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WHY SHOULD EMERGING-MARKET COUNTRIES (STILL) CONCERN THEMSELVES WITH CAPITAL INFLOWS?

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Abstract

This paper develops a simple analytic framework to analyze the effects of capital surges and sudden stops in the financial account of the balance of payments in emerging economies. In this model, capital inflows are largely exogenous to the recipient economies, they are very large when scaled to the size of the domestic financial sectors of recipients, and have large real effects. They also sow the seeds for the ensuing sudden stops, or capital flow reversals, observed in recent financial crises in emerging markets. Sudden stops can have devastating effects on output, growth, and employment. The paper goes on to test the main hypothesis derived from the model with an econometric analysis of capital surges and sudden stops using a panel-probit framework with heterogeneous unobserved country effects. While capital surges can be triggered by a number of domestic or foreign signals, the main variables that account for sudden stops are preceding capital surges, the size of the current account deficit, and contagion from sudden stops in other emerging markets. The main policy conclusion is that emerging economies need specific policies to deal with capital surges, which are largely exogenous to them.

Keywords:

Capital Flows, Sudden Stops, Capital Surges, Contagion, Financial Crises, Current Account Balance.

JEL: F30, F32, F39

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Abstract

This paper develops a simple analytic framework to analyze the macroeconomic impacts of capital surges and sudden stops in the financial account of the balance of payments in emerging economies. Capital inflows have a significant exogenous component, they are very large when scaled to the size of the domestic financial sectors of recipients, and they have large real macroeconomic effects. They also sow the seeds for the ensuing sudden stops, or capital flow reversals, observed in recent financial crises in emerging markets. The paper goes on to test the main hypotheses derived from the model with an econometric analysis of sudden stops using a panel-probit framework with heterogeneous unobserved country effects. The most important variables that account for sudden stops are preceding capital surges, the share of flows other than foreign direct investment, the size of the current account deficit, contagion from sudden stops in other emerging markets, and the ratio of external debt to exports. We examine in greater detail domestic policy variables and find some evidence that lax fiscal policy precedes sudden stops. We also find that banking crises do not precede but often accompany sudden stops. The main policy conclusion is that emerging economies need specific policies to deal with capital surges.

JEL classification: F30, F32, F39
Key words: Capital Flows, Sudden Stops, Capital Surges, Contagion, Financial Crises, Current Account Balance.

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Why Should Emerging Countries (Still) Concern Themselves with Capital Inflows?

1. INTRODUCTION

As a consequence of the foreign capital surge experienced by many developing countries, since the early 1990s international economists and policy makers have been debating whether foreign capital flows should be the object of specific policy (see, for example, Agosin and Ffrench-Davis, 1996 and 2001). This paper argues that countries in a position to integrate themselves into world capital markets should develop specific policies to deal with the macroeconomic impact of capital flows. Capital inflows have a significant exogenous component, which can be very volatile and which depends on the humors of investors, as has been shown in the literature on herd behavior, technical analysis, informational cascades, and other approaches that are well-described in the behavioral finance literature. Because they can be large relative to the size of the financial sectors of recipients, they can be destabilizing. Such inflows can change the recipient's fundamentals in ways that lead to capital account crises. In other words, the main hypothesis of this paper is that, in emerging economies, capital inflow booms are the ultimate cause of capital account crises, or sudden stops as they have been called in the recent academic literature on the subject. We also show that sudden stops are more likely when capital flows are dominated by items other than foreign direct investment (FDI). Non-FDI items include both portfolio capital and international lending.

In other words, we pose the question of whether prudent macroeconomic policies are enough to prevent destabilizing sudden stops or whether other policies, explicitly

designed to avoid capital surges are also needed. The first generation of currency crises models, best exemplified by Krugman's (1979) classic article, generally blamed domestic policies in recipient countries for capital flight. In Krugman's argument, pride of place for generating capital flights is given to chronic budget deficits in the context of a currency peg. The fixed exchange rate can be maintained until the (monetized) budget deficits cause a sufficient fall in reserves, reducing the credibility of the peg and leading eventually to capital flight. By contrast, we argue in this paper that sudden stops are visited even on countries with impeccable fiscal and monetary policies. In fact, it is previous capital surges that set the scene for sudden stops, and such capital surges have been known to occur in well and poorly managed economies. This means that part of good macroeconomic policy is deploying policy instruments to reduce the amplitude of the capital flow boom and bust cycle.

The paper is organized in the following way. The second section shows that net foreign capital inflows, scaled to the size of the recipient's financial sector, are larger and more volatile in emerging developing countries than in developed countries. The third section lays out a simple open-economy macroeconomic model in which a sharp exogenous rise in capital inflows induces an appreciation of the real exchange rate and a large widening of the current account deficit, which in turn sow the seeds for a reversal in capital flows. Section 4 explores the empirical determinants of sudden stops. Section 5 deals in somewhat greater detail with the relationship between domestic policy and sudden stops, and section 6 summarizes the paper's findings.

2. HOW IMPORTANT ARE CAPITAL FLOWS IN EMERGING ECONOMIES?

Capital flows to emerging economies are very large relative to relevant macroeconomic variables; they are also much larger than flows to developed economies, and they are more volatile. As a consequence of these characteristics, they are more destabilizing. Since what matters for the purposes of this study is the size of capital inflows relative to the size of domestic financial markets, capital flows are scaled to broad money supply (M2).

Table 1 shows unweighted mean values of capital flows to M2 for the period 1975-2004 for Asian and Latin American emerging economies and for developed countries for which we were able to collect sufficient data. The full period is broken down into four sub periods, which correspond to the buildup of foreign debt in emerging economies after the first oil shock (1975-82), the debt crisis in Latin America (1983-89), the capital flow bonanza of 1990-97, and the period since the Asian and Russian crises (1998-2004). Except during this last period, ratios of capital flows to M2 in emerging economies (be they Asian or Latin American) are, in absolute terms, an order of magnitude larger than in developed countries. The table also shows that the unweighted average standard deviation of flows to M2 is also much higher in the developing regions than in the developed countries.

[insert table 1]

The table shows other interesting regularities. During the period following the first oil shock and ending with the Mexican default of 1982, flows to Latin America and

Asia were huge relative to their money supplies. In the following period, the one corresponding to the debt crisis, flows to Latin America became strongly negative, while they continued to be significant in Asia. The 1990s up to the Asian and Russian crises (1997-98) were marked by very high flows to Asian and Latin American countries. After the onset of the currency crises that marked the end of the period of high inflows, flows to Asia became negative and those to Latin America dropped very substantially. All the while, net annual flows to/from developed countries remained very modest relative to the size of their financial markets.

Since in developed countries capital flows are small relative to the size of their economies and financial markets, these countries can more easily adjust to changes in the direction and size of flows and, therefore, most of them practice benign neglect of capital flows, inward or outward. Developing countries, in contrast, cannot afford that luxury. In the absence of capital controls, during foreign-capital surges, countries that peg to a major currency experience an inflating money supply and real exchange-rate appreciation through higher prices for nontradables. Those that float their currency are visited by sharp nominal (and real) exchange rate appreciation. In both cases, export diversification and the capacity of domestic producers to compete with imports are threatened. During periods of capital outflows, the real exchange rate tends to depreciate, and it does so even more rapidly in countries with floating exchange-rate regimes.[1]

[1] There is an asymmetry between inflows and outflows. Whereas a country can maintain a peg indefinitely during periods of inflows by accumulating reserves, when outflows are severe, floating is inevitable, because reserves are depleted and the country loses access to capital markets. IMF finance, which is supposed to provide a cushion, has proved to be very skimpy.

3. AN ELEMENTARY MODEL OF CAPITAL SURGES AND SUDDEN STOPS

In this section we present a simple model where capital flows have a large element of exogeneity and can change fundamentals in ways that induce outflows. With the aid of the model, we then explore the mechanics of capital inflows and their eventual reversal. The framework of this model is Kindleberger's (2005) classic analysis of financial crises. We call this the Kindleberger-Minsky model, recognizing, as Kindleberger himself does, its indebtedness to Minsky's model of the business cycle. The model is also in the spirit of the literature on behavioral finance (see Shiller, 2003; and De Grauwe and Grimaldi, 2006), which emphasizes that agents, who are manifestly unable to perform continuous optimization exercises, tend to use heuristic rules which are corrected as the returns on their investment decisions are realized. An important such rule is "chartism", or "technical analysis", which induces agents to buy assets when they are increasing in price and sell them when price is declining.[2]

There has been an ample literature modeling cycles of boom and bust over the last decade or so (for a summary, see López-Mejía, 1999; and Calvo, 2005). The contribution of this paper is to show that financial account crises, or sudden stops, are usually caused by capital surges that can be engendered by expectations that are often unrelated to economic fundamentals. Even if a capital surge is set off by the improvement in some fundamental, the shear volume of the capital inflows that ensue is too large to keep other fundamentals – in particular, the current account deficit – from deteriorating sharply. The recipient economy is faced with a basic fallacy of composition: while some increases in

[2] For an analysis along these lines of the behavior of agents in foreign exchange markets, see Menkhoff and Taylor (2007).

capital inflow will have a positive effect on growth and welfare, very large increases eventually lead to crises. There is also a fallacy of composition on the side of foreign investors: what is good for a few investors (investing in an emerging economy with good growth prospects) can be terribly bad for all of them together, when their collective behavior leads to deteriorating fundamentals and capital account crises in the recipient economy.

a. Stylized Facts

Capital inflows can be set off by many causes. For example, portfolio investors can come to believe that assets in domestic currency ("peso" assets) have become more attractive, because of a variety of reasons (perceptions of market-oriented reforms, better-behaved macroeconomic policies; lower growth in capital market countries; lower international interest rates that set off a search for investments with higher yields that would otherwise be outside the investors' radar). For any of these reasons, or for no reason at all except the intuition of a group of important investors, a Kindleberger-Minsky "displacement" may occur in favor of the assets of a particular country or groups of countries.[3] These changing perceptions often elicit sharp increases in capital inflows. *Ex post*, the country risk premium is seen to decline.

As a result of the heavy inflows, the economy experiences a boom, international liquidity constraints are relaxed, banks relax their lending policies, and asset prices rise. In line with the Kindleberger-Minsky framework, the boom is made possible by a credit loosening and/or by financial-market innovation. In our case the loosening takes place at

[3] There is ample evidence that investors in major capital markets treat emerging market assets as a distinct asset class (see Leijonhufvud, 2007).

the international level first (which allows larger flows to emerging markets)[4] and later at the national level (domestic money creation as a result of private banks expanding credit). The big boost in demand is in the nontradable segments of the economy (real estate, commerce, finance) and in the stock market. Although the production of tradables is discouraged by real exchange-rate appreciation, real income and employment rise.

There are two amplifying mechanisms at work. One is the behavior of domestic asset holders, who substitute peso for dollar assets during a capital surge, leading to greater currency appreciation. The second one refers to fiscal policy, which, in emerging markets, is endogenously procyclical (Braun and Di Gresia, 2003). While automatic stabilizers are weak or non-existent in these countries, during periods of bonanza government revenues improve, and there are strong pressures to increase spending. Governments may even be able to increase their borrowing, as a boom is normally a positive signal for international creditors.

As noted above, currency appreciation, sharply higher current account deficits, mounting debt, sagging exports, and eventually slackening growth may cause financial investors to reassess their good rating of a country. As foreign lenders fail to roll over debt coming due and foreign investors stop making net purchases of domestic assets, international reserves begin to fall and/or the domestic currency depreciates,[5] firms and consumers begin to cut back on expenditures, and the negative expectations of financial investors are validated. As capital flows go into reverse, there is a generalized flight to

[4] There have been plenty of examples in recent decades. During the seventies, international banks created the syndicated loan with interest rates pegged at LIBOR plus a spread, resetting every six months. During the 1990s, deregulation in capital market centers allowed institutional investors to create vehicles for investing in emerging markets. Likewise, financial deregulation in the later allowed domestic banks to borrow large amounts of funds from money market centers.

[5] Depending, of course, on the exchange rate regime.

liquid assets, a process labeled "revulsion" by Minsky (Kindleberger, 2005, p.22). In an emerging market setting, revulsion takes a particularly nasty form: the flight from domestic illiquid assets is also a flight from the domestic currency. Expectations of currency depreciation amplify the flight from the domestic currency. The darlings of Wall Street become, almost overnight, its pariahs, and new theories emerge to explain why a particular country was, after all, not such a great place to invest.[6] As in the boom, fiscal policy amplifies the bust.

Contagion can spread the crisis from one country to another. Contagion can be subjective or objective. Subjective contagion is the stampede of investors in economies other than the one originally hit by the crisis who run simply because investors in the other country do. For example, investors in assets denominated in Korean won panicked because they assumed, after investors in Thailand started to run, that Korea was next. Objective contagion is the result of the behavior of institutional investors – whether hedge funds or mutual funds – who, when faced with losses in one market, sell still-good assets of another country in order to meet margin calls or recoup losses.

b. The Model

Assume a two-country world, with a very large country (the Rest of the World) and a small domestic economy. There are two financial instruments: a domestic and a foreign bond. Both countries produce a tradable good each. Variables in foreign currency are expressed with an asterisk. The domestic economy produces an exportable (say, "sugar") that it doesn't consume (with dollar-price, p_x^*, set in the Rest of the World). It

[6] After the Asian crisis hit, a favorite was the existence of "crony capitalism", the allegedly unhealthy symbiosis between a corrupt government and big domestic businesses. Why this factor hadn't been noticed before the crisis is not easily explainable.

imports from the rest of the world a good ("computers") that it doesn't produce, with price p^*, also set in the Rest of the World. The domestic economy also produces one nontradable good, p_{NT}. The nominal exchange rate (e, pesos per dollar) clears the market for foreign exchange (i.e., the Central Bank runs a flexible exchange rate regime). For simplicity, we will assume that international prices, p^* and p_x^*, are unity. Therefore, we have one real exchange rate: $\varepsilon = e / p_{NT}$. The model has three markets: the market for domestic output, the domestic money market, and the foreign exchange market.

The model being strictly short-term (there is no growth), we assume that output is demand-driven. Letting A_n stand for the part of domestic absorption that falls on the nontradable, X for exports, and i for the domestic interest rate, aggregate demand in real terms (Y, expressed in units of the non-tradable good) would be as follows:

$$Y = A_n(Y, i, \varepsilon) + \varepsilon X(\varepsilon) \qquad (1)$$

where $A_i^{'} < 0,\ A_Y^{'} > 0, A_\varepsilon^{'} > 0, X_\varepsilon^{'} > 0$.[7]

With a flexible exchange rate, reserve accumulation is zero. Therefore, money supply (M) depends on Central Bank credit to the private banking sector (DC), times a banking multiplier, φ. We assume that φ depends on the optimism of bankers, which here will depend on the net demand for the country's asset; in other words, on net capital inflows (F*). This is in line with Kindleberger-Minsky, who observe that asset price booms are accompanied by domestic private credit expansion and by private financial innovation. In a simplified form, equilibrium in the money market is as follows:

[7] This unconventional formulation follows from the following. The value of output (NY) is as follows: $NY = eC_M + p_{NT}C_{NT} + eI_M + p_{NT}I_{NT} + eX - eZ$, where subscript M stands for an imported component and subscript NT for a nontraded one. Since $Z = C_M + I_M$, dividing both sides by p_{NT}, and calling $A_N = C_{NT} + I_{NT}$, equation (1) obtains.

$$M = \varphi(F^*)DC = [\lambda e + (1-\lambda)p_{NT}]L(i,Y) \quad (2)$$

In other words, foreign capital surges accompanied by credit expansion (increases in φ) which a larger than the growth in the demand for liquidity will lead to a higher nominal exchange rate *and* to a higher price for the nontradable:

$$[\lambda e + (1-\lambda)p_{NT}] = \frac{\varphi(F^*)DC}{L(i,Y)} \quad (2a)$$

Since with a foreign capital surge the real exchange rate must appreciate (fall), the rise in the price of the nontradable must be larger than the increase in the nominal exchange rate.

With a flexible exchange rate,[8] the foreign exchange market is in equilibrium when the current account deficit equals net capital inflows at the going real exchange rate and domestic and foreign interest rates. Calling ΔD^* the value (in foreign prices) of purchases of the domestic bond by foreigners, ΔK^* the value of private domestic purchases of the foreign bond, the balance-of-payments equilibrium condition (in foreign currency) is:

$$Z(\varepsilon,Y) - X(\varepsilon) + iD^* - i^*K^* = F^* = \Delta D^* - \Delta K^* \quad (3)$$

The current account deficit has two components: the trade deficit (imports minus exports) and net interest payments abroad. The latter are captured by the third and fourth expressions in (3). The real exchange rate adjusts in a manner such that the current account deficit equals the level of capital inflows.

Imagine that the domestic and foreign bonds are consols yielding, respectively, 1 peso and one dollar per period; then, their prices are 1/*i* and *1/i**. The price of the

[8] This is a simplifying assumption. In a fixed nominal exchange rate version of the model, we would have the added complication that money supply is endogenous and that sticky prices yield even larger fluctuations in activity than those that can be expected from capital movements. The advantage of working with a flexible exchange rate model is that the results do not depend on the fixity of the nominal exchange rate.

domestic consol in foreign currency is 1/*ie*. Labeling the volume of consols purchased by foreigners as Q_D, we obtain the following for gross capital inflow:

$$\Delta D^* = \frac{1}{ie} Q_D[(i - i^*); \theta; Q_{D,-1}] \tag{4}$$

The first argument of (4) is conventional: a widening of the interest rate differential in favor of the domestic bond leads to higher purchases of the asset. But even when the adjusted interest rate spread is unchanged, the appetite of foreign investors for the domestic asset (reflected in θ) can be quite volatile and subject to bandwagons (reflected in the lagged value of purchases of the domestic bond).

The parameter θ is defined in such a way that an increase indicates greater appetite for domestic bonds (e.g., a willingness to invest in them even at current interest rates); hence, the first derivative of Q_D with respect to θ is positive. Increases in θ are akin to Kindleberger-Minsky "displacements", or "discoveries" of the presumed profitability of domestic assets that do not necessarily have a correspondence with any change in fundamentals (Kindleberger, 2005, p. 22). Sudden declines are "revulsions", or the realization that domestic assets are likely to be much less profitable than previously expected, or to yield losses.

The presence of parameter θ and of the lagged volume of foreign purchases of the domestic bond in the decision-making process of foreign investors is consistent with the feedback models of the theory of behavioral finance where individuals cannot know with certainty the yield of an asset and must form an opinion with regard to it, which may or may not turn out to be right.[9] This opinion is reinforced over time; the possibility thus

[9] Opinion-formation may be influenced by what is happening in other, similar economies (contagion) or by excess liquidity on international markets, especially if this excess liquidity is unexpected.

arises that an economy may experience a surge based only on favorable expectations that are tenuously related to its fundamentals.[10]

On the other hand, domestic asset holders jump on the bandwagon of foreign investors when they are increasing or decreasing their exposure to the domestic asset. In order to increase (decrease) their holdings of the domestic asset, they sell (buy) the foreign asset:

$$\Delta K^* = \frac{1}{i^*} Q_K[(i - i^*); Q_{D,-1}] \tag{5}$$

where Q_K is the volume of net purchases of foreign bonds by domestic private wealth holders. The first derivative of Q_K with regard to the adjusted interest rate differential is negative (domestic asset holders sell the foreign bond when the interest rate spread in favor of the domestic bond widens). And an increase in the purchases of the domestic bond by foreigners will lead domestic investors to do the same and, therefore, to sell foreign bonds. This means that the first partial derivative of Q_K with respect to $Q_{D,-1}$ is negative.

In modeling the humors of foreign investors, we assume that they are exogenous to the domestic economy (represented by $\bar{\theta}$), but that they turn negative when the current account deficit (*CAD*) widens beyond a threshold considered prudent (*max CAD*):

$$\theta = \theta[\bar{\theta}; (\max\ CAD\ - CAD\ )] \tag{6}$$

where $\theta'_{CAD} \leq 0$. The strict equality holds when the current account deficit has not reached the threshold.[11]

[10] For a review of advances in feedback models, see Shiller (2003).
[11] In practice, investors also observe the behavior of international reserves and the ratio of foreign debt to export earnings.

Because net capital inflows are equal to the current account deficit, capital surges imply a deterioration of an important economic fundamental by the same magnitude. Equation (6) shows the moment in which the behavior of this fundamental leads to a change in foreign investors' appetite for risk. As a consequence, foreign purchases of the domestic bond become negative, with the correction in foreign investors' appetite for the domestic asset going beyond what fundamentals would have dictated.

Finally, we close the model with the uncovered interest rate parity condition. The sovereign risk spread and the expectation of exchange rate depreciation depend on net capital inflows. Optimism (i.e., rising capital inflow, F^*) leads to a lower country risk spread and to expectations of currency appreciation. Contrariwise, as optimism turns to pessimism, inflows decline (or become net outflows), and the country risk premium and depreciation expectations rise.

$$i = i^* + \rho(F^*) + \dot{e}(F^*) \qquad with \;\; \rho', e' < 0 \tag{7}$$

There is no stable, fundamentals-determined, risk premium (ρ) that responds to variables that change slowly and are known with certainty by all market participants. Moreover, exchange rate expectations are not independent from the risk premium. Here we make both of them depend on the same variable (net capital inflows).

From our perspective, the model's most important feature is that exogenous changes in capital flows to emerging markets generate fluctuations in capital flows and in output. A heuristic illustration of the model runs as follows. Assume that θ can take three values. In normal times, its value is zero and capital flows are at their long-term, steady state level that corresponds to the economy's fundamentals. When θ rises exogenously, say to a value of unity, interest in the domestic bond on the part of foreign investors

increases at an unchanged interest rate differential. As foreign investors turn sour on the domestic bond (when the current account deficit reaches its threshold level), θ goes to -1. After the crisis is over, θ returns to zero. This is reflected in the first panel of figure 1, where the sudden interest in the domestic asset by foreign investors occurs at t_d, the crisis at t_r, and eventually, as positions in the domestic consol unwind, θ goes back to zero at time t_n.

[insert figure 1]

In the second panel, we map the behavior of net capital flows and the current account deficit (which must be equal, because there are no changes in reserves). Before the increase in interest by foreigners in the domestic bond, capital flows are at their long-term, steady-state level, F_n^*. When θ jumps to 1, there is a discrete rise in the current account deficit, after which it continues to grow owing to persistence, but at a declining rate, since the domestic interest rate is falling. At t_r, the current account deficit reaches its critical level, at which point foreign investors become bearish on the domestic bond (with θ going to -1) and rush to sell it. Sales accelerate until they become a stampede, capital inflows decline and turn negative (requiring a current account surplus). But as the domestic interest rate rises, the rate at which net capital flows decline gradually begins to subside. After the sell-off, the tide eventually turns at t_n and capital inflows slowly begin to go back to their "normal", long-term level.

4. AN EMPIRICAL ANALYSIS OF SUDDEN STOPS

From the analytical story developed above, the main hypothesis that emerges is that sudden stops are related mainly to previous capital surges. In other words, countries experiencing a capital surge are likely to go through the harrowing effects of a sudden stop. Both surges and sudden stops are bunched: through contagion, they tend to take place in several countries at the same time or in short sequences. In addition, we will show evidence that capital surges and sudden stops are associated with non-FDI flows, that is, with portfolio investments and lending across borders.

a. Some Recent Empirical Literature

There is already an abundant empirical literature on sudden stops (defined as sudden, large declines in capital inflows), and this paper is clearly indebted to it. Using a probit for a panel of countries, Calvo, Izquierdo, and Mejía (2004) and Calvo, Izquierdo, and Talvi (2005) find that the probability of a sudden stop is increased significantly by liability dollarization and by the current account deficit as a share of the demand for tradables. Edwards (2005) finds that sudden stops are more likely in countries that have run up large current account deficits. Eichengreen et al. (2006) find that the price of petroleum, the trade deficit, domestic credit expansion and foreign debt as a share of GDP all have an incidence in the occurrence of a sudden stop. With a somewhat less demanding definition of a sudden stop than that of other studies and restricting sudden stops to those that follow significant capital inflows, Edwards (2007) finds that the current account deficit, a measure of regional contagion, an indicator of exchange rate

rigidity, and an indicator of capital mobility are important variables explaining sudden stops. The implication of Edwards' (2007) results is that higher capital mobility raises the probability of a sudden stop. With the exception of Eichengreen et al. (2006), the data in these studies are not restricted to emerging market economies.

Broner and Rigobón (2006) find that capital flows to emerging economies, scaled to GDP, are more variable than flows to developed countries. This greater variability cannot be explained by larger variances in fundamentals, but rather by persistence (lags in capital flows themselves) and contagion. They also find that emerging market countries are much more prone to crises than developed countries, as evidenced by the left-skewness in the distribution of the financial account relative to GDP.

Contagion has also been the subject of an important literature (see Calvo and Reinhart, 1996; Hernández et al., 2001; and Edwards, 2007). With different methodologies, in order to detect contagion, these papers examine the possible co-movement of capital flows across countries. On the other hand, Fiess (2003) and Forbes and Rigobón (2001) look for evidence of contagion in the co-movement in bond and stock prices across countries.

b. Data and Methodology

We will attempt to see whether sudden stops are indeed related to previous capital surges, controlling for other variables, either domestic or international, that might also trigger a sudden stop. We define both capital surges and sudden stops as binary variables taking values zero and unity in the manner described below and employ a panel-probit

framework with unobserved random country effects.[12] We use annual data for the period 1976-2003 for 42 emerging economies.[13] We exclude developed countries, where capital flows are much smaller relative to their domestic financial markets, and the poorer developing countries that depend largely on aid flows for foreign capital.

We define a capital surge as an episode in which the financial account of the balance of payments (excluding reserve transactions) is a standard deviation above its mean and is at least 5 percent of GDP. Thus, a capital surge in period t is defined as FF_{it} = 1 according to the following rule:

$$FF_{it} = \begin{cases} 1 \; if \; F_{it} > \overline{F}_t + \sigma_{F_i} \; and \; \dfrac{F_{it}}{GDP_{it}} > 5\% \\ \\ 0 \; \text{otherwise} \end{cases} \qquad (8)$$

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 a capital surge the joint condition that capital inflows be a standard deviation above their mean and, at the same time, at least 5% of GDP, we seek to ensure that they are relatively large. In the entire period 1976-2003, for the 42 countries included in the sample we observe 152 capital surges.

On the other hand, following Guidotti, Sturzenegger, and Villar (2004), a sudden stop is also defined as a binary variable according to the following rule:

[12] The econometrics of the estimation procedure and its justification can be found in Huaita (2008).

[13] The countries included are 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.

$$SS_{it} \begin{cases} 1 \; if \; \Delta F_{it} < \overline{\Delta F_i} - \sigma_{\Delta F_i} \; and \left| \frac{\Delta F_{it}}{GDP_{it}} \right| \geq 5\%, \; whenever \; F_{it-1} > 0 \; and \; FF_{it} = 0 \\ 0 \text{ otherwise} \end{cases} \tag{9}$$

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 surges, the joint condition applied to classify an event as a sudden stop seeks to identify large declines in capital inflows. Since our interest is in identifying 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 (9), we discard episodes which are both sudden stops and capital surges, as per definition (8). In our sample, we found 74 episodes that qualify for sudden stops.

The following equation is estimated:

$$\Pr(SS_{it} = 1 / FF_{i,t-1}, CONT_{it}, NF_{i,t-1}, X_{i,t-1}, c_i) = \Phi(\gamma_f FF_{i,t-1} + \gamma_c CONT_{it} + \gamma_{nf} NF_{i,t-1} + X_{i,t-1}\beta + c_i) \tag{10}$$

where Φ represents the standard normal distribution, CONT is a binary contagion 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), *NF* is the share of non-FDI net capital inflows in GDP, ***X*** is a matrix of control variables, and c_i represents an unobserved, country specific effect.

Our main hypothesis is that previous capital surges (FF_{t-1}) significantly increase the likelihood of occurrence of a sudden stop (SS_t). The second hypothesis that we want to test is that the higher the share of non-FDI flows in GDP (*NF*), the higher is the probability of a sudden stops. This latter hypothesis is consistent with the findings of Levchenko and Mauro (2006), who show that the most volatile flows around the time of a sudden stop are non-FDI flows. As can be seen in figure 2, which averages net capital inflows during a three year window around all sudden stops in the sample, it is non-FDI flows that show the greater volatility and that account for both the capital surge and the sudden stop.

[insert figure 2]

Included in the matrix $\boldsymbol{X}$ are all the variables that are thought to affect capital flows. The one that turned out to be most significant was the current account deficit as a share of GDP (*CAD*). Remember the importance the model places on the current account deficit, which we take as our preferred signal for the turn-around in investor sentiment. Another closely watched variable is the ratio of external debt to exports (*ED/X*), and for this reason we include it in almost all runs of the model.

Other variables included refer to domestic or external conditions that may account for sudden stops. These are changes in the terms of trade (*TT*), changes in the real exchange rate (*RER*), changes in reserves (*DRES*), the ratio of M2 to GDP (*M2/GDP*), the real foreign interest rate (*Rf*, three-month LIBOR adjusted for the change in US consumer prices), the rate of growth of GDP in the G7 countries *(G7gdp*), the real

domestic interest rate (*Rd*, deposit money market rate adjusted for consumer price inflation), the rate of inflation (*Inflation*), and the fiscal deficit (*Gov_Def*).[14]

In some runs of the model, we also used an indicator of exchange rate rigidity (*EXR*, taken from the classification of régimes made by Levy-Yeyati and Sturzeneggerer, 2005).[15] With this variable we seek to test an idea found in the literature that a more rigid exchange rate is likely to make a country more prone to sudden stops. In order to account for the possibility that banking crises may precede sudden stops, we added an indicator of banking crises (*bankcrises*), taken from Caprio and Klingebiel (2003). Other variables found significant in other studies (see Calvo et al, 2004) are liability dollarization (*dollarization*, defined as external liabilities of the financial sector to M2), economic openness (*openness*, equal to exports plus imports as a share of GDP, as in Cavallo and Frankel, 2004).[16] In order to avoid endogeneity problems, all variables with the exception of contagion are lagged one period.

c. Results

Table 2 shows the results for the estimation of the panel probit. The specification in column (1) includes the capital surge lagged one year, the share of non-FDI flows in GDP lagged one year, contagion, and the current account deficit as a share of GDP, lagged one year.[17] The four variables are highly significant in explaining the probability

[14] The sources of data for all variables which are not specifically mentioned in the text come from the IMF's International Financial Statistics and the World Bank World Economic Indicators data bases.
[15] Exchange rate regimes are classified as floating (with the index of rigidity taking the value of 1), intermediate (2), or fixed (3).
[16] We also added domestic inflation and the size of the fiscal deficit as explanatory variables, but they did not alter the results.
[17] This latter variable has been shown to be significant in explaining sudden stops in almost all previous studies.

of a sudden stop and continue to be so even as other explanatory variables are added to the empirical model.

[insert table 2]

It is interesting that the only other variable that proves significant in other runs of the model is the ratio of external debt to exports, confirming that an increase in this variable, and not just in the current account deficit, could serve as a signal to investors that it is time to take their money out of a country. No other variable, domestic or external, is a significant determinant of sudden stops. Taking the five estimated equations reported in table 2, a capital surge the year before increases the probability of a sudden stop by between 5.7 and 9.3 percentage points. Contagion also raises the probability of a sudden stop by 2.6 to 3.1 percentage points. Each percentage point increase in the ratio of non-FDI flows to GDP raises the likelihood of a sudden stop by between one third and two thirds of a percentage point.. A rise of one percentage point of GDP in the current account deficit increases the likelihood of a sudden stop by between 0.3 and 0.5 per cent.

In order to test the robustness of the results, we changed the definition of sudden stops and reran the regressions. We used three alternative definitions of sudden stops: (1) the same definition as in (9), but with a fall in GDP during the year of the sudden stop or a year later (*SSgdp*); (2) we consider the possibility that a country may have been experiencing declines in capital inflow (or net outflows) before the sudden stop (e.g., Argentina after 1999), while the actual sudden stop occurs a couple of years later, and accordingly, we date the sudden stop in the year when capital inflows began to decline (*SS1*); and (3) following Faucette, Rothenberger, and Warnock (2005), using the same definition as in definition (9), we use gross capital outflows (changes in external

liabilities) rather than net outflows (*SSgross*).[18] As shown in table 3, the main results change very little, implying that we are in the presence of very robust findings.

[insert table 3]

5. DOMESTIC POLICIES AND SUDDEN STOPS

The fact that we find that sudden stops affect countries with different domestic economic policies does not mean that the conventional view of the causes of capital flight is entirely wrong. A country that persists in running a fiscal deficit while pegging its exchange rate (Krugman-style, 1979) will surely eventually experience capital flight. What the results do show is that even if a country is well-behaved it can have a capital-account crisis. The main explanatory variables are related to the size and composition of capital inflows preceding the sudden stop.

In order to evaluate the extent to which poor domestic policy could be independently responsible for sudden stops, we undertook a few additional exercises. In the first place, we look at the possible effect of a exchange rate regimes on the probability of a sudden stop. Second, we evaluate whether countries with decelerating inflation are less prone to sudden stops than countries with accelerating inflation. Third, we try to answer the question of whether countries that experience a rise in ratio of the fiscal deficit to GDP are more prone to sudden stops than other countries. Finally, we ask ourselves whether sudden stops were preceded by domestic financial crises and, therefore, could have been due to poor banking regulation. We conclude with a

[18] Correspondingly, capital surges are also redefined in terms of liabilities only.

discussion of policy instruments specifically designed to deal with excessive capital inflow and policy during sudden-stop episodes.

a. Exchange Rate Regimes and Sudden Stops

Several observers have blamed fixed exchange rate regimes as the ultimate cause of sudden stops. With the Levy-Yeyati and Sturzenegger (2005) database, we attempted to determine whether there was a difference in the number of sudden stops that had occurred in country/year combinations throughout the sample period (1976-2003) in countries with three exchange rate regimes: fixed exchange rate, floating, and intermediate regimes (dirty floating, crawling pegs, bands).

The results are shown in table 4. It is true that countries with floating exchange rates (lagged one year) have a slightly lower proportion of sudden stops than countries which either fix their exchange rates or resort to intermediate regimes. This may be because floating might work as a disincentive to excessive inflows (since there is always the possibility of a reversal in the trend of the exchange rate) or because capital outflows quickly depreciate the currency, preventing some capital from exiting. However, from the data that we have, the advantages of floating appear to be quite modest: the unconditional probability of a sudden stop for floating, intermediate regimes, and pegs is 5.4, 7.4, and 7.1 per cent, respectively. The small advantage of floating suggests that floating, by itself, offers little comfort that it can forestall a sudden stop.

[Insert table 4]

b. Monetary and Fiscal Policy

Prudent monetary policies don't appear to add much to lowering the unconditional probability of a sudden stop. As shown in table 5, during the period prior to the "great moderation" in inflation that took place in the early 1990s, the proportion of country/year combinations experiencing sudden stops was slightly lower for countries that had reduced their rates of inflation during the preceding year than for those that had not (5.7 per cent, versus 7.7 per cent). However, after 1990, the proportion of sudden stops is practically identical in both groups of countries.

[Insert table 5]

On the other hand, sudden stops do seem to be less frequent in countries that are able to bring down fiscal deficits or widen fiscal surpluses as a share of GDP the preceding year (when the capita surge is in full swing) than in countries where the fiscal balance remains the same or deteriorates as a share of GDP (table 6). Whereas countries whose fiscal balance improves the year before experience sudden stops 6.4 per cent of the time, in countries where the fiscal balance deteriorates, this figure rises to 8.2 per cent.

We also turned around the question and asked whether countries which had not experienced sudden stops had lower government deficits the preceding year than countries which had been visited by sudden stops. Countries with sudden stops (68 observations) had an average fiscal deficit of 4.4 per cent of GDP the preceding year, while the average fiscal deficit of countries without sudden stops (897 observations) was 3.3 per cent of GDP. The difference of these averages is statistically significant at the 5 per cent level.[19] While the fiscal deficit is not a significant explanatory variable in the econometric analysis, especially when one controls for other factors, it could be that

[19] We conducted a similar test for the rate of inflation, but the difference in means was not significant.

tighter fiscal policy does moderate booms and the ensuing asset price bubble, lowering the probability of a sudden stop.

[Insert table 6]

c. Banking Crises

Third-generation theoretical models of capital account crises postulate that the weakness of domestic financial systems can lead to balance-of payments crises (see Chang and Velasco, 2001). Kaminsky and Reinhart (1999) argue that banking crises precede balance-of-payments crises, which eventually feed back into a worsening of the initial banking crisis. It is not easy to disentangle the line of causation between sudden stops and banking crises. We attempted to do so by looking at the time sequence that runs from banking crises to sudden stops. In table 7, we use the data of Caprio and Klingebiel (2003) for the year banking crises start and cross it with our main sudden stop indicator.

[Insert table 7]

Sudden stops and banking crises tend to occur the same year: while only 5.9 per cent of countries not experiencing a banking crisis have a sudden stop the same year, a full 22.9 per cent of countries that undergo a banking crisis also have a sudden stop. However, the proportion of sudden stops in countries that experienced a banking crisis during the preceding year is practically identical to the proportion of sudden stops in countries not experiencing banking crises the preceding year.

Since the onset of recent capital-account crises, there has been a growing awareness of the role played by banks, which during the upswing in the capital flow cycle tend to take on excessive exchange rate risk, making them vulnerable to currency

depreciations. That is why, in emerging market settings, bank supervision should strive to prevent domestic banks from holding net debtor positions in foreign currency. This, of course, is easier said than done. Regulators must take into account that denominating banks' assets in foreign exchange may only transfer exchange rate risk to the banks' clients. During crises involving currency depreciations, borrowers in foreign currency who don't earn foreign currency are particularly prone to default on their loans, rendering creditor banks unable to service their own foreign borrowing. Although not easy, the avoidance of net exposures in foreign currency in the banking sector has been achieved in some countries with sophisticated regulatory environments (e.g., Chile since its banking crisis of 1982-1983).

Reform to banking regulations can be useful in another sense. As the model highlights, episodes of excessive capital inflow tend to be accompanied, or followed, by credit expansions, which accentuate capital-surge-related booms. Raising bank reserve requirements during booms (and lowering them during busts) could assist in reducing the amplitude of the cycle, whether induced by capital flows or other variables.

d. Policies Toward Capital Flows and During Sudden Stops

Our empirical results suggest that good macroeconomic policy is not enough to prevent sudden stops. Therefore, emerging economies would do well to manage capital inflows carefully. The experiences of some countries (e.g., Chile, Colombia, Malaysia, and Taiwan) indicate that a wide variety of unorthodox policies designed to deal with excessive inflows and outflows can be successful in smoothing the time path of capital

flows. These policies include unremunerated reserve requirements (URR) on capital inflows and outright capital controls.[20]

When faced with capital flight, should emerging-market countries raise interest rates to encourage wealth holders to keep their assets in domestic currency and, at the same time, allow the exchange rate to depreciate to wherever the market will take it? Up to now, this has been the traditional IMF recipe. Furman and Stiglitz (1998) and Radelet and Sachs (1998) argue that, by pushing borrowing firms and domestic banks into bankruptcy, such policies simply accelerate capital flight. Domestic firms would face not only higher interest rates, but those that have borrowed in foreign currency would also be hit by much larger debts in domestic currency. Banks with currency mismatches would be particularly hit. These are among the lessons of the Asian crisis. Countries would be wise to just call a moratorium on capital outflows and stabilize interest rates and the exchange rate, much as Malaysia did when the Asian crisis hit (see Kaplan and Rodrik, 2001).

5. CONCLUSIONS

This paper has developed a model in which capital account crises are the result of prior capital surges. Because capital inflows can be large relative to the size of the financial sectors of recipients, the collective action of investors who individually have turned bullish on an economy – for reasons that cannot be fully explained by changes in

[20] For an analysis of the Chilean URR, see Agosin and Ffrench-Davis (2001); Lefort and Lehmann (2003); De Gregorio, Edwards, and Valdés, (2000). The Colombian case is discussed in Cárdenas and Barrera (1997); and Ocampo and Tovar (2003). The Malaysian experience with capital controls is described in Kaplan and Rodrik (2001). Agosin (2001) shows that Taiwan was able to avoid contagion from the Asian crisis because it had applied controls on capital inflows prior to the onset of the crisis.

fundamentals – can induce a deterioration of the recipients' fundamentals that eventually leads to a financial account crisis. Capital surges deteriorate the current account; when that deterioration reaches a certain level, it leads to a stampede by financial investors out of the recipient economy (i.e., to a sudden stop). Empirically, we have shown that the most important variable explaining sudden stops is a prior capital surge. We have also shown that sudden stops are more probable when flows are dominated by non-FDI items, which are more volatile and easier to reverse than FDI; when current account deficits are large; when other countries are experiencing a sudden stop at the same time; and when the level of foreign debt to exports is high. We also show more qualitative evidence that the capital flow cycle can be moderated by prudent fiscal policy. Banking supervision that puts an emphasis on avoiding currency mismatches in bank balance sheets should be part of good policy to protect countries from experiencing excessive capital inflows and outflows.

REFERENCES

Agosin, M. R. 2001. Korea and Taiwan in the financial crisis. *Financial crises in "successful" emerging economies*. Ed. Ricardo Ffrench-Davis. Brookings and ECLAC, Washington, D.C., 38-64.

Agosin, M. R., and Ffrench-Davis, R. 1996. Managing capital inflows in Latin America. *The Tobin tax – coping with financial volatility*. Eds. M. ul Haq, I. Kaul, and I. Grunberg. Oxford University Press, New York and Oxford, 161-192.

Agosin, M. R., and Ffrench-Davis, R. 2001. Managing capital inflows in Chile. *Short-term capital flows and economic crises*. Eds. S. Griffith-Jones, M. F. Montes, and A. Nasution. UNU/WIDER Studies in Development Economics. Oxford University Press, Oxford and New York.

Braun, M. and Di Gresia, L. 2003. Toward effective social insurance in Latin America: the importance of countercyclical fiscal policy. Seminar "Dealing with Risk: Implementing Employment Policies Under Fiscal Constraints". Annual meetings of the Board of Governors of the Inter-American Development Bank and the Inter-American Investment Corporation. Milan, Italy. March 23.

Broner, F. A., and Rigobón, R. 2006. Why are capital flows so much more volatile in emerging than in developed countries? *External vulnerability and preventive policies*. Eds. R. J. Caballero, C. Calderón, and L. F. Céspedes. Central Bank of Chile. Santiago, 15-39.

Calvo, G. 2005. *Emerging capital markets in turmoil*. The MIT Press. Cambridge, MA.

Calvo, G, Izquierdo, A., and Mejía, L. F. 2004. On the empirics of sudden stops: the relevance of balance-sheet effects. NBER Working Paper 10520. Cambridge, MA.

Calvo, G., Izquierdo, A., and Talvi, E. 2005. Sudden stops, the real exchange rate and fiscal sustainability: Argentina's lessons. IDB Working Paper, Washington, DC. Reprinted in Calvo, G. *Emerging Capital Markets in Turmoil. Bad Luck or Bad Policy?* The MIT Press. Cambridge, MA.

Calvo, S., and Reinhart, C. M. 1996. Capital flows to Latin America: is there evidence of contagion effects? *Private capital flows to emerging markets after the Mexican crisis*. Ed. G. A. Calvo, M. Goldstein, and E. Hochreiter. Institute for International Economics. Washington, D.C., 151-188.

Caprio, G,, and Klingebiel D. 2003. Episodes of systematic and borderline financial crises. Working Paper, World Bank.

Cárdenas, M., and Barrera, F. 1997. On the effectiveness of capital controls: the experience of Colombia during the 1990s. *Journal of Development Economics*. Vol. 54, 27-57.

Cavallo, E., and Frankel, J. 2004. Does openness to trade make countries more vulnerable to sudden stops, or less? Using gravity to establish causality. NBER Working Paper N. 10957. Cambridge, MA.

Chang. R., and Velasco, A. 2001. A model of financial crises in emerging markets. *Quarterly Journal of Economics*. Vol. 116, No. 2, 489-517.

De Grauwe, P., and Grimaldi, M. 2006. *The Exchange Rate in a Behavioral Finance Framework*. Princeton University Press. Princeton, NJ.

De Gregorio, J., Edwards, S., and Valdés, R. 2000. Controls on capital inflows: do they work? *Journal of Development Economics*. Vol. 63, 59-83.

Edwards, S. 2005. Capital controls, sudden stops and current account reversals. NBER Working Paper No. 1170. Cambridge, MA.

Edwards, S. 2007. Capital controls, capital flow contractions and macroeconomic vulnerability. NBER Working Paper No. 12852. Cambridge, MA.

Edwards, S., and Rigobón, R. 2005. Capital controls, exchange rate volatility and external vulnerability. NBER Working Paper No. 11434. Cambridge, MA.

Eichengreen, B., Gupta, P., and Mody, A. 2006. Sudden stops and IMF-supported programs. NBER Working Paper No. 12235. Cambridge, MA.

Faucette, E. J., Rothenberg, A. D., and Warnock, F. 2005. Outflows-induced sudden stops. *The Journal of Policy Reform*. Vol. 8, No. 2, 119-129.

Fiess, N. 2003. Capital flows, country risk, and contagion. Policy Research Working Paper 2943. World Bank. Washington, D. C. January.

Forbes, K., and Rigobón, R. 2001. Contagion in Latin America: definitions, measurement, and policy implications. *Economía.* 1, 1-46.

Furman, J., and Stiglitz, J. E. 1998. Economic crises: evidence and insights from East Asia. *Brookings Papers on Economic Activity*. No 2, 1-135.

Guidotti, P., Sturzenegger, F., and Villar, A. 2004. On the consequences of sudden stops. *Economía*. Vol. 4, No. 2, 1-44.

Hernández, L., Mellado, P., and Valdés, R. 2001. Determinants of private capital flows in the 1970s and 1990s: Is there evidence of contagion? IMF Working Paper WP/01/64. International Monetary Fund. Washington, D. C. May.

Huaita, F. (2008). Capital flows to emerging economies: booms, sudden stops, and contagion. Ph.D. dissertation. Faculty of Economics and Business, Universidad de Chile. Santiago. Unpublished.

Kaminsky, G., and Reinhart, C. 1999. The twin crises: the causes of banking and balance-of-payments problems. *American Economic Review*. Vol 89, No. 3, 473-500.

Kaplan, E. and Rodrik, D. 2001. Did the Malaysian capital controls work? NBER Working Paper Nº 8142, Cambridge, MA., February.

Kindleberger, C. P. 2005. With R. Aliber. *Manias, Panics, and Crashes, A History of Financial Crises*. Wiley, 2005.

Krugman, P. 1979. A model of balance-of-payments crises. *Journal of Money, Credit and Banking*. Vol. 11, No. 3, August, 311-325.

Lefort, G., and Lehmann, S. 2003. Reserve requirements and net capital inflows: Chile in de nineties. *CEPAL Review*, No. 81, December, 33-64.

Leijonhufvud, C. 2007. Financial globalisation and emerging markets volatility. *The World Economy*. December, 1817-1842.

Levchenko, A., and Mauro, P. 2006. Do some forms of financial flows help protect from sudden stops? IMF Working Paper WP/06/202. Washington, D.C. September.

Levy-Yeyati, E., and Sturzenegger, F. 2005. Classifying exchange rate regimes: deeds vs. words. *European Economic Review.* 49, 1603-1635.

Menkhoff, L., and Taylor, M. P. 2007. The obstinate passion of foreign exchange professionals: technical analysis. *Journal of Economic Literature*. 45, December, 936-972.

Ocampo, J. A. 2002. Developing countries' anti-cyclical policies in a globalized world. Serie Informes y Estudios Especiales. UN Economic Commission for Latin America. Santiago. June.

Ocampo, J. A., and Tovar, C. 2003. Colombia's experience with reserve requirements on capital inflows. *CEPAL Review* No. 81. December, 7-32.

Radelet, S., and Sachs, J. D. 1998. The East Asian financial crisis: diagnosis, remedies, prospects. *Brookings Papers on Economic Activity*. No. 1, 1-90.

Shiller, R. J. 2003. From efficient markets theory to behavioral finance. *Journal of Economic Perspectives.* Vol. 17, No. 1, Winter 2003, 83-104.

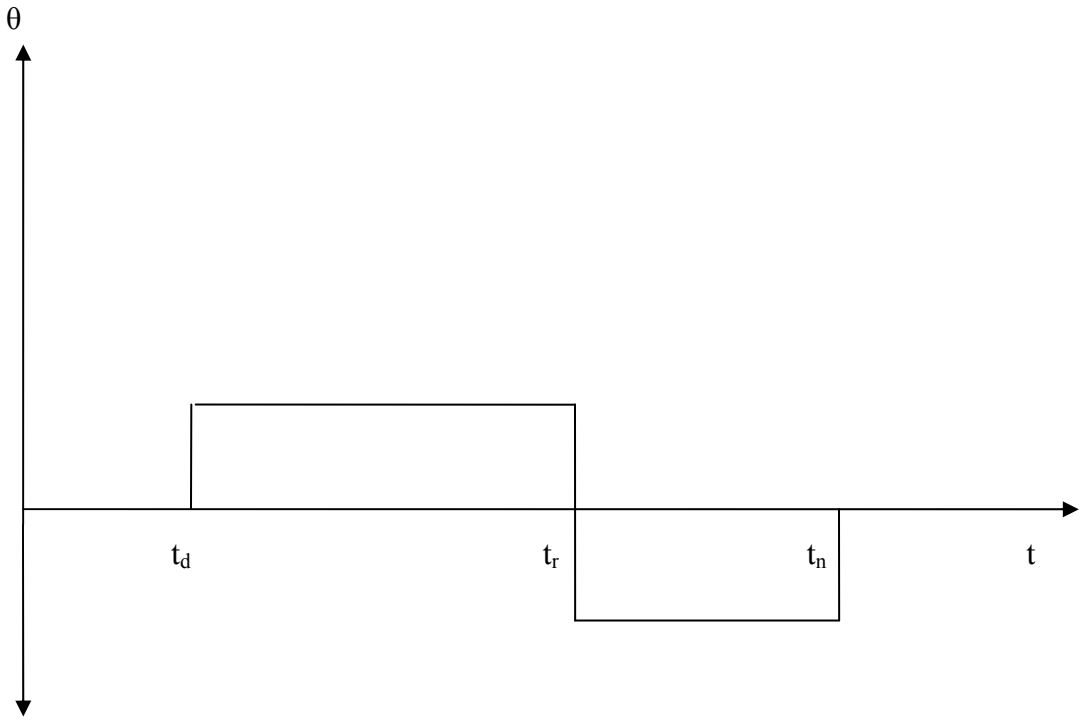
Table 1
Net capital flows to emerging and developed economies, 1975-2004
(financial account, except reserves, as a percentage of M2)

	Unweighted mean	Median	Standard deviation	Maximum	Minimum	No. of Countries	Equality tests	
							Means	Standard dev.
1975-1982								
Asia	16.6	19.4	6.0	25.2	5.1	7	A	B
Latin America	18.6	16.6	13.9	32.3	1.0	11	A	A
Developed	2.4	2.5	3.6	8.5	-10.0	18		
1983-1989								
Asia	7.7	8.0	7.7	19.2	-0.1	9	A	A
Latin America	-8.2	-10.2	16.3	15.4	-38.9	11	A	A
Developed	2.2	2.8	3.3	12.5	-5.4	18		
1990-1997								
Asia	6.9	6.2	5.9	16.3	-2.6	9	A	A
Latin America	9.1	10.2	12.1	18.8	-4.6	11	A	A
Developed	1.3	1.5	3.1	6.7	-5.2	18		
1998-2004								
Asia	-3.9	-3.8	4.0	1.5	-14.7	9		
Latin America	2.3	6.9	15.9	12.5	-25.8	11		B
Developed	-0.5	-0.9	3.2	7.3	-11.9	18		

Source: Authors' calculations, based on World Bank, *World Development Indicators* and IMF, *International Financial Statistics*.
A: Mean or standard deviation that is significantly different from that of developed countries at the 1% level of significance.
B: Mean or standard deviation that is significantly different from that of developed countries at the 5% level of significance.
Countries included:
Asia: Bangladesh, China, Indonesia, Korea (Rep.), Malaysia, Philippines, Singapore, Thailand, Turkey.
Latin America: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Panama, Peru, Uruguay.
Developed countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Switzerland, United Kingdom, United States.

Figure 1
The dynamics of capital flows: displacement, revulsion, and back to normality

Panel A: The behavior of θ



Panel B: Capital flows and the current account deficit

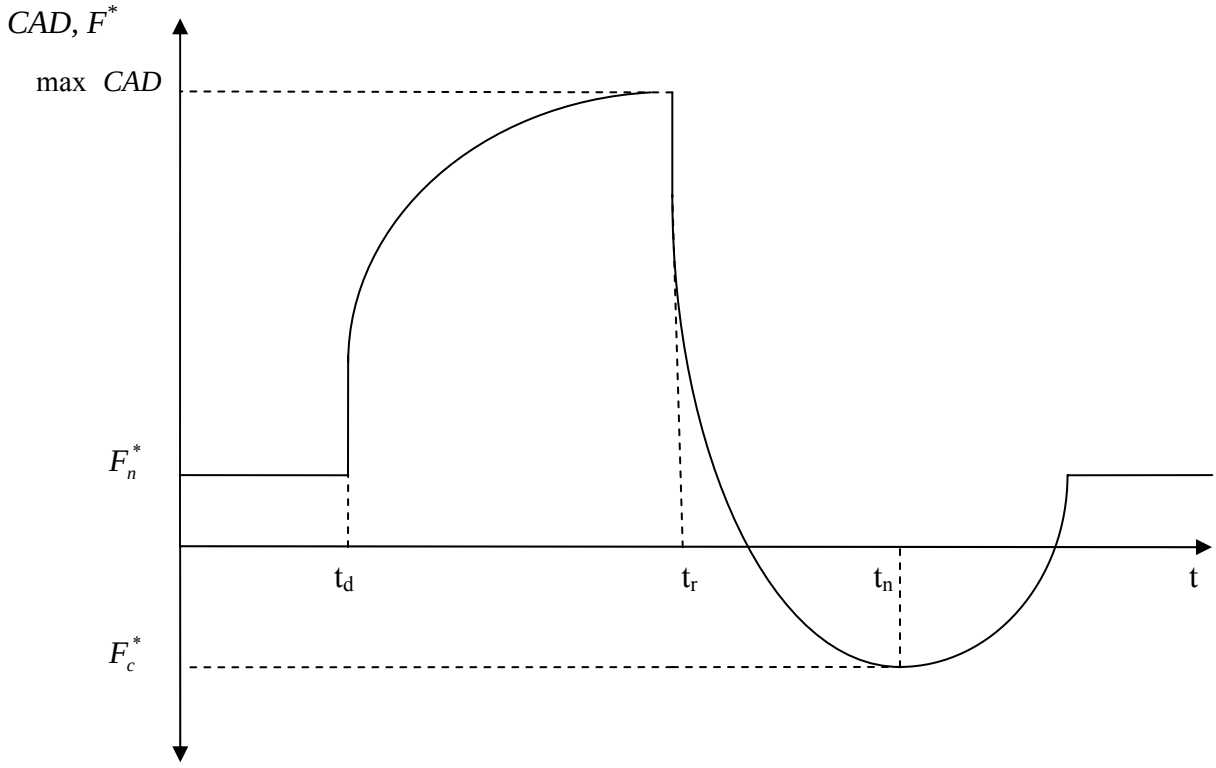
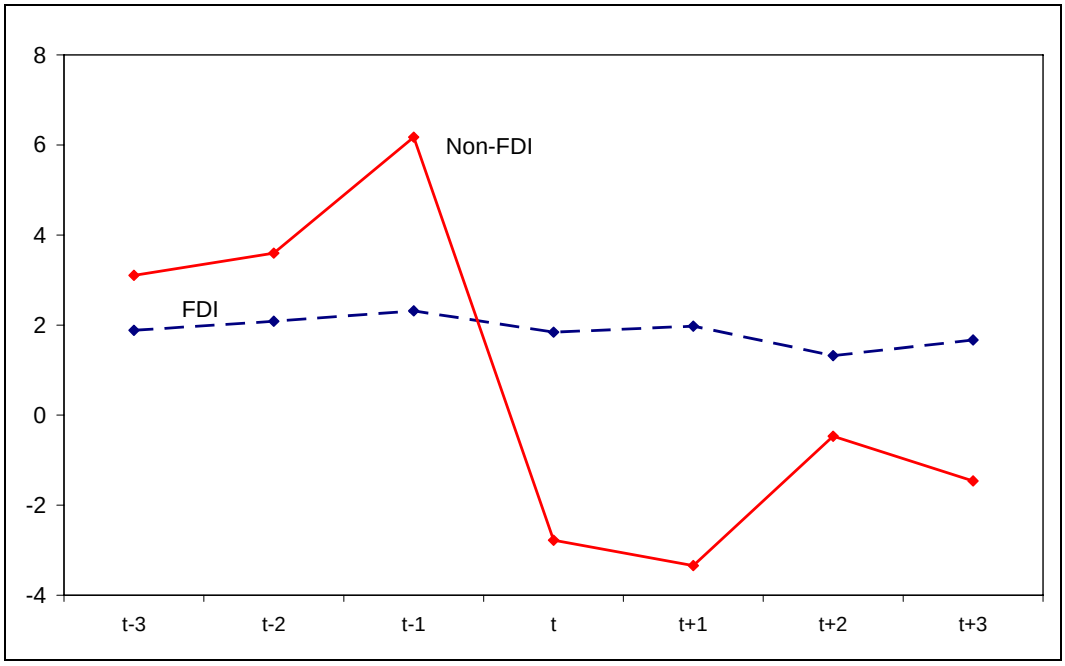


Figure 2
Capital flows around sudden stops: net FDI and non-FDI flows
(average flows to GDP ratios)



Note: Sudden stops occur at t.

Table 2
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	8.338
	(4.25)***	(2.90)***	(3.89)***	(3.89)***	(3.68)***
CONT	2.798	2.990	3.051	2.611	2.587
	(2.33)**	(2.30)**	(2.26)**	(2.02)**	(1.82)*
NF	0.369	0.594	0.491	0.553	0.676
	(3.18)***	(4.54)***	(3.45)***	(3.71)***	(4.66)***
CAD	0.472	0.361	0.355	0.287	0.302
	(3.60)***	(2.39)**	(2.26)**	(1.77)*	(1.91)*
ED/X		0.822	0.943	0.967	0.836
		(1.97)**	(2.21)**	(2.16)**	(1.97)**
EXR		-0.250			
		(0.61)			
bankcrises		0.318			
		(0.14)			
TT			0.055		
			(1.48)		
RER			-0.007		
			(1.44)		
dollarization			0.000		
			(0.26)		
openness				0.017	
				(0.82)	
DRES				-0.008	
				(0.96)	
M2/GDP				-0.022	
				(0.69)	
Rf					-0.080
					(0.42)
G7gdp					-0.413
					(0.72)
Gov_Def					0.071
					(0.57)
Rd					0.004
					(0.80)
Inflation					0.004
					(0.95)
Observations	1070	893	875	958	758

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 CONT.

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

Table 3
Robustness exercises: Significant coefficient values
Dependent variables: different definitions of *SS*

Explanatory variables	**Benchmark**	***SSgdp***	***SS1***	***SSgross, FFgross***
FF_{t-1}	5.7***-9.3***	4.3***-6.2***	9.4***-13.0***	11.7***-14.8***
NF_{t-1}	0.4***-0.7***	0.1*-0.2***	0.4***-0.6***	0.1**-0.3**
CONT	2.6*-3.1**	1.5-2.6***	2.2-3.1**	
CAD_{t-1}	0.3-0.5**	0.1-0.3***	0.1-0.4***	0.5***-0.6***
ED/X_{t-1}	0.8**-1.0**	0.5*-0.8***	0.8*-1.0**	

The two empty boxes indicate non-significant coefficients. In the regressions for SS1, the foreign and the domestic real interest rates were also significant explanatory variables in one run. As for the results reported in table 3, the coefficients reported are average marginal effects (times 100). .
* significant at 10%; ** significant at 5%; *** significant at 1%
Full results available on request.

Table 4
Country/years with and without sudden stops,
by exchange rate regime

	Floating	Intermediate	Fixed
1979-1989			
No SS	91	102	197
SS	5	8	16
Total	96	110	213
Percentage SS	5.2	7.2	7.5
1990-2003			
No SS	171	149	156
SS	10	12	11
Total	181	161	167
Percentage SS	5.5	7.5	6.5
1976-2003			
No SS	262	251	353
SS	15	20	27
Total	277	271	380
Percentage SS	5.4	7.4	7.1

Source: Authors' calculations; exchange rate regime classification from Levy-Yeyati and Sturzenegger (2005).

Table 5
Country/years with and without sudden stops and with and without improving inflation

	1976-1989	
	Higher inflation	Lower inflation
No SS	229	182
SS	19	11
Total	248	193
Percentage SS	7.7	5.7
	1990-2003	
	Higher inflation	Lower inflation
No SS	269	274
SS	21	20
Total	290	294
Percentage SS	7.2	6.8

Source: Authors' calculations, based on IMF data for inflation.

Table 6
Country/years with and without sudden stops and with and without improving fiscal balance

	Fiscal balance t-1	
	Improving	Not improving
No SS	442	426
SS	30	38
Total	472	464
Percentage SS	6.4	8.2

Source: Authors' calculations, based on IMF data for fiscal balances.

Table 7
Country/years with and without sudden stops and with and without banking crises

	Banking crisis year t-1	
	No	Yes
No SS	965	54
SS	70	4
Total	1035	58
Percentage SS	6.8	6.9
	Banking crisis year t	
	No	Yes
No SS	975	44
SS	61	13
Total	1,036	57
Percentage SS	5.9	22.8

Source: Authors' calculations; banking crises from Caprio and Klingebiel (2003).