 Index							$-2.70E-06$	$1.03E-05$					$2.25E-06$	$1.71E-05$	$1.35E-05$	$3.11E-05$
							[0.34]	[3.07]***					[0.33]	[5.34]***	[2.43]**	[7.49]***
US inflation rate							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							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							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	0.0831	0.174	0.077	0.2031	0.114	0.201	0.0553	0.0926	0.0741	0.159	0.114	0.203	0.150	0.194
	[2.18]**	[5.37]***	[4.94]***	[21.21]***	[5.08]***	[22.22]***	[5.41]***	[2.81]***	[2.72]**	[5.61]***	[3.43]***	[8.23]***	[4.55]***	[2.75]***	[8.51]***	[3.94]***
Observations	471	216	370	211	316	199	439	254	357	204	306	195	400	247	267	195
Number of groups	37	36	32	32	31	31	38	38	32	32	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 4: Volatility of portfolio flows on GDP. Regression results for the full sample and for 2000 to 2006.

	Macro		Financial		Financial 2		Global		Macro-Financial		Macro-Financial		Macro-Global		Total	
	1980-2006	2000-2006	1980-2006	2000-2006	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	-0.0001	$-8.77E-06$							$-5.24E-05$	$-1.01E-05$	$-1.20E-05$	$4.54E-06$	$-7.23E-06$	$3.46E-06$	$-1.11E-05$	$-3.79E-06$
	[3.25]***	[0.18]							[1.50]	[1.04]	[2.37]**	[0.76]	[1.18]	[0.22]	[0.96]	[0.09]
(GDP pc)^2	$1.26E-08$	$2.53E-09$							$4.71E-09$	$7.77E-10$	$1.07E-09$	$7.06E-10$	$1.03E-09$	$8.03E-10$	$1.15E-09$	$9.01E-10$
	[3.54]***	[0.37]							[1.53]	[5.78]***	[4.08]***	[1.79]*	[4.39]***	[2.46]**	[3.58]***	[0.88]
GDP pc growth	$8.16E-05$	0.0025							0.0011	0.0021	0.0012	0.0005	0.0008	0.0026	0.0023	0.0034
	[0.11]	[2.83]***							[1.44]	[2.27]**	[3.05]***	[0.65]	[1.25]	[3.64]***	[2.62]**	[1.95]*
Inflation	$2.88E-06$	$7.46E-05$							$4.75E-06$	0.0001	$1.44E-05$	$7.30E-05$	$6.65E-06$	$9.07E-05$	$9.95E-06$	0.0001
	[1.37]	[3.37]***							[2.20]**	[2.45]**	[1.85]*	[6.43]***	[1.48]	[3.76]***	[1.73]*	[4.59]***
Trade openness	0.0004	-0.0008							-0.0005	-0.0011	$5.89E-05$	-0.0003	-0.0004	-0.0008	-0.0008	-0.0011
	[0.85]	[0.46]							[0.99]	[0.55]	[0.39]	[1.70]*	[0.87]	[0.55]	[0.92]	[0.63]
Reserves to imports	0.0027	0.0055							-0.0005	0.0031	-0.0002	-0.0001	-0.0058	0.0015	-0.0028	0.0009
	[1.05]	[1.45]							[0.23]	[0.73]	[0.12]	[0.06]	[2.72]***	[0.98]	[1.04]	[0.21]
DMB assets/GDP			0.0507	-0.0736	-0.1557	-0.2618			-0.0471	-0.0772	-0.0915	-0.192			0.0253	-0.0395
			[1.36]	[1.00]	[2.06]**	[5.20]***			[0.68]	[1.00]	[2.43]**	[3.09]***			[0.39]	[0.89]
Private credit (DMB)/GDP			0.1119	0.0799	0.1476	0.2378			0.215	0.125	0.170	0.210			0.0301	0.0468
			[3.28]***	[2.73]***	[3.29]***	[8.40]***			[2.50]**	[3.58]***	[7.45]***	[8.51]***			[0.83]	[0.38]
FSD/GDP			0.0083	0.1317	0.0058	0.1511			-0.0771	0.112	-0.0346	0.0385			0.0265	0.0938
			[0.18]	[5.56]***	[0.12]	[3.61]***			[0.84]	[0.72]	[1.10]	[1.37]			[0.27]	[0.32]
Interest rate spread			$5.39E-07$	-0.0014	$-9.67E-06$	-0.0008			$-2.20E-05$	-0.0014	$-4.64E-05$	-0.0012			$-3.10E-05$	-0.0009
			[0.06]	[2.37]**	[2.14]**	[7.93]***			[1.87]*	[1.32]	[2.12]**	[6.26]***			[1.47]	[0.54]
SMC/GDP					-0.0099	-0.1107					-0.0032	-0.104				
					[0.23]	[3.80]***					[0.09]	[3.25]***				
(SMC/GDP)^2					0.0027	0.0254					-0.0053	$1.38E-02$				
					[0.23]	[2.90]***					[0.54]	[1.07]				
Stock Market					0.0272	0.0377										
Turnover Ratio					[2.50]**	[3.13]***										
US 3 month T-Bill							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 Index							$2.84E-05$	$7.14E-05$					$3.85E-05$	$7.71E-05$	$5.34E-05$	$8.86E-05$
							[1.33]	[6.67]***					[2.07]**	[7.01]***	[2.42]**	[3.03]***
US inflation rate							-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							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							-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	0.167	0.235	0.1855	0.1828	0.290	0.427	0.270	0.292	0.173	0.208	0.431	0.463	0.560	0.588
	[8.82]***	[1.35]	[5.71]***	[9.20]***	[16.60]***	[14.14]***	[3.22]***	[1.74]*	[7.85]***	[2.19]**	[9.32]***	[9.15]***	[6.98]***	[1.74]*	[8.93]***	[1.67]
Observations	629	252	523	255	342	210	577	312	477	236	332	206	495	291	368	236
Number of groups	45	43	41	40	33	33	48	47	40	38	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 5: Volatility of other flows on GDP. Regression results for the full sample and for 2000 to 2006.

	FDI		Portfolio		Other	
	1980-2006	2000-2006	1980-2006	2000-2006	1980-2006	2000-2006
Economic-Political	−0.0068	0.0155	−0.0047	−0.0038	0.0119	0.0023
Stability	[1.23]	[1.61]	[3.33]***	[1.22]	[2.59]**	[0.52]
Quality of governance	0.0623	0.0869	−0.0153	0.0377	0.0019	−0.0091
	[1.00]	[0.99]	[0.71]	[1.05]	[0.04]	[0.25]
English legal origin	−0.0491	0.0112	0.0817	−0.0002	−0.211	−0.211
	[1.30]	[0.42]	[2.06]**	[0.05]	[8.21]***	[12.83]***
French legal origin	−0.0052	0.0147	−0.0040	−0.0356	0.0139	−0.0416
	[0.58]	[0.79]	[0.24]	[7.02]***	[1.45]	[7.56]***
Pipelines (oil and gas)	$-1.02E-06$	$-1.82E-06$	$-1.29E-07$	$3.93E-07$	$7.61E-07$	$2.63E-08$
	[2.96]***	[4.55]***	[0.25]	[1.62]	[3.90]***	[0.11]
Reserves (oil and gas)	0.0001	$2.23E-05$	−0.0001	$-7.04E-05$	$-7.04E-05$	0.0003
	[3.95]***	[0.27]	[2.00]*	[2.26]**	[0.51]	[5.64]***
Nuclear power	$-2.25E-06$	$-3.95E-06$	$-2.57E-06$	$-3.22E-06$	$2.36E-07$	$1.61E-06$
	[1.81]*	[2.63]**	[2.53]**	[2.10]**	[0.19]	[0.85]
IMF quota	$7.00E-09$	$1.51E-08$	$1.25E-08$	$2.35E-09$	$3.51E-09$	$-3.18E-08$
	[1.83]*	[1.61]	[1.34]	[0.79]	[0.22]	[6.32]***
Constant	0.124	0.0209	0.129	0.141	0.220	0.326
	[3.03]***	[0.26]	[7.65]***	[4.57]***	[4.78]***	[8.75]***
Observations	189	103	148	84	206	110
Number of groups	32	28	28	24	33	29

***. ** and *: Significant at 1%, 5% and 10%

Table 6: Institutional and geopolitical factors. Regression results by type flow for the full sample and for 2000 to 2006.

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