Overreaction in Capital Flows to Emerging Markets: Booms and Sudden Stops

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Abstract

This paper tests the overreaction hypothesis of capital flows to emerging markets. Using excessive capital flows episodes and other of deep contractions we found that a surge in capital flows or a capital boom can predict to sharp contractions or sudden stops. We use a large list of possible economic fundamentals as control variables and the result shows the best predictor of a sudden stop is a year of capital boom. When the capital boom episode is longer than one year the probability of suffering a sudden stop the next year is higher. These results are interesting for two reasons: because they are opposite to other studies that emphasize the worsening of a particular economic variable as a cause of a sudden stop and because of the much known negative real effects of sudden stops.

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1. Introduction

Informal claims on overreaction in financial markets seem arise more frequently than they are admitted by economists and analysts. The latter feel more comfortable anchoring stock prices movements to informed expectations on future fundamentals. However, in a seminal work De Bondt and Thaler (1985) evaluated the overreaction in the stock market and proved that, as occurs in many other human activities, financial markets showed an excessive reaction to new information or unexpected events. One of the main conclusions of De Bondt and Thaler was that the pronounced reversion in prices (negative returns) could be predictable according to the observation of extreme previous positive returns, that is, the upward overreaction subsequently calls for a dramatic adjustment.

An important detail is what literature identifies as overreaction. This identification is related to psychological factors that push the price far from what would be determined by fundamental factors. Consequently, examples of markets with frequent overreaction behaviour are those showing excess of volatility. Such is the case of capital flows to emerging markets, where an unexplained volatility has been found. In a very illustrative paper, Broner and Rigobon (2006) showed that capital flows to emerging markets are more volatile than those to developed countries. Using GDP per capita, inflation rates, real depreciation of exchange rates, terms of trade and interest rates from a set of emerging countries, the standard deviation of the error from panel estimations was greater than the error from a panel using data for developed countries in more than 60%. This standard deviation was deeply reduced using own lags of capital flows and contagion variables.

Our approach is different. We focus in the predictive power of capital flows bonanza on subsequent and sharp reversions of capital flows, also named sudden stops, as an

overreaction display. We define episodes of large capital flows that we call capital boom to emerging markets those that are largely unusual as determined by a standard deviation over the historical mean and are at least a five percentage of GDP. Based on a paper of Guidotti et al. (2004) we define periods of abrupt reversions or sudden stops in a very close way. Similarly to the findings in stock prices, our results indicate that a capital boom period predicts a latter sudden stop. If the capital boom is longer, the probability of a sudden stop will be greater.

In our approach, emerging markets should be seen as an asset class for financial markets.[1] This view has been confirmed by Leijonhufvud (2007) indicating that financial institutions have separate business units that manage profit and loss targets for their investments to emerging markets. Leijonhufvud stresses this organizational construct to accuse the financial markets to be responsible for the risk concentration in emerging markets and the consequent formation of bubbles in asset prices. In addition, managers and employees at financial institutions have compensation systems "which link annual bonus payments to the amount of net income an employee has generated for the firm or its clients in a given year directly encourage employees to focus on short-term income opportunities" (Leijonhufvud, 2007). To strengthen these ideas we can mention a test performed by Kamisnky et al. (2004) using monthly and quarterly data proved the existence of chartist strategies (buy winners and sell losers) and contagion trading in mutual funds dedicated to Latin America. These strategies were proved stronger during crises.

In this paper we use the financial account of balance of payments as capital flows and through a multivariate analysis of the probability of suffering a sudden stop we test the relevance of the prior capital boom. A capital boom year is a period dominated by

[1] It is a direct application of traditional model of Kindleberger (2005) of financial crises. In Kindleberger's model the participants in financial markets are exposed to suffer manias and panics for an asset class.

short run chartist strategies as described previously and the probability found of carrying on a capital boom the next year is significant and very similar to the probability of suffering a sudden stop. However, as the capital boom is longer greater will be the probability of a consequent sudden stop and the probability of a capital boom will vanish.

In contrast to other studies such as Edwards (2007), Calvo at al. (2004) or Cavallo and Frankel (2004), who attributed domestic variables the cause of sudden stops, our results point to these episodes (some times a case of downward overreaction) are sharp adjustments to prior upward overreaction periods. But it does not mean that fundamentals are unimportant to prevent a sudden stop episode. As a matter of fact, large capital flows can deteriorate some macroeconomic variables such as the current account deficit, the consequent deep appreciation of the real exchange rate, the excessive private debt to bank sector, or the mismatch of the balance sheet of firms and banks that receive flows in foreign money and that can trigger a massive withdrawal.[2] However, many of these variables are not robust in its predictive power which tempts us to think large capital flows are the best indicator of this worsening in the recipient economies.

The rest of the paper is organized as follows. The next section shows the definitions of boom and sudden stop episodes. Section 3 describes the methodological analysis. Section 4 and Section 5 present our main results and some robustness exercises respectively. Finally, Section 6 provides some discussion and concluding remarks.

2. Definition of Boom and Sudden Stop Periods

We use annual data for 42 emerging economies in the period 1976 - 2003. We chose that period trying to cover the most known crises in a number of countries which might

[2] A recent discussion can be seen in Reinhart and Reinhart (2008)

lead to obtain consistent estimators based on the asymptotic theory of panels. The complete list of countries is shown in the Appendix

2.1 Boom Episodes:

We define a year of capital boom when the financial account of the balance of payments is a standard deviation above its mean and is at least 5% of the GDP. Thus, there is a capital boom in the year t when $F_{it} = 1$ according to the following rule:

$$FF_{it} = \begin{cases} 1 \; if \; F_{it} > \overline{F}_t + \sigma_{F_i} \; and \frac{F_{it}}{GDP_{it}} > 5\% \\ \\ 0 \; \text{otherwise} \end{cases} \qquad (1)$$

where F_{it} is the value of the financial account of country i in year t (current US dollars deflated by the US consumer price index), $\overline{F}_i$ is its mean for the entire period and σ_{F_i} is its standard deviation. By using as our definition of capital boom requiring that the capital flows are one standard deviation above the mean we assure the unusual character of this episode. The normalization by GDP is a way to show a big deviation of one of the most important fundamentals. We prefer to use the level of capital flows rather than the annual change because the latter could give the idea of sudden increases, however, our objective is to get not only big increases but high inflows received by the economies. In the period 1976-2003 for the 42 countries in our sample we observe 152 capital booms, a 13% of the sample. In the Appendix we show the list of these episodes.

2.2 Sudden Stop Episodes:

Following Guidotti et al. (2004), we identify a sudden stop of capital flows when the annual change in the financial account is one standard deviation below its mean and is

5% above the GDP, measured in absolute value. Concretely, a country will suffer a sudden stop when $SS_{it} = 1$ according to the following rule:

$$SS_{it} \begin{cases} 1 \; if \; \Delta F_{it} < \overline{\Delta F_i} - \sigma_{\Delta F_i} \; and \left| \frac{\Delta F_{it}}{GDP_{it}} \right| \geq 5\%, \; whenever \; F_{it-1} > 0 \; and \; FF_{it} = 0 \\ 0 \text{ otherwise} \end{cases} \quad (2)$$

where ΔF_{it} is the change in the financial account of country i in year t, $\overline{\Delta F_i}$ is the average change in the financial account of country i over the sample period and $\sigma_{\Delta F_i}$ is its standard deviation. In the case of sudden stops, we are interested not in the absolute value of capital flows but in a significant decline from the preceding year. Again, as with capital booms, the joint condition applied to classify an event as a sudden stop works complementarily. Thus, countries with little volatility in capital flows can have episodes where a standard deviation below the mean implies a minor contraction, however, to fix a share of GDP guarantees a larger contraction. Since our interest is to identify the start of a contraction in capital inflow, whenever a sudden stop in a particular year is followed by another sudden stop the following year, only the first contraction will be considered to be a sudden stop. As noted in definition (2), we discard episodes which are both sudden stops and capital booms, as per definition (1). In our sample, we found 74 episodes that qualify for sudden stops, a 7% of the sample. The annual distribution of sudden stops is shown in the Appendix.

A view of these episodes can be seen in Figure 1. The horizontal line is placed a standard deviation above the mean for each country. The shadowed region shows the drop in capital flows that corresponds to a sudden stop. Sudden stops look as sharp adjustments after periods of consecutive booms.

[Insert Figure 1]

In Table 1 we show the average contraction of capital flows as a share of GDP occurring two years after a period of three years of capital boom. This contraction is always higher than after three-year period of positive capital inflows in tranquil periods[3] and significantly different for all the geographical regions considered with the exception of Europe. Another relevant characteristic is that the average growth rate of GDP after two years of this large period of capital boom is less (and even sometimes negative) than after two years from those episodes of positive capital inflows. Again, this difference is significant unlike Europe. This negative effect of capital booms has renewed interest in these episodes as is noticed in a recent paper of Reinhart and Reinhart (2008).

[Insert Table 1]

3. Multivariate Probit Analysis

Being Φ the standard normal distribution, we estimate a panel probit with heterogeneous unobserved effects. For the boom episodes we estimate the following equation:

$$\Pr(FF_{it} = 1 / FF_{it-1}, ContFF_{it}, NonFDI_{it-1}, \mathbf{X}_{it-1}, c_i) = \Phi(\gamma_f FF_{it-1} + \gamma_c ContFF_{it} + \gamma_{nf} NonFDI_{it-1} + \mathbf{X}_{it-1}\beta + c_i) \quad (3)$$

where ContFF is a binary contagion variable taking value 1 when the number of boom episodes in a particular year and the year before in other countries of the sample exceeds twice the average annual number of booms. NonFDI is the share of GDP that represents the type of capital flows different to FDI in the financial account, **X** is a matrix of control variables and c is the unobserved country specific effect.

[3] 3 years after sudden stop episodes are discarded in the calculus of positive capital inflows in tranquil periods.

The FF lagged one period describes the feedback effect in euphoric phases. According to Kindleberger (2005) the psychology of investors strengthens these periods of bonanza because of the knowledge of large financial investments in some emerging country done for the rest of participants in the international financial markets that attracts more investments and build overconfidence in these strategies day by day, month by month or year by year. This variable is a way to consider the chartist strategies that are used for institutions when the capital flows are high. The inclusion of NonFDI variable makes sense with our theoretical support because this kind of flows generally has a shorter horizon than FDI and is susceptible to be checked more frequently according to the new information received.

As can be seen in Figure 2, non-FDI flows show an increasing trend in previous years of sudden stops and drop sharply during these events.[4]

[Insert Figure 2]

Matrix X includes variables that could be interpreted as capital flows determinants.[5] These are the GDP growth (GDP), the change in terms of trade (TT), the ratio of external debt to exports (ED/X), and the current account deficit as a share of GDP (CAD), all of them as measures of economic solvency although CAD works as a proxy of capital flows as will be seen in the results section. Other variables included refer to domestic or external conditions. The real foreign interest rate (Rf) and the rate of growth of G7 countries (G7gdp) are presented as external variables and the real domestic interest rate (Rd) and the fiscal surplus (Gov_Def)[6] as domestic ones.

We follow a similar strategy to estimate the probability of suffering a sudden stop:

[4] It is consistent with findings of Levchenko and Mauro (2006) who decomposed the flows around sudden stops and showed that the most volatile are non-FDI flows.

[5] All variables are from IFS and World Development Indicator. Details of the each variable are in the Appendix

[6] A positive number means surplus.

$$\Pr(SS_{it} = 1 / FF_{it-1}, ContSS_{it}, NonFDI_{it-1}, \mathbf{X}_{it-1}, c_i) = \Phi(\gamma_f FF_{it-1} + \gamma_c ContSS_{it} + \gamma_{nf} NonFDI_{it-1} + \mathbf{X}_{it-1}\beta + c_i) \quad (4)$$

This time the FF lagged describes the euphoria effect on the sudden stop as an overreaction period that needs to be corrected. Eventually a large period of bonanza is not going to persist much time. In a financial market with many heterogeneous agents some of them are aware of the high levels of capital flows with no correspondence to economic fundamentals or investment decisions using only information from other investors, new information or new investors can arrive both provoking a sharp adjustment. These periods are typically dominated by non-FDI flows as it was shown in Figure 2. Similarly to equation (3) ContSS is a binary variable taking value 1 when the number of sudden stops in a particular year and the year before in other countries of the sample exceeds twice the average annual number of sudden stops.[7] This contagion can rise the probability of suffering a sudden stop as will be showed in the next section.

In matrix **X** there are variables that have been used in the literature on balance of payment crises and determinants of sudden stops. The most used variable is CAD[8]. Furthermore, we use an indicator of banking crises (bankcrises) with data from Caprio and Kinglebiel (2003) and other of exchange rate rigidity from Levy-Yeyati and Sturzenegger (2005) in order to test the assumption that if a country has a more rigid regime of exchange rate it is more prone to suffer a sudden stop. Problems to pay external debt have been present in many of the most known crises so we considered including the external debt to exports ratio (ED/X). Other variables found significant in other studies are liability dollarization (dollarization) and economic openness

[7] For this variable we consider the total number of sudden stop without eliminate a second year of sudden stop as in equation (2). For example, we consider a sudden stop in 1994 and 1995 in Mexico.
[8] See Calvo et al. (2004), Cavallo y Frankel (2004) and Edwards (2007), among others.

(openness).[9] In addition, in some specifications we use the real exchange rate depreciation (RER), the ratio of M2 to GDP (M2/GDP), the change in terms of trade (TT) and the change of reserves (Reserves) to control for a possible signal that can activate the stampede of investors. External (Rf, G7gr) and domestic variables (Rd, Gov_Def) are used too.

To estimate (3) and (4) we use random effects and following Wooldridge (2002) report the average marginal effect given by:

$$\frac{\partial E\left[P(y=1/\mathbf{X},c)/c\right]}{\partial X_j}=\frac{\partial \Phi(\mathbf{X}\beta/\sigma)}{\partial X_j}=(\beta_j/\sigma)\phi(\mathbf{X}\beta/\sigma) \qquad (5)$$

where for notational simplicity we have suppressed both cross and time units, y indicates the endogenous variable (FF or SS) and $\mathbf{X}$ collect all variables in the right hand side of (3) and (4). c has a conditional distribution $c/\mathbf{X}\sim N(0,\tau^2)$ so that $\sigma=(1+\tau^2)^{1/2}$.

However, additional assumptions are needed since the lagged dependent variable in equation (3) becomes it in a dynamic panel. In order to report consistent estimators we can not use a first difference of the dependent variable as is very popular in linear models because the standard normal distribution is a highly nonlinear function. We follow Wooldridge (2000 and 2002) and propose a distribution for c_i of the following way:

$$h(c_i/y_{i0},\mathbf{X}_i,\delta)=\psi+\xi_0 y_{i0}+\overline{\mathbf{X}}_i\,\xi+a_i \quad \text{con} \quad a_i\sim N(0,\sigma_a^2) \qquad (6)$$

where i indicates cross section units, y_{i0} is the initial value of the dependent variable and $\overline{\mathbf{X}}_i$ is a matrix with the average value for each explanatory variable. Including the

[9] See Calvo et al. (2004) and Cavallo y Frankel (2004) respectively.

assumption (6) in the estimation of equation (3) require to add the average variables only.

4. Main Results

Table 2 shows the results for the estimation of equation (3). In column (1) all the variables employed are at least 5% significant presenting the expected signs. Our variable capital boom lagged is very significant and shows the highest marginal effect. If the previous year the economy was undergoing a boom episode the probability that this boom persists the next year increases a 13%. This result makes sense with the feedback forces of the Kindleberger model and the strategies and transmission mechanisms explained in the behavioral finance literature[10].

Contagion from other countries is another relevant variable. This increases the probability of a boom episode in 6%. Furthermore, large non-FDI flows, a high growth rate of GDP and a positive shock of terms of trade augment the probability of a capital boom episode the next year although their marginal effects are small. The external debt to exports ratio emerges as an important variable to discourage boom periods and unexpectedly the current account deficit has a positive sign. This result seems to indicate that the current account deficit works as a proxy for capital flows to the country.

In column (2) of Table 2 we aggregate external and domestic variables. A fall in external interest rate and in the growth rate of G7 countries increase the probability of a capital boom, as are expected, whereas widen fiscal deficits reduce it. Terms of trade and non-FDI flows are not robust to the inclusion of new relevant variables.

[Insert Table 2]

[10] See Shiller (2003) or Barberis and Thaler (2003) for a review of this literature.

Table 3 shows the results for the estimation of equation (4). We progressively include variables in columns and exclude others to avoid inference problems from irrelevant variables. Capital boom in a previous period has a predictive power on a sudden stop and its effect is the highest (increases the probability of a sudden stop around 9%) and is robust to the inclusion of other variables. This result is interesting because is achieved conditioning to the action of other variables or fundamentals that can be affected by the bonanza of capital flows, therefore widening the hypothesis of adjustments caused by a previous upward overreaction period to the capital flows to emerging markets. Other variables resulting significant and robust are: contagion, non-FDI flows, current account deficit and external debt to exports ratio. The international contagion is very important to raise the probability of suffering a sudden stop; its marginal effect is around 3%. All significant variables show the expected signs.

[Insert Table 3]

4.1 Longer capital boom period

In the case of the probability of a capital boom, it does not rise significantly if the prior period of bonanza is extended for more than one year[11], however the probability of suffering a sudden stop increases significantly. Table 4 shows the marginal effects for similar specifications as in Table 3 widening boom periods in each column. Thus, column (1) considers a two-year boom period according to equation (1), column (2) a three-year boom period and the column (3) a four-year boom period. Results go to support the increasing importance of a longer capital boom period to predict a sudden stop episode raising the probability to 27% when boom endure 4 years.

[Insert Table 4]

[11] We do not report these results. Available on request.

4.2 Sub-sample 1990-2003

As can be seen in the Appendix years after 1982 were absent of large capital inflows in the emerging world until 1991 when a new wave of financial flows arrived mainly to Asia, Mexico and South America. These countries have shown to be more open to international financial markets. Table 5 shows new estimations done for a sub-sample including only the period 1990-2003 in a subset of countries: Argentina, Bolivia, Brazil, Chile, China, Colombia, Ecuador, India, Indonesia, Korea, Malaysia, Mexico, Pakistan, Paraguay, Peru, Philippines, Thailand and Uruguay.

[Insert Table 5]

The probit estimations for capital boom episodes show domestic variables to increase their probability are GDP and CAD only. On the other hand, results for sudden stop determinants confirm the evidence of Table 4. As the boom period lengthens greater is the probability of suffering a sudden stop. Other important result is the larger effect of contagion in relation to the complete sample during sudden stop episodes. These countries seem to be more related among them than to other countries so that the occurrence of sudden contractions of capital flows in these countries rises the probability of suffering a sudden stop since a 3% in Table 4 to 6% -15% levels in Table 5.

5. Some Robustness Tests

In order to test the robustness of the results we change the threshold of 5% of GDP in equations (1) and (2). A 3% and 7% threshold is used to prove the results to the change of this condition. Furthermore, as can be seen in Tables 6 and 7, following the studies of Faucette et al. (2005) and Rothenberg and Warnock (2006) we use only gross flows (liabilities) instead of net flows to construct the capital boom and sudden stop periods.

Finally, Table 7 shows an additional definition for sudden stops. We name this definition SSgdp and it requires in addition to equation (2), a fall in GDP during the year of the sudden stop or a year later. SSgdp collects the episodes with a large effect in real sector, which is one of the main reasons for the increasing interest in sudden stops of academics and policy makers.

Table 6 reports the marginal effects of probit estimations for capital boom episodes. The effect of a prior capital boom is similar to that showed in Table 2 and very significant therefore the conclusions about the sources of a capital boom still hold. Some variables such as Rf, G7gdp and Rd are not relevant when we define a more extreme capital boom episode unlike the fiscal surplus, Gov_Def, that become significant only in that case. Contagion and nonFDI flows seem not to be relevant in extreme episodes of boom but they do are relevant when we use only gross flows. The gross flows to an emerging country seem to be dominated by external factors such as the international financial markets and the performance of the most industrialized countries as can be seen in the last column of Table 6.

[Insert Table 6]

Table 7 shows that our main variables are still significant using different definitions of sudden stops, supporting our conclusions described in the previous section. The prior boom of capital flows and its composition are very important to predict a sudden stop. International contagion helps to account for a sudden stop episode although it loose its relevance when a more extreme fall is required or gross flows are used instead of net flows. The domestic variable that is important in every case is CAD supporting previous studies in the literature.[12] New variables appear to be significant in a sudden

[12] See Calvo et al (2004), Cavallo and Frankel (2004) and Edwards (2007), among others.

stop with a sharper fall such as dollarization, the change in reserves and exchange rate regime. With the exception of the exchange rate regime all show the expected sign.[13] The capital boom, international contagion and increasing nonFDI flows are robust to predict a sudden stop with negative real effects on GDP growth, SSgdp. An increase in external debt to exports ratio and not just in the current account deficit are domestic signals that could generate a reversion in capital flows. In one run the dollarization and the rise of the foreign real interest rate will show to be significant to increase the probability of SSgdp. Unexpectedly, rises in domestic real interest rates have a positive effect instead of stopping the stampede of capital flows as was expected. The latter may be due to an increase of interest rate is taken as a tightening of credit conditions for the domestic debtors.

[Insert Table 7]

The effect of an extended capital boom period is stronger on SSgdp than on SS as can be seen in Table 8 when it achieve a 35% of marginal effect on the probability of a SSgdp.

[Insert Table 8]

Other robustness proof is based on the creation of early warning signals to crisis period as in Kaminsky et al. (1998). It could seem that the creation of the capital boom indicator works as a signal and strengthens its importance in the probit estimations compared to other explanatory variables that are measured in a continuous way. For this reason we use the current account deficit, which is the most successful domestic

[13] The negative sign in TC in Table 7 indicates that a more rigid regime reduces the probability of suffering an extreme sudden stop which is an opposite result to the consensual view. However, this can be a fuzzy result because we use the 1-5 classification of Levy-Yeyati and Sturzennegger (2005) where although floating regime (2 in their classification) has the fewer episodes of sudden stops this number is not very different from other regimes and even the most of sudden stops does not occur in a 5 regime (fix).

variable in previous estimations, and create a signal in the same way as a capital boom according to equation (1) named S1CAD. On the other hand, we create other indicator based on the percentile of the current account deficit that minimizes the noise-signal ratio, as is calculated in Kaminsky et al. (1998). This optimal threshold is 5%, that is, the 5% of the largest current account deficits minimize this noise-signal ratio.[14] We name this variable S2CAD.

Tables 9 and 10 show results of probit estimations including both indicators of the current account deficit. We use three definitions of sudden stop: SS, SSgdp and SSgross. Tables 9 and 10 indicate that to include these indicators do not add relevant information to the has already been declared by capital boom, contagion, nonFDI flows, current account deficit as a share of GDP measured in a continuous way and the external debt to exports ratio. In some cases when both indicators replace the current account variable they show significant marginal effects but they are less than the effect from capital boom variable.

[Insert Table 9]

[Insert Table 10]

Finally, we use the two-step procedure of Rivers and Vuong (1988)[15] to discard some endogeneity problem between capital booms and the subsequent sudden stops in spite of capital boom are lagged one period. This test involves evaluating the significance of the residuals from the probit estimation of capital boom episodes in the probit estimation of sudden stops. All the results can not reject the null hypothesis that residuals are

[14] This threshold looks for balancing the risk of having many wrong signals and the risk of having no signal when a crisis does occur. The threshold is chosen to minimize B/(A+B)/D/(C+D) according to the following chart:

		$Signal_{t-1}$	
		No	Yes
SS_t	No	A	B
	Yes	C	D

[15] See Wooldridge (2002) for a simple explanation.

different of zero, that is, there is no evidence of endogeneity and our previous results keep robust. We do not show these results but they are available on request.

6. Discussion and Concluding Remarks

Many studies have been looking for what is the variable or variables that trigger a deep withdrawal of capital flows to emerging markets. The current account deficit, the dollarization of liabilities or the excessive banking credit are some of the most dealt with in recent literature. However, sudden stops have not been seen as a consequence of a previous period of overreaction self-created in the international financial markets. A capital boom is a display of upward overreaction and is a powerful signal that chartist strategies dominate financial markets rather than strategies based on future expectations of fundamentals. In this sense, a capital boom exposes to capital flows to sharp and sudden contractions. This means that many times it does not necessary to have a fundamental which is the source of the reversion of positive expectations, it can be a minor rumor that disheartens the apparent optimism in a particular country or international contagion that does not have any relation with the domestic conditions. Recent studies of the behavioral in financial markets and herd behavior demonstrate periods of overoptimism are fragile and can be sudden finished facing new information. Our application to capital flows to emerging markets confirms the overreaction hypothesis and its predictive power.

Using other arguments of behavioral finance we can explain that the reversion process is sharper and shorter during sudden stops than previous bonanza, for instance by means of loss aversion[16] (see Kahneman and Tversky, 1979) in investors and financial institutions with stop loss orders and margin calls. Unambiguously, if the receipt

[16] For a more recent treatment of it called myopic loss aversion see Benartzi and Thaler (1995)

country has a deteriorated profile the reversion has a high probability to be more extreme.

Finally, as policy recommendation we have to say emerging countries having a future agenda to integrate themselves into international financial markets should take into account the self-created volatility of these and primarily their self-created euphoria.

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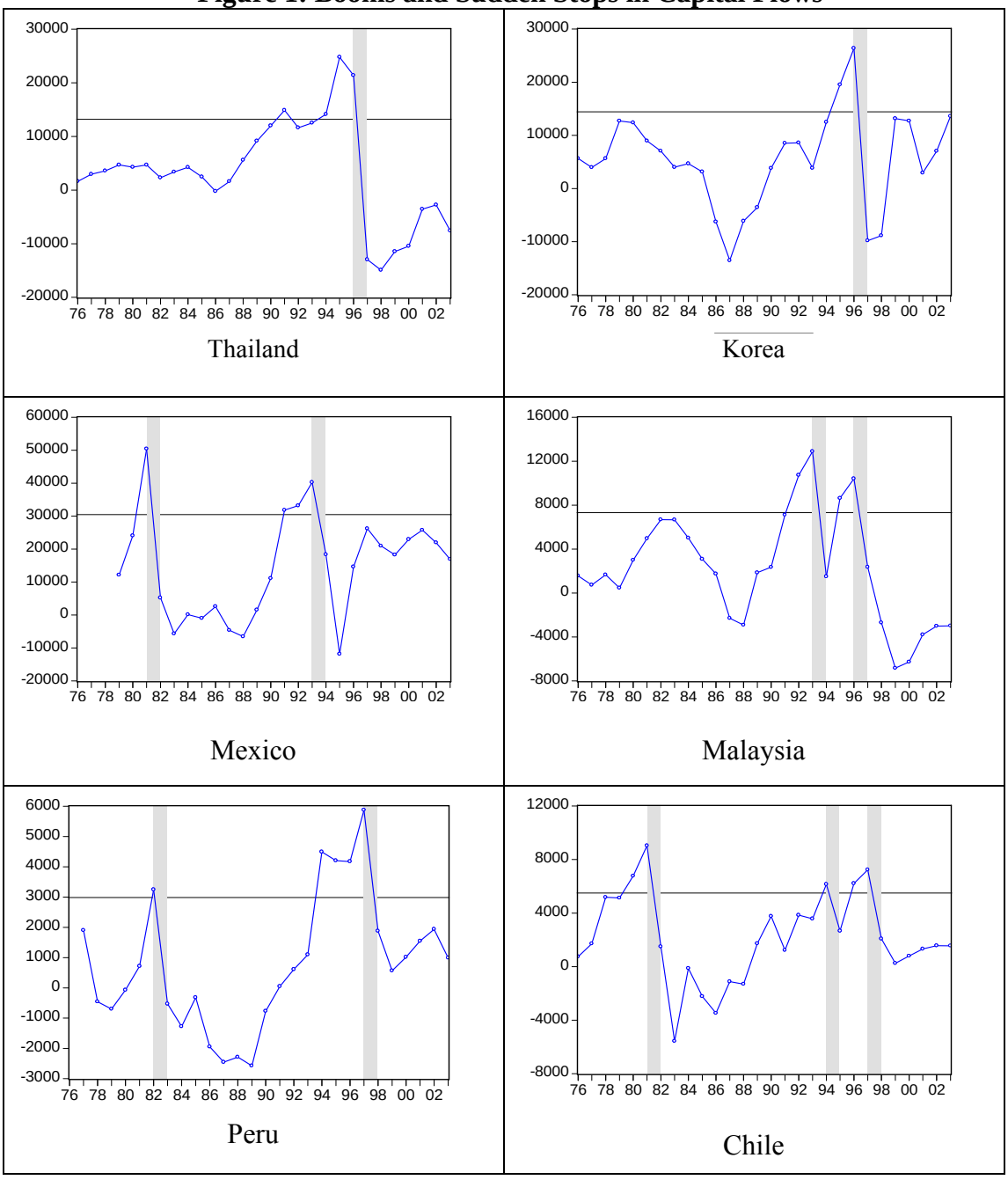
Figure 1: Booms and Sudden Stops in Capital Flows



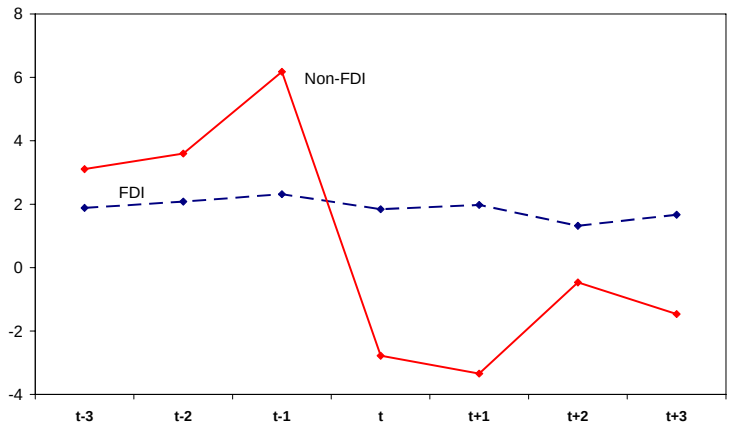
Note: millions of 2000 US dollars.

Table 1. Average Change of the Financial Account (%GDP) and GDP growth 2 years after a period of 3 years of capital boom

	3 years with boom		3 years without boom[a]	
	ΔF/GDP	ΔGDP	ΔF/GDP	ΔGDP
South America and Mexico	-3.9* (11)	-1.6* (11)	-1.0 (68)	2.2 (68)
Central America	-5.0* (6)	-0.4* (6)	0.6 (56)	3.6 (56)
Asia	-7.7* (5)	1.6* (5)	-0.0 (131)	5.7 (132)
Africa	-9.4* (7)	1.9* (7)	-0.5 (56)	4.0 (56)
Europe	-2.0 (2)	2.5 (2)	-0.9 (16)	1.1 (18)

[a] Implies 3 years of positive capital inflows without considering 3 years after sudden stops. Between ( ) the number of episodes. * Difference is significant at 5%.

Figure 2: FDI and non-FDI flows around sudden stops
(Average flows to GDP ratios)



Note: Sudden Stops occur at t

Table 2. Probability de occurrence of a Capital Boom

Dependent Variable FF

	(1)	(2)
FF_{t-1}	12.514	11.913
	(4.29)***	(3.74)***
CONTFF	5.617	4.282
	(3.15)***	(2.22)**
NonFDI	0.393	0.162
	(2.08)**	(0.83)
GDP	0.976	0.655
	(4.05)***	(2.51)**
CAD	1.091	1.185
	(4.20)***	(3.85)***
TT	0.167	0.154
	(3.56)***	(1.52)
ED/X	-6.440	-5.225
	(4.81)***	(3.60)***
Rf		-0.629
		(1.93)*
G7gdp		-1.773
		(2.04)**
Gov_Def		0.498
		(1.74)*
Rd		0.029
		(1.09)
Observations	941	726

Average marginal effects (times 100) are reported for all regressors. Constants omitted. Figures in parenthesis are z statistics with robust standard errors. All regressors are lagged one period, with the exception of CONTFF.

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

Table 3. Probability of occurrence of a Sudden Stop

Dependent Variable SS

	(1)	(2)	(3)	(4)	(5)
FF_{t-1}	9.148	5.663	9.333	8.638	9.595
	(4.25)***	(2.90)***	(3.89)***	(3.89)***	(4.07)***
CONTSS	2.798	2.990	3.051	2.611	2.340
	(2.33)**	(2.30)**	(2.26)**	(2.02)**	(1.70)*
NonFDI	0.369	0.594	0.491	0.553	0.627
	(3.18)***	(4.54)***	(3.45)***	(3.71)***	(4.31)***
CAD	0.472	0.361	0.355	0.287	0.192
	(3.60)***	(2.39)**	(2.26)**	(1.77)*	(1.24)
TC		-0.250			
		(0.61)			
bankcrises		0.318			
		(0.14)			
ED/X		0.822	0.943	0.967	0.867
		(1.97)**	(2.21)**	(2.16)**	(2.05)**
TT			0.055		
			(1.48)		
dollarization			0.000		
			(0.26)		
openness				0.017	
				(0.82)	
Reserves				-0.008	
				(0.96)	
M2/GDP				-0.022	
				(0.69)	
Rf					0.011
					(0.06)
G7gdp					-0.704
					(1.19)
Gov_Def					-0.061
					(0.47)
Rd					0.004
					(0.47)
Observations	1070	893	875	958	856

Average marginal effects (times 100) are reported for all regressors. Constants omitted. Figures in parenthesis are z statistics with robust standard errors. All regressors are lagged one period, with the exception of CONTSS.

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

Table 4. Probit Estimations with an extended period of Capital Boom

Explanatory Variables	SS (1)	SS (2)	SS (3)
FF_{t-1} and FF_{t-2}	7.0*** - 9.3***		
FF_{t-1} - FF_{t-3}		11.6*** - 18.9***	
FF_{t-1} - FF_{t-4}			14.5* - 26.7*
CONTSS	2.1* - 2.9**	2.4* - 2.8**	2.5** - 2.9**
$NFDI_{t-1}$	0.6*** - 0.8***	0.7*** - 0.8***	0.7** - 0.8***
CAD_{t-1}	0.3** - 0.5***	0.3* - 0.5***	0.3** - 0.5***
ED/X_{t-1}	0.7* - 0.8*		

Table reports significant marginal effects (times 100) only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Probit Estimations with an extended period of Capital Boom. 1990-2003

Explanatory Variables	FF	SS (1)	SS (2)	SS (3)
FF_{t-1}	6.6**	11.3*** - 12.8***		
FF_{t-1} and FF_{t-2}			14.6** - 20.8***	
FF_{t-1} - FF_{t-3}				25.5* - 28.1*
CONT	5.8**	6.0* - 15.1**	6.7** - 14.2***	7.5** - 14.0**
NF_{t-1}		0.6** - 0.7**	0.8*** - 0.9***	0.8** - 1.1***
CAD_{t-1} [a]	1.3***			
GDP_{t-1}	1.2***			
$dollarization_{t-1}$		0.02**		

Table reports significant marginal effects (times 100) only. [a] CAD was used in the boom equation only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Some Robustness Exercises for Capital Boom Estimations

Explanatory Variables	3%	7%	FFgross[a]
FF_{t-1}	10.5***	11.9***	10.5***
CONTFF	5.7**		4.1*
NF_{t-1}			0.4**
CAD_{t-1}	1.1***	1.1***	1.1***
GDP_{t-1}	0.7**	0.5**	
ED/X_{t-1}	-5.9***	-4.5***	-5.6***
Rf_{t-1}	-0.9**		
$G7gdp_{t-1}$	-2.7***		-2.1**
Gov_Def		0.5**	
Rd_{t-1}	0.05*		

Table reports significant marginal effects (times 100) only. [a] Indicators of capital boom and contagion are created using gross flows only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7. Some Robustness Exercises for Sudden Stop Estimations

Explanatory Variables	3%	7%	SSgross[a]	SSgdp
FF_{t-1}	10.5*** - 12.9***	5.2*** - 7.5***	11.7*** - 14.8***	5.1*** – 6.2***
CONTSS	3.1** - 4.0***			1.6* - 2.6***
NF_{t-1}	0.4*** - 0.7***	0.3*** - 0.3***	0.1** - 0.3***	0.1* - 0.2***
CAD_{t-1}[a]	0.3* - 0.4***	0.2*** - 0.3**	0.5*** - 0.6***	0.2** - 0.3***
ED/X_{t-1}	0.9* - 1.0**	0.5** - 0.7**		0.5* - 0.8***
TC_{t-1}		-0.4* - -0.6**		
$Dollarization_{t-1}$		0.0** - 0.0***		0.0**
$Reserves_{t-1}$		-0.02** - -0.02***		
Rf_{t-1}				0.3**
Rd_{t-1}				0.0* - 0.0**

Table reports significant marginal effects (times 100) only. [a] Indicators of sudden stop, capital boom, nonFDI flows and contagion are created using gross flows only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8. Probit Estimations on SSgdp with an extended period of Capital Boom.

Explanatory Variables	SSgdp (1)	SSgdp (2)	SSgdp (3)
FF_{t-1} y FF_{t-2}	5.5*** - 9.4***		
FF_{t-1} - FF_{t-3}		8.0*** - 18.9***	
FF_{t-1} - FF_{t-4}			20.1*** - 34.5***
CONTSS	1.6* - 2.3**	1.6* - 2.7**	1.6* - 2.5***
NF_{t-1}	0.2***- 0.3***	0.3*** - 0.7***	2.8** - 3.2**
CAD_{t-1}	0.2* - 0.3***	0.2** - 0.4**	0.2* - 0.4**
ED/X_{t-1}	0.5* - 0.8**	0.6** - 0.7***	0.5** - 0.6*
Rd_{t-1}			0.0**

Table reports significant marginal effects (times 100) only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 9. Probability of occurrence of a Sudden Stop including a "signal" of the Current Account Deficit

	(1) SS	(2) SSgdp	(3)[a] SSgross	(4) SS	(5) SSgdp	(6)[a] SSgross
$S1CAD_{t-1}$	1.867	0.946	4.868	4.070	2.359	8.930
	(0.96)	(0.73)	(1.88)*	(2.17)**	(1.81)*	(3.70)***
FF_{t-1}	8.204	4.880	14.699	8.716	5.538	15.873
	(3.80)***	(3.15)***	(5.57)***	(3.92)***	(3.31)***	(5.91)***
CONTSS	3.137	2.184	0.132	3.321	2.307	0.182
	(2.42)**	(2.42)**	(0.10)	(2.51)**	(2.47)**	(0.13)
$NonFDI_{t-1}$	0.493	0.189	0.098	0.596	0.227	0.113
	(3.77)***	(2.10)**	(2.14)**	(4.32)***	(2.31)**	(2.26)**
CAD_{t-1}	0.268	0.155	0.310			
	(1.62)	(1.42)	(1.72)*			
ED/X_{t-1}	0.819	0.726		0.989	0.842	
	(2.12)**	(3.16)***		(2.59)***	(3.64)***	
Observations	1006	1007	1067	1006	1007	1067

Average marginal effects (times 100) are reported for all regressors. Constants omitted. Figures in parenthesis are z statistics with robust standard errors. All regressors are lagged one period, with the exception of CONTSS. [a] Indicators of sudden stop, capital boom, contagion and nonFDI flows are created using gross flows only. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 10. Probability of occurrence of a Sudden Stop including a "signal" of the Current Account Deficit

	(1) SS	(2) SSgdp	(3)[a] SSgross	(4) SS	(5) SSgdp	(6)[a] SSgross
$S2CAD_{t-1}$	0.661	1.169	4.080	2.636	2.480	6.923
	(0.34)	(0.79)	(1.45)	(1.20)	(1.53)	(2.45)**
FF_{t-1}	8.292	4.880	14.783	9.409	5.821	15.107
	(3.87)***	(3.16)***	(5.59)***	(4.17)***	(3.41)***	(5.44)***
CONTSS	3.094	2.192	0.160	3.381	2.342	0.683
	(2.41)**	(2.43)**	(0.12)	(2.54)**	(2.49)**	(0.49)
$NonFDI_{t-1}$	0.484	0.189	0.093	0.644	0.245	0.388
	(3.77)***	(2.20)**	(2.03)**	(4.54)***	(2.54)**	(2.94)***
CAD_{t-1}	0.351	0.168	0.420			
	(2.31)**	(1.64)*	(2.47)**			
ED/X_{t-1}	0.783	0.717		1.033	0.858	
	(2.07)**	(3.22)***		(2.70)***	(3.67)***	
Observations	1006	1007	1067	1006	1007	1067

Average marginal effects (times 100) are reported for all regressors. Constants omitted. Figures in parenthesis are z statistics with robust standard errors. All regressors are lagged one period, with the exception of CONTSS. [a] Indicators of sudden stop, capital boom, contagion and nonFDI flows are created using gross flows only. * significant at 10%; ** significant at 5%; *** significant at 1%

Appendix

List of emerging countries

Argentina, Bangladesh, Barbados, Belize, Bolivia, Brazil, Chile, China, Colombia, Cote d'Ivoire, Costa Rica, Ecuador, Egypt, El Salvador, Philippines, Guatemala, Hungary, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Korea, Mali, Malaysia, Malta, Morocco, Mauritius, Mexico, Nigeria, Peru, Pakistan, Panama, Paraguay, Poland, Dominican Republic, South Africa, Thailand, Tunisia, Turkey, and Uruguay.

Capital Booms (FF) 1976-2003[a]

1976	BRA	POL	MAR	TUN								
1977	CRI	MAR	TUN									
1978	BOL	BRA	CRI	CIV	PAK	PRY	BGD	SLV	JOR	KEN	MAR	TUN
1979	CRI	CIV	NGA	PRY	URY	KEN	MLI	PAN	EGY			
1980	CHI	CRI	CIV	ECU	PRY	URY	BGD	DOM	KEN	MLI		
1981	BOL	CHI	CIV	MEX	NGA	PRY	URY	BGD	BRB	EGY		
1982	CRI	IDN	NGA	PER	URY	EGY						
1983	IDN	NGA										
1984	JAM											
1985												
1986												
1987												
1988	MUS											
1989	KEN											
1990	MUS											
1991	IRN	MEX	THA	JOR								
1992	IRN	MYS	MEX									
1993	ARG	HUN	IRN	MYS	MEX	PAK	TUR	TUN				
1994	ARG	CHL	CHN	PAR	PAK	PHL	THL	MLT	TUN			
1995	BRA	CHN	COL	HUN	IDN	MYS	PER	PHL	POL	THA		
1996	BRA	CHI	CHN	COL	IDN	KOR	MYS	PAK	PER	PHL	THA	
1997	ARG	BOL	CHI	COL	PER	PHL	SLV	PAN	ZAF			
1998	ARG	BOL	HUN	POL	SLV	GTM	MLT	PAN				
1999	ARG	BOL	HUN	POL	DOM	MLT	PAN					
2000	HUN	POL	BRB	DOM	GTM	JAM	MLI	MUS				
2001	BRB	BLZ	DOM	GTM	JAM	PAN						
2002	BLZ	GTM	JAM									
2003	HUN	BRB	BLZ	SLV	MLI							

[a] We use country abbreviations from World Development Indicator.

Sudden Stops (SS) 1977-2003[a]

1977							
1978	PER						
1979	SLV	MAR	TUN				
1980	BOL	GTM	PAN				
1981	CRI	KEN	POL				
1982	BOL	CHL	MEX	BRB	MLI		
1983	BRA	CIV	ECU	PER	PHL	URY	TUN
1984	IDN	NGA	BRB	GTM			
1985	BOL	PRY	JAM				
1986							
1987	MLI						
1988	PRY						
1989	ARG	MLI					
1990	KEN	EGY					
1991	TUR						
1992	BRB	JOR	KEN				
1993							
1994	HUN	MYS	MEX	POL	TUR	BLZ	
1995	CHL	MLT	MAR				
1996	HUN						
1997	IDN	KOR	MYS	THA	MLI		
1998	CHL	PAK	PER	PHL			
1999	COL	ECU	IRN	NGA			
2000	CRI	MLT	PAN				
2001	ARG	TUR	MUS				
2002	URY	BRB	DOM	PAN			
2003	BOL	JAM					

[a] We use country abbreviations from World Development Indicator

Variables Definition

Variable	Definition	Source
Capital Flows	Financial Account deflated by the US consumer price index 2000.	IFS
GDP	Real Data	World Development Indicator
Current Account to GDP, CAD	Measured as Deficit	World Development Indicator
NonFDI to GDP, NonFDI	Sum of Portfolio Flows, Other Investment and Financial Derivatives as share of GDP	IFS and World Development Indicator
External Debt to exports ratio, ED/X	Public and Private external debt of long and short term to exports of goods and services ratio	World Development Indicator
Terms of Trade	Exports deflator to imports deflator ratio. Both obtained from real and nominal data.	World Development Indicator
Real Exchange Rate	US consumer price index multiplied by nominal exchange rate to domestic consumer price index ratio	IFS
Foreign real interest rate, Rf	three-month LIBOR adjusted for quarterly change in US consumer prices	IFS

Domestic real interest rate, Rd	deposit money market rate adjusted for consumer price inflation	IFS
GDP growth of G7 countries, G7gr	Average of annual growth rate of real GDP of G7 countries	World Development Indicator
Fiscal surplus, Gov_Def	Measured as surplus	International Monetary Fund
Banking Crises, bankcrises	Binary variable taking value 1 if is a year of banking crises	Caprio and Klingebiel (2003)
Exchange Rate Regime, TC	1-5 index according to exchange rate rigidity. 5 indicates a fixed regime	Levy-Yeyati and Sturzenegger (2005)
Openness	Exports plus imports as a share of GDP	World Development Indicator
Dollarization	External liabilities from financial sector as a percentage of money	IFS
Reserves	International Reserves	IFS
M2 to GDP, M2/GDP	M2 as a percentage of GDP	IFS