Capital Controls and Financial Crisis Management: Lessons from the 1990s and 2000s

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Throughout the 1990s, an important tool adopted by a number of emerging market economies (EMEs) in attempting to deal with the increasing risk of financial crises and mitigate their effects was to control – either directly (through quantity-based and price-based restrictions) or indirectly (through prudential regulations and changes in banking rules) – the flows of capital into their economies. With the recent surge in capital flows into emerging market economies, capital account restrictions (controls) are once again at the center of discussions and policy proposals for the EMEs. The recent rounds of quantitative easing by central banks in advanced economies exacerbates the macroeconomic policy challenges of emerging economies, for a commitment and acceptance of very low (near zero) interest rates for the near future implies greater incentives on the part of investors to engage in speculative investments in emerging markets through the carry trade. That is to say, a confluence of events in both industrialized and emerging market economies points to the likelihood of a surge in capital flows into the EMEs that is likely to be unprecedented in its effects and consequences.

In light of these current and ongoing trends, this paper seeks to analyze whether the conditions that made controls attractive to emergent markets during the inflow surge of the 1990s have been present during the recent inflow episode to justify their re-imposition. The analysis unfolds through a survey and review of the theoretical and empirical literature related to financial crises and capital controls in the period starting from 1990 to the present.

This paper is composed of five sections. The subsequent section offers a discussion on the three generations of models developed in the literature on financial crises. The diverse nature of the economies hit by crises throughout the 1990s brings into focus the particular basis each generation of model offers as channels through which crises become manifest. The third section establishes a framework for thinking about the recent episode of capital inflows into EMEs by juxtaposing this recent episode with that which occurred during the 1990s. This section also highlights what is distinct in regards to the recent episode. The fourth section reviews the empirical literature on capital controls, and tackles the particular contentious issue concerning their effectiveness at achieving the desired goals of policymakers. This section addresses issues relating to the nature and target of controls in the 1990s, and offers a discussion around the recent and ongoing debate regarding their re-imposition, and assesses some of the main areas of disagreement in this debate. And finally, the fifth section offers some concluding thoughts on the general findings of this study.

perhaps the noteworthy aspect of the model is the attempt made at developing a framework through which an attack on the currency by speculators can be regarded as optimizing behaviour, in their seeking to avoid the capital loss associated with the holding of domestic money when the bank's remaining reserves is completely exhausted and the currency depreciates in value.

The analysis unfolds in a simple macroeconomic model. A study of balance-of-payments crises makes necessary, Krugman notes, that the demand for domestic money be a function of the exchange rate, and that the latter vary through time. Accordingly, it is assumed, through purchasing-power-parity (PPP), that the domestic price level moves one-to-one with the nominal exchange rate by setting the foreign price level at unity. Furthermore, the balance-of-payment is set equal to the current account, where the latter is given by the trade balance given the assumed existence of only two assets in the model (domestic and foreign money) which earn zero interest.

The short-run behaviour of the economy is given by the wealth constraint of agents which sums their holdings of real domestic money and foreign money, and the condition for portfolio equilibrium which gives the relation between the demand for real domestic money and wealth, with demand increasing with foreign money for a given rate of inflation. In the short-run, what concerns us is the choice of real domestic and foreign money stocks by agents. In this framework, the analysis shows that under a flexible exchange rate system changes in expectations are reflected in changes in the nominal exchange rate (thus, the domestic price level) given that neither the government nor foreigners seek to alter their holdings of foreign money. So that an increase in expected inflation which lowers real domestic money demand results in an increase in the price level (thus, the nominal exchange rate) given that agents' foreign money holdings cannot change. While in the fixed exchange rate system, the government stands ready to exchange foreign for domestic money at a fixed price, so that the change in expected inflation results instead in agents altering the composition of their wealth by acquiring foreign and selling domestic money. This acquisition of foreign money in the fixed exchange rate system thus depletes the reserves of the central bank.

Evidently, in considering the floating exchange rate system in a dynamic context, Krugman shows that changes in expectations are reflected in domestic price level (thus, nominal exchange rate) movements such that the reserves of the bank do not occupy the primary focus of speculators (as it is irrelevant in so much as the evolution of the exchange rate is concerned).[1] The central bank is not motivated in any way to use its reserves in this case given that no parity

bank's domestic assets). In fact, in the framework offered, the central bank is constrained by both a policy of defending the peg and the need to finance the fiscal deficit. What is more, the deficit is assumed to generate no shifts in current or future productivity (and thus, output); it is as such entirely conducive to weakening economic fundamentals and thus generating a crisis.

2.2. Second-generation crisis model[2]

A main weakness of first-generation models however is their inability to explain the onset of crisis in the 1990s in some of the advanced European economies which did not have such inconsistencies between fiscal and monetary policy (Sarno and Taylor, 2002). Second-generation models are thus able to explain the nature and logic of speculative attacks when economic fundamentals are not necessarily weak. What becomes important in this regard is the temptation that the authorities have to renege on the policy of defending the exchange rate peg. That is, they enjoy the ability of making use of a perceived 'escape clause' that allows them to fulfill other desired policy objectives such as increasing output and employment.

In the analysis of the more encompassing 'escape clause' version of second-generation models, the government is assumed to conduct exchange rate policy with the objective of minimizing a loss function.[3] This loss function is composed of two squared terms, that is, the government is assumed to care about both price stability (i.e., inflation) and the actual level of output relative to a given target level. A weight between zero and infinity is attached to the price inflation term to capture the degree to which it generates a welfare loss to the authorities. The actual level of output is determined in an ad hoc manner through a surprise supply function: it is assumed to increase with respect to both a given natural level of output and the difference between actual and expected inflation, and to decrease with respect to a stochastic shock term. The presence of the second component in the real output supply curve is in essence the source of market perceptions that the authorities might consider reneging on defending the peg by inducing a currency devaluation (i.e., price inflation) so as to increase output.

Sarno and Taylor (2002: 251) emphasize two distinguishing features about second-generation models. The first reflects the fact that the target level of output deviates from the natural or equilibrium level by a fixed positive amount. This is what they refer to as the level of output target bias, which second-generation theorists have appropriated from models of monetary policy credibility.[4] This added feature to the model is not unimportant, for, as they show

relative weight attached to each objective in either generating a speculative attack or allowing the peg to survive. Thus, in a context in which unemployment is high or output is falling, the authorities would be more willing to surprise the market with inflation to increase output by essentially reneging on their commitment; agents then form expectations appropriately by taking into account the current economic context.[6]

2.3. Third-generation crisis model

The literature on third-generation crisis models is composed primarily of two streams. Early developments focus on the existence of implicit or explicit government guarantees which drive market agents to over-borrow on the short at low short-term interest rates and invest in assets with long maturities and high yield. There is then an emphasis on the moral hazards of government management of liquidity which is seen as implicitly condoning such behaviour. Later developments on the other hand take on a micro level analysis of banking sector practices and rules as the main drivers of currency crises or speculative attacks. Thus, in these later developments a financial crisis is a crisis of both the banking sector and the foreign exchange of capital-importing economies. What is important to note is that both strands of third-generation models were developed essentially as attempts to explain the particular situation in which crises developed or perpetuated in some of the Asian economies during the 1990s.

MacDonald (2007: 323) notes that if the second-generation models are correct then the post-crisis situation of devaluation or the transitioning of the crisis-hit economy into a floating rate regime should allow for more expansionary fiscal and monetary policies. The situation in many countries however was characterized by an inability of authorities to stabilize the value of their currencies by stemming the outflow of capital from their economies. Furthermore, Marion (1999: 4) remarks on the fact that many of the Asian economies enjoyed high growth, low unemployment and low inflation before the crisis; hence, there were no clear trade-offs between policy objectives when considering to the social loss function that would in a sense serve to drive agents' expectations toward a negative outlook. Third-generation models consider avenues not having to do with economic fundamentals or agents' interactions with government policies in driving the state of the economy. These look more to the relationship between regulators and the banking sector or the structure and practices governing the latter in generating financial crises in the EMEs.[7]

channel emphasized by Krugman is instead the weakness of domestic companies' balance sheets in generating a sense of pessimism within the foreign investor class that causes them to liquidate and withdraw their investments, which in turn depreciates the currency and further weakens the firms' balance sheets in a self-fulfilling fashion. The weakness of firms' balance sheets originates from their exposure to foreign-currency denominated debts, i.e., they borrow in dollars and take on long-term investments in the local currency such that the liability side of their balance sheets increases with a devaluation (or depreciation) whereas the value of their assets deteriorates.

Three things are worth some emphasis. First, the model shows clearly how capital flows are able to influence the exchange rate and thus generate a financial crisis. This will be shown to be an important basis on the discussions surrounding the implementation of controls during the 1990s and the ongoing current debate on the matter. Second, balance sheet problems are shown to be the genesis of the non-performing loans that result in bank runs. Krugman thus aims at a much deeper understanding of the cause of the Asian financial crisis. Evidently then it becomes clear that the policy of simply injecting liquidity into the domestic financial system by re-capitalizing the banks does not resolve the crisis. For as he notes, what is at work in such crises is a depreciation of the entrepreneurial class that can be resolved either by creating opportunities for the rise of new ones originating from foreign direct flows or to impose some measures of control on capital flows (1999: 471).

In sum, the goal of this section has been to highlight the theoretical literature on models of financial crises. The underlying theme in the development of the three generations of models has been a focus on how emerging economies can be vulnerable to sudden stops and capital flow reversals. These negative forces become more prevalent in second- and third-generation models given that agents are seen as both taking an active role in bringing about a particular state of the economy, and consider the structure and rules governing financial intermediation and domestic borrowing in capital-importing EMEs in forming expectations. Hence, issues that have to do with the types of investment flows moving to and from the EMEs and their particular uses by domestic agents are important when considering the likelihood of crises and the tools aimed at preventing their development. The following sections thus tackle these sorts of concerns.

from the viewpoint of macroeconomic stability given that they generate foreign income streams to repay foreign financing, whereas investments directed primarily, for instance, to the real estate sector of emerging economies are viewed as precursor to asset-price bubbles and thus instability.

The analysis in the following two sections deal primarily with the first and second important characteristics of capital flow dynamics noted above: specifically dealing with the 'equity' versus 'debt' consideration and the maturity structure of flows (i.e., describing the dynamics of the subcomponents of the capital account).

In terms of analyzing the dynamics of flows during the past two decades, an important issue that must be addressed at the outset concerns the characteristics of the subset of countries consisting of the EMEs. Das (2006: 2) sees them as embodying a group containing both newly industrialized economies and middle-income developing countries in which "governments and corporations have access to private international capital markets, or can attract international portfolio investment, or both." Such a definition thus pre-supposes that these countries maintain a level of institutional capacity that is conducive to some degree of capital movement. In considering what defines the "emergent" aspect of these economies, Das (2004: 1-19) points to the rapid pace of their integration into the global financial system. This is motivated in part by a desire to break away from having their levels of domestic investment constrained by their domestic saving rate. Thus, in taking advantage of the process of financial globalization (i.e., advances in information, communication, and computer technologies) this subgroup of economies is able to make gains from profitable domestic opportunities. Evidently then these economies must present foreign investors with relatively stable growth potentials by engaging in reforms of their domestic financial sectors and in the monetary and fiscal management of their macro-economy.[8]

From the viewpoint of investors in industrialized economies however, the EMEs represent the "emergence" of new markets and demand for their goods and services and new avenues to profitably channel their surplus capital (Das, 2004). There is thus some degree of divergence on how each set of actors conceptualizes the EMEs. At the most basic level, we find the authorities in the EMEs who seek the transition of their economies into fully-fledged mature market economies. They work primarily at the level of re-structuring domestic sectors and policies so that their economies are better able to take advantage of global capital flows in a stable manner, i.e., in ways that do not expose their economies to excessive risks and crises. At a second level,

then the set of countries selected seems entirely appropriate. The data on flow measures are taken from the IMF's *World Economic Outlook* (WEO) dataset, which classifies flows into five categories: portfolio flows (bonds and equities), short-term flows, FDI, and other long-terms flows, and errors and omissions. They consider the first three of the subcomponents.[12]

Figures 1-3 (in the Appendix) show the dynamics of net capital movements for Asia and Latin America over the time period 1990-1996, as detailed in tables by the authors. The first shows the evolution of total or overall flows over the period for each country and the respective regional averages, while the latter show similar measures but for the individual components of portfolio and short-term flows. Based on these dynamics, Montiel and Reinhart (2001) establish some stylized facts concerning regional differences in capital flows over the considered period for Asia and Latin America – the two main capital-importing regions during the 1990s:

i. The magnitude of total flows relative to GDP is substantially larger for Asian countries (7 percent of GDP) than for Latin American ones (4 percent of GDP).[13]
ii. The magnitude of short-term flows is also larger for Asia (2.8) than for Latin America (1.3)
iii. The share of short-term flows in total flows for Asia is 39 percent, whereas for Latin America it is 32 percent.

As for the variability of different component of capital flows, they conclude that:[14]

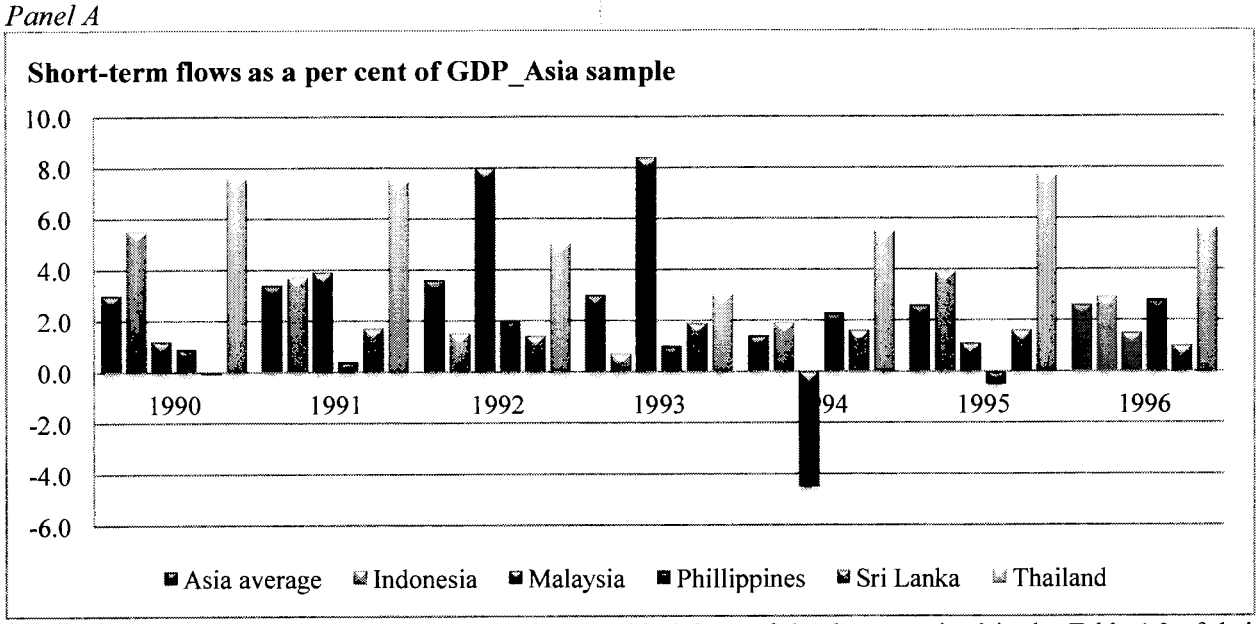
iv. Total inflows are more volatile in Latin America (0.66) than in Asia (0.24), and that
v. Short-term flows are more volatile than all other types of flow in both regions.

On this basis, they argue against the conventional wisdom that associates Latin America with a disproportionately larger share of short-term capital over the considered period, relative to Asia. Instead, they emphasize the fact that short-term flows appear on average to be more "skittish" or volatile in Latin America relative to Asia.

Das (2004: 20-50) offers additional insights on capital movements into the EMEs during the 1990s. The data used is also from the IMF's WEO dataset; but, unlike Montiel and Reinhart (2001), he aggregates portfolio and short-term investments into a single category such that the analysis unfolds as one between the relatively more stable FDI flows and the relatively more volatile portfolio and short-term flows.[15] A third category of 'other net flows' is considered, which consists mostly of bank related lending. Furthermore, the data used is measured in billions

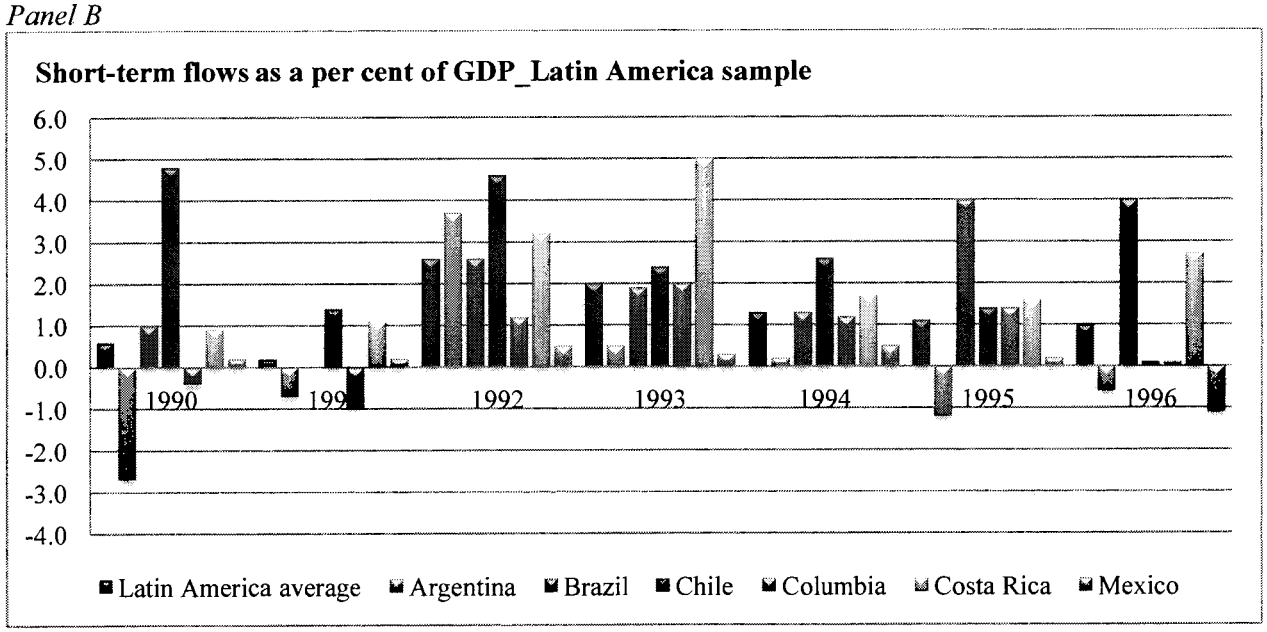
Figure 2: Short-term flows for Asia and Latin America 1990-1996

Panel A



Source: Montiel and Reinhart (2001: 15). This is a graphical form of the data contained in the Table 1.3 of their paper.

Panel B



Source: Montiel and Reinhart (2001: 15). This is a graphical form of the data contained in the Table 1.3 of their paper.

of U.S. dollars, and contains the list of EMEs as defined by the IMF as of 2003 (See note 11), as opposed to the arbitrary sample selected by Montiel and Reinhart.

His analysis provides a wider perspective by considering some of the factors that motivated the inflow episode of the 1990s; specifically, noting that the oil price shock of 1973 had a particularly strong role in generating large deposits of petrodollars that commercial banks deemed profitable investments in the more creditworthy and better performing emerging markets. However, the Latin American sovereign debt crisis in 1982-1983 saw sharp reversals in syndicated bank lending, which in turn gave rise to beliefs that flows to the EMEs would remain considerably low for many years.

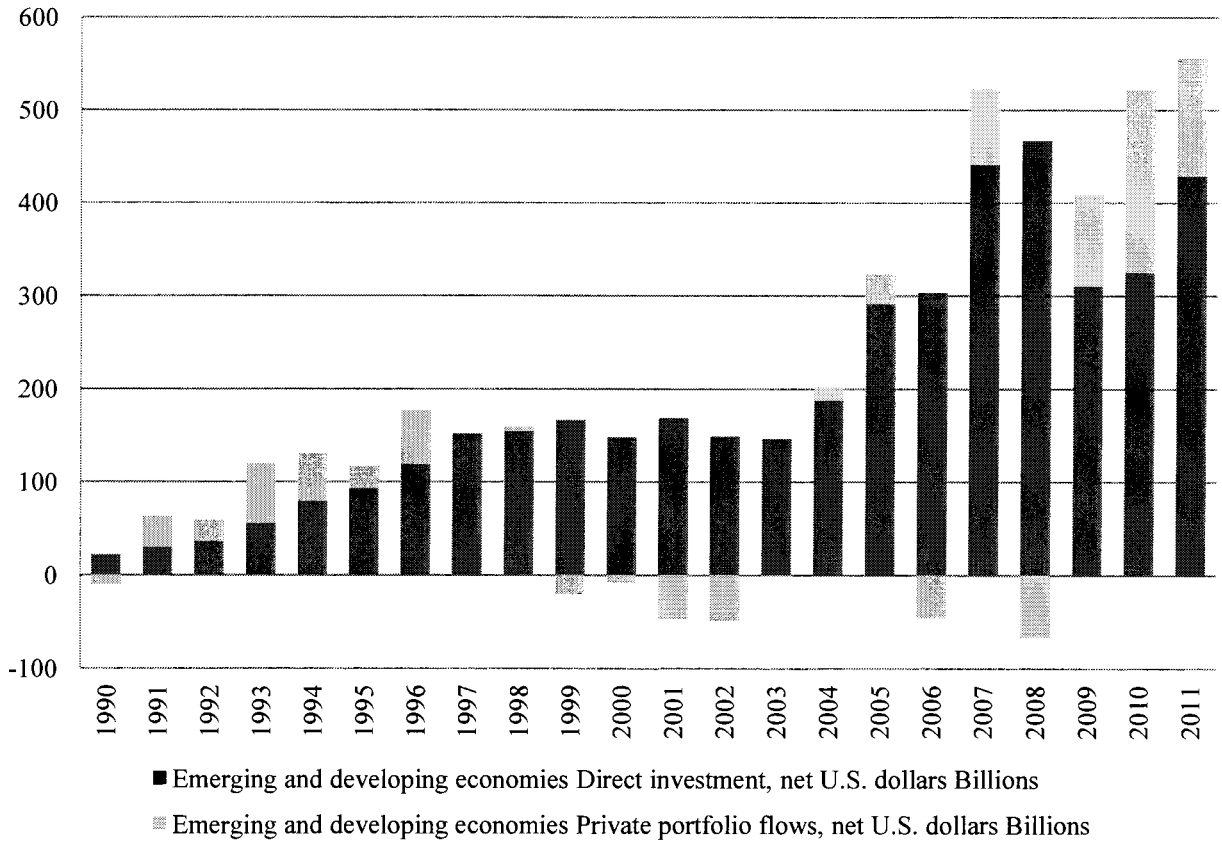
But, as Figure 4 (Panel A) shows, such fears were entirely unjustified as net flows to the EMEs took an unprecedented positive turn increasing from an annual average of $13.76 billion for the period 1980-1989 to an annual average of $121.88 billion for the period 1990-1996. The increase in net private capital flows was buttressed by the increasing volume of both portfolio, short-term, and direct investment flows. Foreign direct investment flows were by far the most stable, given that when total net private flows (including other private flows) peaked at $267.89 billion in 1995 – before the onset of crisis in Asia – direct investment flows peaked much later in 2001 at $169.09 billion (See Figure 4; Panel B). Furthermore, as of 1994 foreign direct flows accounted for more than half of the total net flows into the EMEs. Another important, though less stable, channel of investment into the EMEs came in the form of private portfolio flows. For the period 1991-1996, these made up on average 39 percent of the total net flows into the EMEs.

An important aspect of capital dynamics during the 1990s highlighted by Das (2004) concerns the decreasing volume of bank related lending into the EMEs. As he notes, these were in fact the primary channel of capital injection into the emerging markets throughout the 1970s and 1980s. The decline in bank related lending is noted as being primarily the result of factors ranging from weak growth in the industrialized economies to political instability in Latin America and macroeconomic policy inconsistencies which led to a general tightening of lending standards by commercial banks. This trend is in fact more pronounced for the recent period of capital movement, as bank related flows turned negative for most of the period after the Asian financial crisis (See Figure 4; Panel C).

In all, the dynamics of capital movements into the EMEs during the 1990s are characterized best by two major trends. The first is the increasing globalization of emerging

Panel B

FDI and portfolio flows, net



Source: International Monetary Fund, World Economic Outlook Database, September 2011.

market financial instruments, in that external financing was increasingly being acquired from European and developing Asian stock markets. The second and most important trend has been the increasing influence of institutional investors in global capital markets, while the conventional channel of bank-related lending gradually waned. The latter development is important, as the changing categories of global investors imply an increased risk of financial crises in the EMEs given the ease with which portfolio and short-term flows can be repatriated (Das: 2004).

Before embarking to analyze the dynamics of flows in the more recent period, consider first the very interesting paper in the literature concerning the volatility and desirability of the different components of capital flows by Sula and Willett (2009). They seek to provide some clarity regarding the conflicting results of empirical analyses addressing the aforementioned issue by challenging the conventional methods of investigation.[16] As they note, many studies analyze volatility by considering time periods dominated primarily by capital inflow episodes, without consideration for the crises periods; that is, samples such as those previously considered – 1990-1996. Thus, the implicit assumption made is that volatility during inflow periods is a good predictor of volatility and the size of reversals during crisis periods. In fact, what matters from a policy viewpoint, they argue, is the size of reversals during crisis periods rather than volatility during normal periods. This is because a particular flow may be stable during normal times, but can display large reversals during unexpected crises. Hence, their analysis tries to link together two distinct parts of the literature on emerging market financing: that dealing with the determinants and consequences of 'sudden stops' which has tended to differentiate between normal and crisis periods while not giving due attention to the different components of capital flows, and that dealing with the volatility of flows which has tended to maintain the opposite focus on the different categories of flows.

The authors first consider the relation between the size of reversals during crisis periods and the volatility of flows during normal times. Hence, a distinction is made on the basis of capital flows during normal periods and crisis periods. Countries are selected based on their inclusion in the Emerging Market Bond Index (EMBI+) and the Morgan Stanley Country Index (MSCI). A sample of 35 emerging markets is selected for the period 1990-2003. The time period selected includes many episodes of capital reversals, beginning with the surge in flows following the Latin American sovereign debt crisis and ending before the start of the new trend of reserve

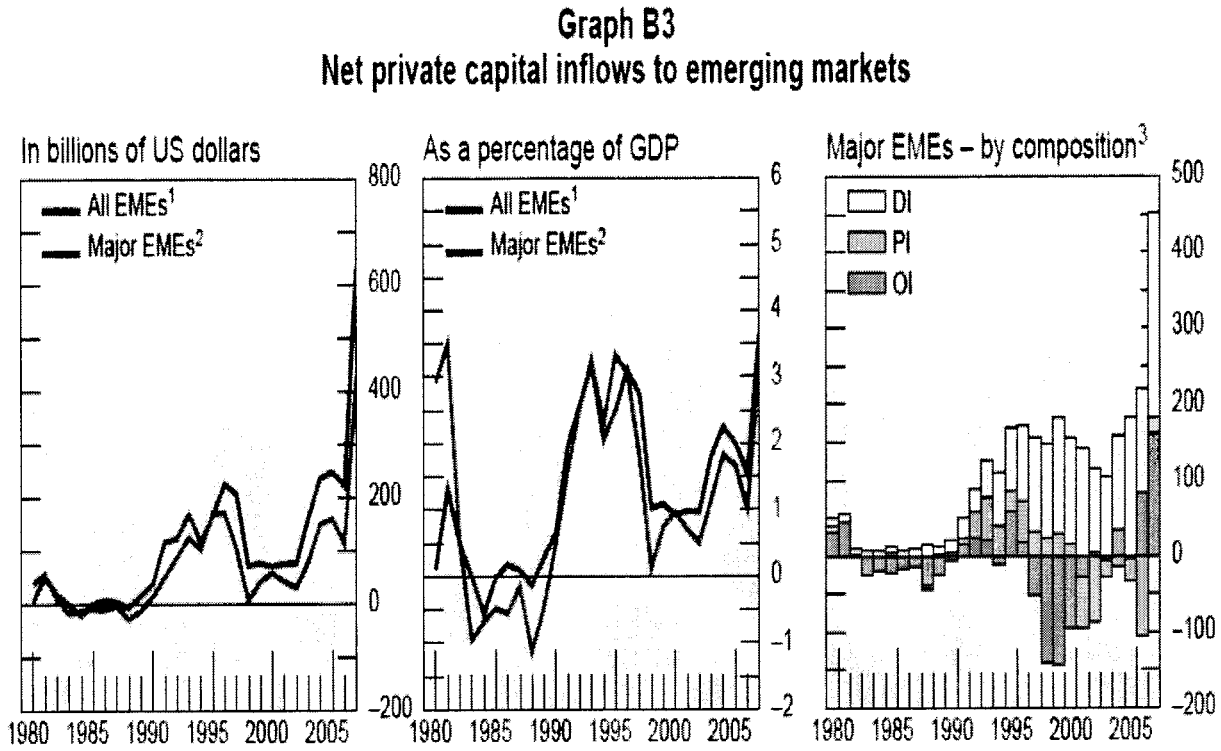
the importance of using samples which include many crisis periods when analyzing the issue of volatility and desirability of certain capital flows. Using such a sample, the authors are able to confirm the conventional view about FDI as the most stable flow even during crisis periods through a simple ordinary least squares regression of the size of capital reversal (the reversal term: note 19) on the sum of the previous five years of capital flows relative to GDP. More importantly, their findings show bank related loans – in addition to portfolio investments – as a highly reversal component of capital flows during crises. This is indeed a relevant finding from the viewpoint of policy when determining the categories of flows on which to apply control programs in seeking to deter and limit the impact of financial crises.

3.2. Capital flows during the 2000s: Stylized facts, new trends and issues

In looking at the recent experience of emerging markets with respect to capital flows, what should be a central concern to policymakers is the resurgence in debt flows as a substantial component of gross private capital inflows. As Figure 5 shows, the two previous experiences of emerging markets with substantial volumes of debt inflows were in the early 1980s and throughout the 1990s – periods which were characterized by numerous debt, banking, and currency crises. A major component of the surge in inflows in the periods after 2000 thus originates from debt related flows. These embody both portfolio debt investments and other investments, whereas equity flows consist of direct investments, and portfolio equity (See Figure 5). Furthermore, the recent experience of the EMEs has also seen an increase in all categories of flows: portfolio debt, portfolio equity, and direct investments (see Figure 6; Panels A and B). Moreover, of concern should be the increasing volume of bank flows to Asia, central Europe, and Latin America. Figure 7 (Panels A and B) shows that in relation to the experience of the 1990s, the recent episode of banking flows to the emerging markets stands in stark contrast when considering the size of such flows.

The recent episode of international capital movement in the EMEs is characterized by another episode of capital infusion. According to BIS (2009), net private capital flows to emerging markets – as defined by the IMF – have increased from $90 billion U.S. in 2002 to about $600 billion in 2007. The recent surge in inflows reflects increased volume in all categories of flows into these economies. However, two trends concerning this current episode set it apart from that which occurred during the 1990s (BIS, 2009). The first distinct feature of

Figure 6: Disaggregated capital flows
Panel A

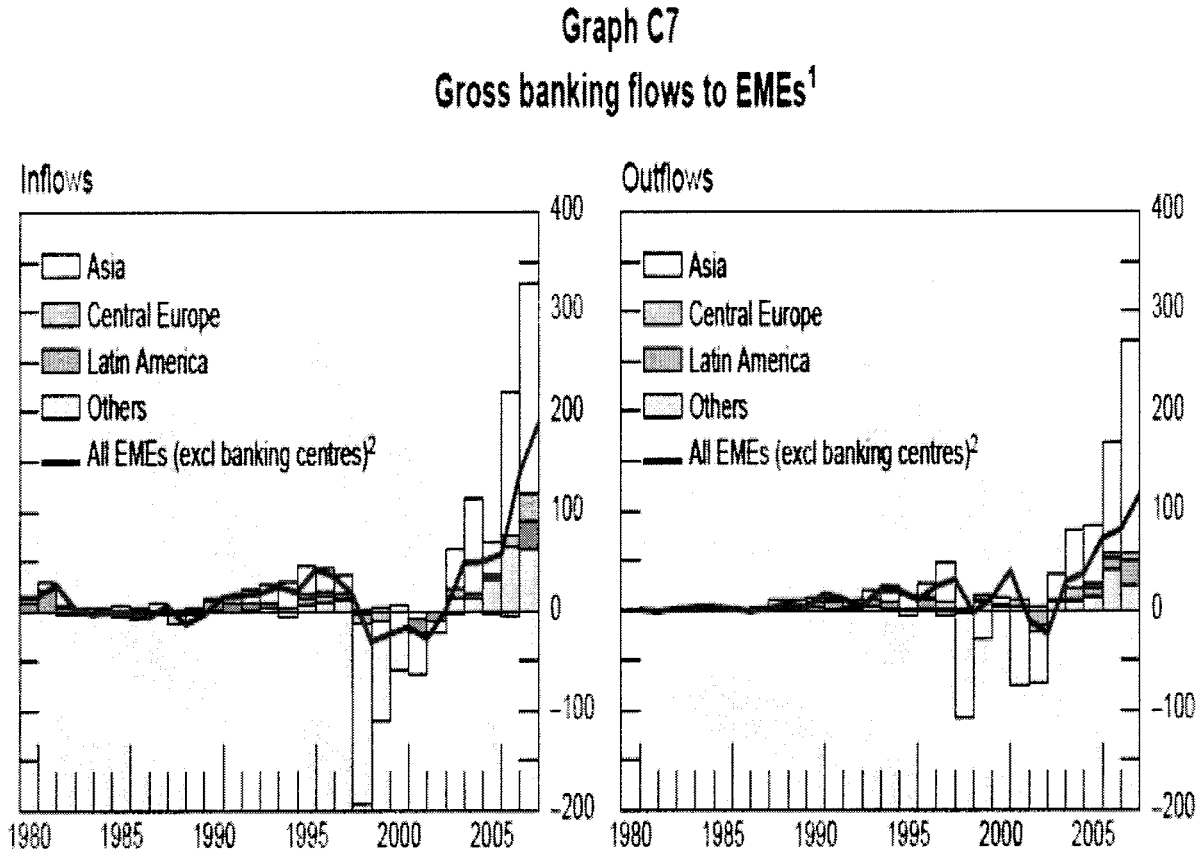


[1] Comprises 142 emerging and developing countries and five small open economies as defined in the IMF WEO 2008 October database. [2] Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Hungary, Hong Kong SAR, India, Indonesia, Korea, Malaysia, Mexico, Peru, the Philippines, Poland, Russia, Singapore, South Africa, Taiwan (China), Thailand, Turkey and Venezuela. [3] In billions of US dollars. DI = direct investment; PI = portfolio investment; OI = other investment.

Sources: IMF, *Balance of Payments Statistics* and *World Economic Outlook*; Central Bank of China (Taiwan).

Source: BIS (2009: 18).

Figure 7: Banking flows
Panel A



[1] Other investment flows that are related to banks; in billions of US dollars. [2] Banking centres: Hong Kong SAR and Singapore.

Sources: IMF, *Balance of Payments Statistics*; Central Bank of China (Taiwan (China)).

Source: BIS (2009: 37).

the recent inflow surge concerns the rising current account surplus recorded by the EMEs. With the exception of South Africa, Turkey, and some economies in central Europe, EMEs as a whole have recorded rising current account surpluses (see Figure 8; Panel A); this has been driven primarily by the Asian EMEs (Figure 8; Panel B). Current account surpluses are generally thought to be more persistent than capital flows; moreover, their persistence is often thought to be associated with an increase in the long-run equilibrium exchange rate of a country.[23]

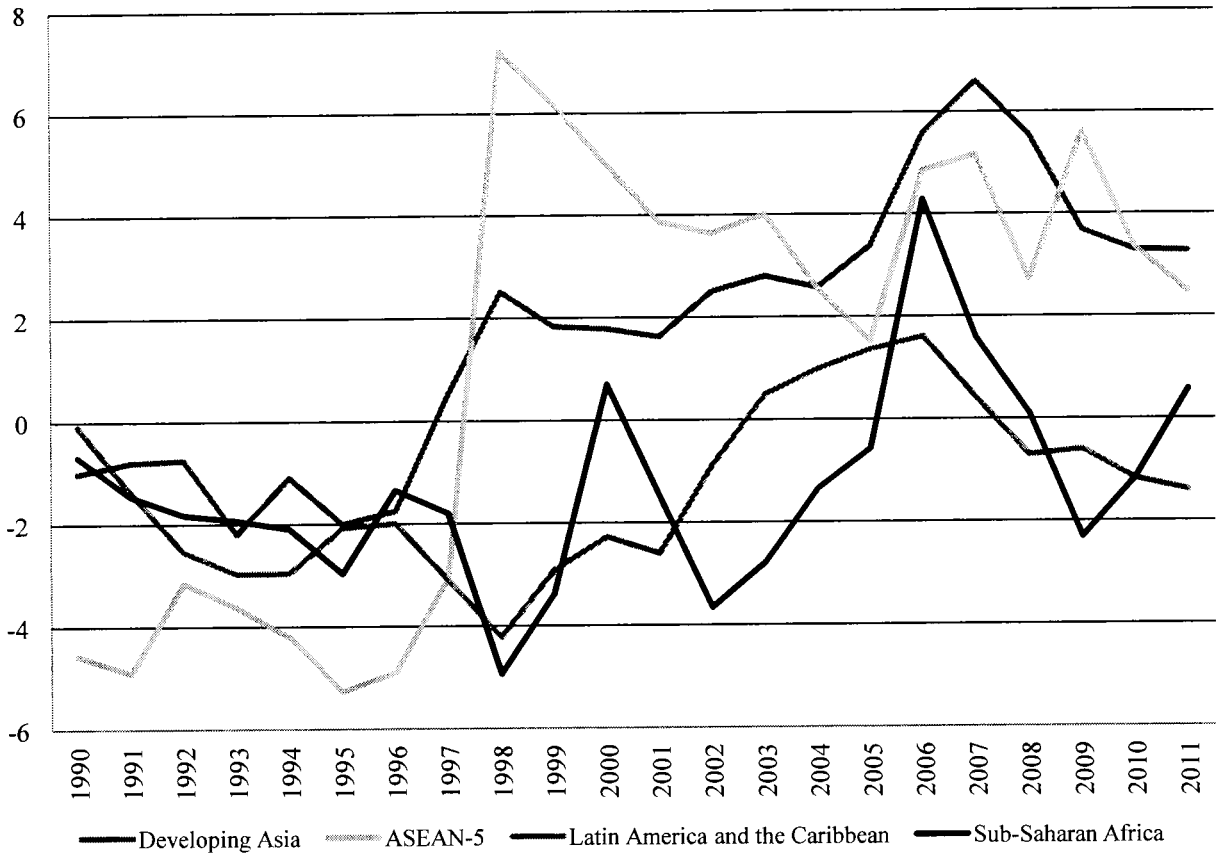
The recorded surpluses for the recent period are opposite to conditions prevailing during the earlier episode of inflows in the 1990s. Inflows during this earlier episode were seen as a necessary consequence or counterpart of the need for external financing of the excess of emerging market investments over savings, so that the EMEs throughout this earlier episode recorded current account balances that were in deficit. External financing during the 1990s thus served to accommodate a low savings rate in the EMEs. The savings ratio for emerging markets has however been rising for most of the period following the Asian financial crisis (BIS, 2009: 21); this trend being driven primarily by dynamics in the EMEs of Asia.

The second distinct feature of the recent inflow surge has to do with the unprecedented increase in international reserve assets held by the EMEs (see Figure 9). The literature has identified two theoretical bases that explain the recent build up in international reserves by emerging economies. The first relates to a concern for currency appreciation that is the consequence of increasing capital inflows. Instead of allowing increased liquidity in the domestic economy, emerging market central banks channel some of the inflows in the form of reserves. The problem however is that this policy consideration begins to lose effectiveness when inflows are large in volume, and there are also fiscal and social costs associated with accumulating reserves (BIS, 2009; Mendoza, 2010).[24]

Another explanation for the reserve build up relates to the fact that reserves embody a sort of insurance in periods of capital reversals and crises. Choi, Sharma, and Strömqvist (2009) analyze the extent to which the recent surge in net capital flows (capital inflows less outflows) has been a factor in explaining the recent surge in reserve assets held by the EMEs. They estimate panel data models for the period 1980-2005 for 36 emerging markets and 24 advanced economies. The aim of their study is determining the extent to which EMEs have developed stockpiling/precautionary motives in increasing their reserve assets. They note that by the end of 2005, the average reserves-to-GDP ratio reached 19 percent for emerging markets, while at 10

Panel B

Current account balance by regions; percent of GDP



Source: International Monetary Fund, World Economic Outlook Database, September 2011.

percent for advanced economies. Furthermore, they emphasize that the pace of reserve accumulation in emerging markets is well in excess of levels predicted by standard reserve holding models, and the Guidotti-Greenspan rule that countries hold reserves to cover the size of short-term external debts.

Reserves are part of a country's liquid assets, and its management has become an important aspect of macroeconomic management. As the discussion on models of speculative attacks (section 2 of this paper) has highlighted, many of the crises during the 1990s were seen as originating from the inability of monetary authorities to defend the fixed price of an asset (currency) with the use of their reserves. Given an external shock that leads to an initial reduction in inflows (or to outflows) of capital from an EME, the stock of reserves held by the central bank is seen by market agents as insufficient to maintain the price-fixing scheme, which leads to a speculative attack on the currency and a further deterioration of flows to the EME. The stockpiling of reserves during inflow episodes can thus be seen as a precautionary measure that serves to lessen the impact of financial disturbances – given the recent surge in capital inflows into the EMEs and the ease with which capital can exit.

Choi, Sharma, and Strömqvist thus analyze the extent to which variations in net capital flows (specifically those related to the recent inflow episode) help in explaining the increasing reserve holding of EMEs, that is, whether countries have used this recent episode to stockpile on reserves with a precautionary motive. The issue of analyzing the determinants of a country's reserve behaviour is not without controversy. Mendoza (2010) notes the particular problems associated with the choice of the crisis model used to explain reserve behaviour, which greatly influences the empirical results. And the fact that crisis models are often developed after the fact means that policymakers are offered little guidance from the predictions and conclusions of empirical models.

Furthermore, there is the issue of a division in the theoretical literature discussed by Choi, Sharma, and Strömqvist (2009): the external versus the internal financing view of reserve. Those holding to the latter view (New Mercantilism) argue that increases in reserves are primarily the result of a concerted policy of protectionism, whereby reserve acquisitions are financed by current account surpluses via a policy of maintaining a competitive exchange rate and high export demand. Those holding the former view however argue reserve accumulation to be the result of increasing flows into EMEs in a manner consistent with the desire to limit the impact of

yielding foreign assets given the relative ease with which they can attract foreign capital even in crisis periods.

Mendoza (2010) takes another route in trying to understand the recent trend in increased reserve holding by emerging market and developing economies. As he makes clear, his analysis does not concern itself with determining causation, i.e., whether variations in net flows of capital help explain variations in reserves as is the case in Choi, Sharma, and Strömqvist (2009). Rather than trying to empirically establish the validity of the external financing view of reserve accumulation, Mendoza takes as given the general finding associating recent surges in reserve accumulation to precautionary motives of reducing crisis risks by developing economies.

He seeks to discover whether there have been changes in the crisis vulnerability conditions of developing countries following the Asian financial crisis to merit a change in reserve behaviour; and more importantly, whether reserves have been responsive to the changing patterns in the crisis vulnerability conditions of these economies. He is aware that establishing causation – i.e., finding variables that explain changes in reserves – is strictly out of hand given both that the various quasi-fiscal and social opportunity costs of holding reserves are difficult to measure and thus excluded from most empirical models, and that empirical models analyzed are often not general equilibrium in nature in failing to account for features such as monetary policy and exchange rate regimes. These two exclusions are important determinants of reserve behaviour, for they can not only influence reserve policy but can also influence other macroeconomic variables which affect the latter.

In general then, Mendoza looks at the elasticities between international reserves (minus gold) and a few crisis vulnerability indicators, with particular focus on whether the post-Asian crisis period is characterized by a structural break in crisis vulnerability that justifies the recent build-up in reserves by developing countries. Two additional aspects of his analysis is examining whether there have been differences in the reserve behaviour of countries that are historically associated with different types of crises – such as export commodity price shocks, debt defaults, and sudden stops; and whether China's reserve build-up is out of step with other developing countries.[25] The analysis of these three empirical questions unfolds through an examination of the movements in the crisis vulnerability indicators in the pre- and post-Asian crisis periods, thereby providing a basis for making sense of the recent reserve build-up by emerging and developing economies.

external factors (e.g., recent rounds of easing in monetary policy in advanced economies) and,

iii. Increasing international reserves has become a mean by which emerging economies attempt to maintain a strategy of exchange rate competitiveness and export-led growth, and prevent overheating in certain sectors of the economy (e.g. real estate). However, there are some limits to both policies of reserve accumulation and of sterilizing inflows in the context of emerging capital markets.[26]

This section has considered the recent surge in capital flows into the EMEs for the years following the Asian financial crisis as characterized by a resurgence of both debt flows and bank related lending into emerging economies. Such flows pose particular problems for macroeconomic management given both that they do not embody the attribute of equity flows – which shift the risks associated with investment mostly to lenders – and the ease with which they can exit and destabilize an emerging economy (Sula and Willett, 2009). Indeed, these flows in addition to foreign-currency (hard currency) denominated debts incurred by domestic agents in the EMEs are seen as mainly responsible for the financial crises of the 1990s. Furthermore, the recent trends of rising current account surpluses and international reserves for the EMEs complicate macroeconomic management. They are both seen as implying a need for exchange rate readjustments (i.e., currency appreciation) in light of changing economic fundamentals. The main issue from the viewpoint of policymakers however is the degree to which the recent influx of foreign capital can be seen as permanent (i.e., related to fundamentals) or temporary (i.e., dependent on accommodative monetary policies in the advanced economies: positive money supply growth and near zero long-term interest rates).

In light of these issues, capital controls emerge as a relevant policy tool at the disposal of authorities. In principle, capital account restrictions are able to lessen the extent to which the two sources of pressure on reserve accumulation operate. Such measures are able to reduce the flow of short-term capital into an EME thereby reducing the precautionary/stockpiling motive for accumulating reserves. Secondly, if properly set-up they are seen as able to reduce the volume of flows into EMEs thereby reducing exchange rate fluctuations and thus lessening the need for intervention by emerging market central banks in preventing currency appreciation. The following section then takes up the issues surrounding capital account restrictions, by

Ulan (2002) emphasizes the need to address first and foremost the market failures which generate these "second-best" concerns before considering controls as a viable option. Indeed this is the view shared by the IMF in giving support to the recent discussions and proposals surrounding the reimplementation of controls (Ostry and others, 2010). In particular, herd behaviour in capital markets is often the consequence of the inability of foreign investors to differentiate between emerging markets in times of crises given incomplete information, which in turn exacerbates a behaviour that results in contagion. The solution to such problems is found in better risk management and prudential regulations of the banking sector, and in consistency and transparency in accounting standards and fiscal and monetary policies. Overall then domestic structural and institutional reforms are seen as prerequisites and complements to the effectiveness of capital controls. Chile's use of controls during the 1990s with the accompanying focus on domestic institutional fiscal and monetary reforms, and the subsequent strength displayed during the 1997-1998 financial crisis is evidence to Ulan of the complementary nature of reforms and the effectiveness of controls, when compared to how the country's fared during the sovereign debt crisis of the 1980s.

Magud, Reinhart, and Rogoff (2011), in a valuable account on the literature on capital controls, note the four fears animating policymakers in the EMEs which lurked beneath the "second-best" arguments in favour of capital account restrictions. The interesting aspect of these four fears is that each corresponds to a particular basis on which empirical studies have sought to analyze the effectiveness of controls during the 1990s. The 'fear of appreciation' is associated with a desire to maintain competitiveness in emerging economies where growth is primarily export-driven. The increasing volume of inflows generates a greater demand for the emerging market currency, thereby putting upward pressure on its value which in turn leads to a fall in the value of exports and a deteriorating current account balance. Hence, controls which are effective in reducing the volume of inflows during episodes of capital infusion are seen as desirable in stabilizing the exchange rate and increasing competitiveness.

The issue concerning the maturity structure of foreign liabilities is also of importance to policymakers. As previously discussed, the increasing volume of debt flows into the EMEs during the recent surge in inflows should signal alarms if the latter are either predominantly short-term in nature, denominated in foreign currency, or finance investments that do not generate future income streams for repayment. The recent episode of capital infusion into the

discussions and attempts, the focus will in part be on the ways various studies have gone about empirically analyzing the success of controls at achieving some of these policy objectives.

4.2. Some considerations in analyzing the effectiveness of control measures

Notwithstanding considerations regarding the particular definitions of "success" employed by studies which have looked at the effectiveness of controls, there are still other important dimensions that must be brought into focus. There is generally a distinction between controls applied to capital inflows and those applied to outflows. There is almost universal consensus in the literature on the ineffectiveness of outflow controls in preventing capital flight in the context of emerging markets. This is a factor of the creativity of market agents and the difficulties associated with preventing capital flight in times of acute economic distress as agents are willing to burden very high costs to evade restrictions and navigate towards assets with better quality (i.e., lower risks). The sole exception on this front is the use of outflow controls by Malaysia in the mid- through late-1990s (Magud, Reinhart, and Rogoff, 2011). The focus of this section however will be on the effectiveness of measures employed by emerging market authorities to restrict capital inflows.[29]

A second important distinction is that between controls that are primarily market-based (e.g., an implicit or explicit tax on flows) and those which place quantity limits on capital movements (e.g., quotas or limits on foreign currency exposure by financial intermediaries). The former are generally considered to be less distortionary to economic activity. This distinction is relevant in so far as it is used as a basis to capture the intensity of capital account restrictions in constructing an index of financial openness.

For instance, Campion and Neumann (2004) construct a capital-control index for Latin America that takes the value of '0' in a given quarter if for most of the period no restrictions or taxes were imposed on capital inflows, a value of '1' if controls were market-based in nature, and '2' if these were administrative (i.e., quantity-based) in nature. The assumption here is that administrative control measures are more restrictive relative to market-based ones. The justification for this assumption might in fact be an attempt to capture the extra distortionary costs and effects of quantity-based restrictions. Montiel and Reinhart (2001) however follow the standard method in the literature in constructing their yearly index of capital account openness: a value of '0' indicates that no restrictions were placed in a given year, a value of '1' is given if

are taken as relevant when looking at outcomes, that is, the actual level of financial activity within an economy. Similarly, within the *de facto* classification there are issues relating to which variables best proxy for actual openness.[34]

And last but not least, a relevant distinction within the literature on capital controls has to do with the types of studies conducted by researchers. Some have used particular countries' use of controls to conduct empirical case studies, while others have used panel datasets to conduct cross-country analyses. Arguably, the latter sort of analysis seems more fitting when considering the effectiveness and applicability of controls on a general basis.

4.3. Capital controls during the 1990s

The theoretical concerns grounding "second-best" arguments (Ulan, 2002) and the underlying fears animating policymakers and public officials (Magud, Reinhart, and Rogoff, 2011) certainly gave momentum to considerations of controls as a legitimate option in macroeconomic management in the 1990s. It is worth remembering, however, that restrictions on international financial transactions were an important and vital component in the establishment of the international financial architecture of the post-war period after 1945. Gallagher (2011) gives an account of the evolution of the political-economy of controls as developing along three phases. The first phase characterizes the Bretton Woods era, in which the liberalization of finance was seen as most efficient from a societal viewpoint if well embedded in an institutional framework of controls and prudential regulations. So that controls were in effect but one part in a barrier erected by authorities to prevent private market forces from taking advantage – by speculating around – the then necessary nature of government involvement in guiding the development of certain sectors and industries of the economy.

The acceptance of such a developmental framework however was to give way to a consensus in advanced countries that saw the applicability of a similar strategy in the emerging and developing world as both unnecessary and an impediment to development starting from the 1970s until the onset of crises in Asia and Latin America in the late 1990s. Gallagher (2011) argues that attitudes following the recent global financial crisis embody a fundamental break from the neoliberalism of neoclassical economics; specifically noting that the increasing influence of other capital centers such as China, India, and Brazil has meant a greater acceptance of alternative developmental frameworks. More importantly, the recent crisis has generated a

an economy (inflation). The concern with inflation thus causes an emerging market's assets to appear more attractive from the viewpoint of foreign investors, thereby leading to inflows of capital into the emerging economy. Under a fixed exchange rate, the increased demand for domestic/emerging market assets puts downward pressure on interest rates (thereby rendering monetary policy ineffective), whereas under a floating regime, the exchange rate – through an appreciation – is able to absorb the inflow surge that is associated with the fight against inflation.[35]

The authors are able to frame surges in flows into the EMEs as originating in part from exogenous shifts in policy objectives (at least as it relates to the 1990s and the focus on inflation and price stability). So that controlling capital flows becomes important in that, according to them, it allows an emerging economy to maintain focus on price stability while avoiding the loss in competitiveness that is associated with currency appreciation. The assumption here is that flows to the EMEs respond to short-term considerations such as interest rate differentials (at the minimum, short-term flows) and that these are in fact the flows that controls are restricting in ensuring that a policy focus on inflation remains effective.

The pertinent question as it relates to the re-adoption of control measures by many EMEs during the 1990s is the extent to which they were able to bring about the desired outcomes. In reviewing the empirical literature, focus is placed on studies which examine the two desired objectives of reducing the total volume of inflows and of altering the composition of flows towards longer maturities (although some of the studies which will be covered address all or more components in the main consideration having to do with what constitutes "success"). Another basis on which this review looks at the literature is that having to do with the types of studies – country case studies versus cross-country studies. As Magud, Reinhart, and Rogoff (2011) note in their insightful account of the literature, one of the main difficulties preventing conclusive agreement on the effectiveness of controls has to do with the eclectic nature of not only the empirical methodologies used but also the sample of countries surveyed by researchers. Though cross-country analyses tend to imply a more general applicability of results, the following review also covers some of the many country case studies in the literature, as the goal is not only to draw out some of the policy conclusions but also to identify and exhibit the various empirical methods used to address the issue of effectiveness.

targeting by the central bank – in an attempt to tackle inflation – implied high interest rate differentials with advanced economies.

The confluence of these factors then pointed towards increasing volumes of flows into Chile. This in turn poses a challenge for macroeconomic management given the liberalization of finance Chile underwent in the previous decade (thus the exposure to short-term debts), the high degree of monetary policy demanded by disinflationary policies, and the desire for external competitiveness (given the target zone regime – i.e., a quasi-price-fixing scheme – that Chile had in place during that period to stabilize the value of its currency). The authors seek thus to determine whether the URR policy was able to alleviate this challenge to macroeconomic management.[36]

Their analysis unfolds from the estimation of a reduced-form equation for capital flows in which the authors run separate regressions of both short-term flows (with maturity less than 12 months) and total flows on the interest rate differential adjusted for expected devaluation, the interest-rate equivalent of the URR (see note 31), and control variables that have been found to be statistically robust determinants of capital flows in the literature. The control variables chosen are credit ranking (index published once a year by Euromoney in quarterly frequency), GDP growth, and the current account-to-GDP ratio. All control variables, in theory, should positively impact flows. The last control term listed is thought to characterize inflows used to finance an excess of domestic spending over savings. Hence, the analysis determines the extent to which the URR is able to influence the behaviour of inflows not "needed" in the sense of financing such excesses. Finally, to avoid endogeneity and simultaneity issues they use a two-stage least squares estimation with lagged variables as instruments.

The evidence presented in De Gregorio, Edwards, and Valdés (2000) points to the URR as having a compositional effect on inflows. In particular, they find that a tightening of the URR is associated on average with a reduction between 0.5 and 1 percentage points in short-term inflows, while results on the volume effects of the URR policy were not statistically significant. The conclusion from their analysis is that the URR was able to alter the composition of inflows towards longer maturity while not necessarily able to reduce the volume of inflows. This would seem to suggest that the policy was also ineffective at preventing currency appreciation in Chile during the period 1991-1998. Though, an important drawback in the analysis offered is the lack of consideration given to the simultaneous presence of two policies that, theoretically, are able to

carried out with the various subcomponents of the capital account as dependent variables; one the one hand, they are considered in relation to GDP (to capture volume effects), and are also considered as shares of total inflows (to capture compositional effects).

Their results indicate that capital controls – as measured by the constructed index that proxies for them – were effective in reducing the volume of short-term and portfolio flows (bonds and equity) for the cross-country sample during the considered period, though the estimates obtained have a low level of precision (based on the t-statistics). The evidence however is more conclusive with regards to the compositional effects of controls; specifically, they find that over the period controls were effective in lowering the share of short-term and portfolio inflows in total inflows while increasing the share of FDI.

David (2007)

He considers the effectiveness of the imposition of taxes on both fixed-income investments (mostly bonds) and foreign currency loans by Brazil over the period 1993-1999. Much like the URR, these taxes on inflows embody forms of control that are price-based and attempt to shift the composition of investment towards longer maturities. David notes however that as it relates to the experience of Brazil during the 1990s, the constraints of the "impossible trinity" were fully at work: a tension was evident from the desire of authorities to maintain an open capital account (as of policy changes in 1987), to sterilize inflows in preventing inflation via high interest rates, while also maintaining a fixed (or quasi-fixed) exchange rate regime.

As previously discussed, sterilization through open market operations that reduce domestic liquidity in the presence of an open capital account leads to an increase in speculative (short-term) flows to the economy, which in turn puts pressure on the currency to appreciate (see note 29). Currency appreciation is avoided only by means of an increase in international reserves. Furthermore, increasing flows in the presence of a fixed exchange rate puts downward pressure on interest rates and renders disinflationary policies ineffective (Cordero and Montecino, 2010). The tax on foreign currency loans and portfolio flows essentially aimed to mitigate these particular dilemmas for monetary policy.

The data on flow measures are from the Brazilian Central Bank. He considers two subcomponents of the capital account – fixed-income and portfolio flows (on a net basis) – and net total capital flows. It must be noted that David uses the measures on a net basis (i.e., inflows less outflows) rather than on a gross basis as most studies in the literature have done. As he takes

the 'push' factors associated with interest rate differentials. The measures used by Malaysia took on a variety of forms ranging from an URR to more direct measures such as bans on foreign currency exposure and limits on maturity mismatch and un-hedged liability exposure by domestic banks. The authors find, through descriptive analysis of time series, that these measures were able to reduce the volume of short-term flows and the total volume of flows during the period. However, they note that authorities did lower interest rates during the period (thereby decreasing arbitrage gains); it is evident then that their findings might be related to this policy response rather than the control measures. More formal analysis is in fact needed to draw conclusive evidence of their effectiveness.

Malaysia's use of outflow controls is not discussed, as these measures aim primarily at preventing currency crises and therefore do not relate to the primary focus of this review which is on the volume and compositional effects of controls (see note 32).

Columbia's use of inflow controls took the form of an URR which was modified throughout the control program to discriminate based on maturity and thus type of flow. The authors note that there is controversy as it relates to Columbia's use of the URR as it has been found to be ineffective at achieving the main policy objectives, though controls in the country were more discriminatory against short-term flows relative to Chile's URR program. However, they point to the lack of an administrative structure in Columbia during the period to effectively enforce the controls, which meant of course a high level of evasion of the URR.

Chile's URR control program is seen as the most effective on the basis of the main consideration of section 4.1, with strong evidence from the more formal analyses in the literature. But, the authors note that there remains controversy as to whether the measures were effective in preventing an appreciation of the currency and reducing the volume of flows during the 1990s.

Lastly, the authors consider Brazil's use of inflow controls as motivated by the consequences of a desire to stem inflation; this of course implied high domestic interest rates. Controls were used to effectively limit currency appreciation (as Brazil maintained a crawling-peg to the U.S. dollar) and reduce the share of short-term inflows in total inflows (as the former made up 2/3 of the latter in 1995). The measures used took the form of both prudential rules on banking practices, limits and restrictions on certain financial transactions, and taxes on fixed-income and portfolio flows (David, 2007). The authors note that the literature has found Brazil's

10 low-income non-oil exporting countries. The inclusion of high-income countries may in fact influence the results. An interesting empirical analysis would be taking the sample of 15 EMEs in Montiel and Reinhart (2001) and conducting a similar analysis using Schindler's (2009) dataset.

Magud, Reinhart, and Rogoff (2011)

The study by Magud, Reinhart, and Rogoff (2011) embodies the most comprehensive survey of the empirical literature on the effectiveness of the use of capital controls by emerging markets during the 1990s. The creativity of the paper comes from the fact that the authors go about building indices of capital control effectiveness based on the literature's findings in a very insightful manner. They construct two indices: Capital Control Effectiveness (CCE) and Weighted Capital Control Effectiveness (WCCE) indices. The latter index differentiates between the different methodological and statistical rigour applied in the studies considered by assigning a weight of '0.1' to studies that do mainly descriptive analysis of events and time series, '0.5' to ones that are formal but lack formal means of empirical testing, and a weight of '1' to studies with highly developed econometric techniques. They divide the studies considered into three broad groups: those analyzing the effects of controls on (1) capital inflows, (2) capital outflows, and (3) those that use multi-country panel datasets. They considered a total of 24 studies for the first group looking at the experiences of various countries (Brazil, Chile, Columbia, Czech Republic, Malaysia, and Thailand), 10 studies for the second group also for various countries (Malaysia, Spain, and Thailand), and 5 studies for the third group.

They then proceeded to assess the findings of studies individually along the basis of the main consideration of effectiveness (or what constitutes a success) in the use of control measures (see section 4.1 of this paper), assigning a value of '1' if the study found capital account restrictions however defined to be effective at achieving the desired objective, a value of '-1' if ineffective, and a value of '0' if the question was not addressed in the study. Based on the three main groups, they construct two indices: one accounting for the effectiveness of controls based on the valuation system (-1, 0, 1) without accounting for studies' methodological rigour (CCE) and another differentiating between studies based on their level of formalism (WCCE) using the weighting scheme (0.1, 0.5, 1). In an appendix to the paper, they go about assessing in detail the empirical methodologies used by each study when deriving its conclusions, and use this information to build the WCCE index.

Moreover, the volume of inflows during the recent surge of capital into emerging and developing countries has been found to reflect on the unprecedented levels of international reserve accumulation by these countries (Choi, Sharma, and Strömqvist, 2009; Mendoza, 2010). So that policy responses aimed at influencing the volume of inflows (at least in the short-term) can be seen as eliminating a source of pressure on reserve accumulation. Secondly, the composition of flows matters when looking at the reversibility and the risks associated with certain categories of flows and the return in bank-related and debt flows to the EMEs (Sula and Willett, 2009; section 3.2).

4.5. Capital controls in the late 2000s

There are ongoing discussions surrounding the re-imposition of capital account restrictions in the context of the EMEs. These discussions have arisen primarily as a result of the recent global financial crisis, and the subsequent dynamics of international capital movements into the EMEs as monetary policy in the advanced economies takes a more accommodative stance in attempts to boost economic activity.[37] Specifically, some have considered the merits of returning to control measures in light of differences in the economic environment that made controls generally effective in the 1990s, while others have looked at the necessary preconditions that would justify the re-imposition of control measures as well as the institutional framework needed for their effective use.

Though it is still too early to assess the extent of success in countries that have re-imposed controls on international financial transactions following the recent crisis, it is possible however to examine the main areas of contention in the current debate, and more importantly, how the current debate reflects on that of the 1990s.

A major line of division in the current debate surrounding the re-imposition of controls seems to be between those who argue for controls as complements to the adoption of macro-prudential measures and those who see their uses simply as measures of last resort. In some respects, this division appears to mirror some of the old debates on controls at the time of the design of the current international financial system at Bretton Woods. The consensus then was that controls should embody one of the pillars in a barrier set up to restrict volatile movements in capital flows, rather than "just one rock in a swiftly flowing stream" (Gallagher, 2011). The political-economic history of controls suggests an evolution from the Bretton Woods era in

perception of unfairness in China's heavy purchases of foreign currency in keeping the value of the renminbi artificially low. Evidently, such a consideration on the part of emerging and developing countries is justified from their viewpoint only if similar considerations of the external effects of domestic policy are reflected in the policies of advanced countries.

Secondly, policymakers in the EMEs, according to Ostry and others (2010), must also look at reserve accumulation and sterilization as initial actions in reducing the volume of liquidity in the domestic economy. But, as previously noted, there are concerns that emerging economies' reserve holdings are well beyond levels deemed appropriate from a precautionary perspective (Choi and others, 2009; Mendoza, 2010). Lastly, the authors emphasize the use monetary and fiscal policy as initial responses in stemming capital inflows. Specifically, they consider appropriate attempts at reducing interest rates so that incentives for cross-border short-term investments are eliminated and at fiscal tightening so that growth in domestic demand which generates the formation of asset-price bubbles is attenuated. It must be noted however that cutting interest rate differentials which are the main 'push' motivations for short-term investments to the EMEs comes at the cost of increased inflation within the framework of the Taylor rule, and that fiscal contraction can be seen as unwarranted if inflows are driven primarily by external factors and short-term considerations rather than fundamentals. The complexities in managing international financial flows absent agreed upon transnational rules and more encompassing coordinated policy actions at the international level point to controls on capital inflows as a second-best response to the recent surge in inflows to the EMEs.

5. Conclusion

This study aimed at a review of the theoretical and empirical literature on financial crises and the use of capital account restrictions in mitigating their effects. The time period considered is from 1990 to the present. The main focus has been on emerging market economies, primarily those of Latin America and Asia. The theoretical models on financial crises have highlighted the channels through which crises can unfold, and the particular mismatches in policy and management which can foster financial instability.

The increasing integration of emerging countries' capital markets into global markets and the nature of the crises that engulfed Asia and Latin America during the late 1990s have re-ignited debates concerning the costs and benefits of financial integration and interdependence.

There is debate however on the extent to which these measures should be adopted; particularly as it relates to their uses as complementary measures to macro-prudential regulations or measures of last-resort. Absent an international regulatory framework in managing the intricate financial transactions and channels of modern finance, capital controls applied at the national level can be seen as second-best responses in solidifying the gains from financial integration and interdependence for emerging economies.

governing the banking sectors of EMEs, or changes in the policy stance of monetary and fiscal policy influence capital flow dynamics in the EMEs. See for instance Kim (2000) and Alfaro and others (2006: 12-18) for discussions on the degree of influence of institutional factors. Doubtless both factors should theoretically influence flows; the issue however from the perspective of policymaking is the degree to which one set of factor dominates the other. The focus of this paper is not so much on the determinants of capital flows, but rather on the degree to which controls are able to influence their volume and composition.

[11] The IMF includes 143 emerging and developing economies in their definition of EMEs, as well as five advanced economies: Hong Kong SAR, Israel, Korea, Singapore, and Taiwan. As such, it represents the broadest measure of emerging market activity. The World Bank includes all developing economies, but inclusion is based on gross national income per capita; so that, many oil exporting Middle East economies with high income per capita which are included in the IMF dataset are excluded from the World Bank's. Lastly, the Institute of International Finance (IIF) maintains the least broad measure, including only 50 low- middle- and high-income emerging economies. See BIS (2009: 147) report.

[12] Net capital flows = Net foreign direct investment + Net portfolio investment + other long- and short-term flows + Official and private borrowing. Consider the balance-of-payments (BOP) identity: Current account balance + Capital account balance + Financial account balance = Change in official reserve. So that, Financial account balance = Net official and private flows + Net errors and omissions => Financial account balance = Change in official reserve – Net errors and omissions – Current account balance – Capital account balance. So that, Net private capital flows = Financial account balance – Official flows => Net private capital flows = Net official and private flows + Net errors and omissions – Official flows. Net private capital flows thus give a measure of the volume of non-official capital entering the EMEs, that is, capital entering for purposes of private ventures.

[13] This is obtained by averaging total flows for each region over the period 1990-1996.

[14] In analyzing the variance of flow components, they make use of coefficient of variation analysis – which is a measure of variability obtained from the ratio of the standard deviation of the flow and its mean. See note 15 for a discussion on the different methods used in the literature in relation to the variability of the different components of capital flows.

[15] In contrasting the analysis of Montiel and Reinhart with that of Das, note must be taken of the fact that the two studies make use of different methods in analyzing the dynamics of capital flows. While the former uses coefficient of variation analysis on the time series to derive conclusions on volatility, the latter engages in purely descriptive analysis of the data on flows. There are of course more advanced statistical methods used in analyzing the behaviour of variables over time. For instance, as it concerns the issue of volatility the literature that deals with the composition of flows and the desirability of certain types of flows has used the popular and less sophisticated techniques of simple standard deviation calculations and coefficient of variation analysis to the more sophisticated techniques of Kalman filtering and vector autoregression. Sula and Willett (2009) discuss the desirability of the two popular and less sophisticated techniques. They note that standard deviation analysis gives only an absolute measure of variability, one that is unrelated to the size of the particular economies. Coefficient of variation analysis on the other hand does relate variability to size, however not of the economy but rather to the size of the capital flow in question. They note further that what is most important from a policy perspective is volatility relative to some measure of loss, such as international reserves, national income, or financial sector fragility.

[16] For instance, they consider some studies that find compositional issues to be irrelevant, while others observe differences in terms of volatility between long- and short-term flows, while still others argue about the relative volatility of the different categories of short-term/non-equity type flows. The study by Sula and Willett fall into the third category of such studies. There are also methodological issues surrounding for instance the particular method used to study variability and the sample period considered for such a study (which is a point of contention of Sula and Willett).

[17] The authors use a threshold of 2.5 standard deviation in establishing the crisis periods used in their analysis.

[18] See Table 1-a in Sula and Willett (2009: 301).

[19] The capital reversal term used by Sula and Willett is the following: $K_{t-1} - K_t/GDP_{t-1}$, where K is the particular capital flow component such that a larger value for this ratio indicates a larger reversal of the flow. The problems associated with non-stationarity are avoided by lagging the variables.

[20] See Table 1-b in Sula and Willett (2009: 302).

[21] The authors also compute the coefficient of variation of the reversal term for the whole sample (including the crisis periods) and a sample excluding them. The surprising find here is the lack of discernible patterns in the

ineffective. Also, the scope for OMOs is constrained by the imperfect substitutability of emerging government securities with the sorts of assets foreign investors want to hold (bonds and equities). He notes that these limits have led some emerging countries to use other less conventional measures such as unremunerated reserve requirements, easing restrictions on outflows, and interest equalization taxes.

[27] In a study of the literature on financial globalization – which has expanded considerably following the Asian crisis of the late 1990s – Kose and others (2009) bring to the center the debates between those who argue for financial globalization and believe it to be associated with more gains than losses and those who favour limiting financial transactions in light of how market imperfections can cause external flows to destabilize emerging economies. The former view however is in fact aware of the costs associated with financial integration given the substantial losses in output that come from crises, but capital controls should in its logic be the last option, well after domestic reforms of banking practices, fiscal and monetary policies, and strengthening local capital markets. Those favouring capital controls (i.e., "putting sand in the wheels of finance") often target short-term or speculative flows for control programs rather than all forms of investments. But the main impulse to the latter group's arguments is the lack of empirical evidence associating increased financial integration with decreased volatility in output and consumption (i.e., smoothing behaviour), sustained increasing flows into developing countries (i.e., where returns are highest), and higher growth in output, as neoclassical theory would predict. There has been a distinct shift however in the types of arguments offered by those opposing controls. The emphasis is no longer on empirically establishing the link between openness and positive macroeconomic outcomes. Instead, there is a focus on the collateral benefits of openness, the necessary complements to openness, and the indirect channels through which openness positively affects growth. A particular distinct line is that taken by Henry (2007) who argues that previous studies – in trying to empirically verify a link between integration and long-run growth – have failed to account for the fact that neoclassical growth models only predict a short-run effect of growth to capital accumulation (which is of course associated with capital inflows). Therefore, Henry (2007) argues that the focus of studies should be on shorter time horizons in the form of 'event studies', i.e., how does a particular episode of capital injection affect growth in the very short-run. Using such a framework, he finds integration of EMEs' capital markets to be associated with positive short-run growth outcomes. It must be noted however that the focus of such studies seems entirely misplaced for they address the particular aspect of neoclassical theory on short- versus long-run growth effects, rather than the relevant questions concerning the channels through which openness destabilizes emerging economies. Nevertheless, the crux in these new formulations is a concession that the positive effects of integration are impossible to uncover in the usual sample periods of 10-20 years taken by studies, which are believed to be dominated by crisis episodes, and thus in which the costs of financial globalization are more easily observable. According to this new consensus that has formed among those in favour of unrestricted openness, the benefits of integration cannot be ascertained at a macroeconomic level because the indirect effects and collateral benefits of financial globalization are not apparent in short time samples (though no indication is given as to a more appropriate and suitable time frame). Instead, the benefits are to be found at a microeconomic level in the efficiency gains associated with increased foreign competition, in the way in which foreign capital movements put a check on bad fiscal and monetary policies, and in the deepening of domestic capital markets in emerging economies that are associated with integration. See also BIS (2009: 1-6) for an exposition of these new formulations.

[28] It must be emphasized that the goal of reducing exchange rate volatility is distinct from that of preventing an appreciation of the currency. The former most often aims to reduce the likelihood of crises originating from the instability in an asset price (currency), whereas the latter relates to a concerted effort to maintain or increase competitiveness in economies where growth is primarily export-driven. Both of these issues obviously take center stage primarily in the context of increasing capital inflows to the EMEs.

[29] Controls on capital outflows are used primarily with the intention of preventing or forestalling a currency crisis. As the discussion in section 2 on speculative attack models makes clear, currency crises tend to be generated by an overwhelming demand by investors to withdraw capital from an emerging economy (which is referred to as 'capital flight' or a 'flight to safety'); this in turn depletes the foreign reserves of the central bank and generates a currency crisis (i.e., a devaluation). This is in effect the anatomy of a crisis exposed in Krugman (1979): in a fixed (or heavily managed) exchange rate regime, the central bank is responsible for supporting the fixed-pricing scheme with the use of international reserves. Controls on outflows then can be seen as attempts to limit the amount of capital exiting the economy, and thus the source of pressure that generates a depletion of the foreign reserves of a central bank and a currency crisis. These include, for instance, taxes on funds remitted abroad, dual exchange rates (with a more depreciated rate for capital transactions), and direct restrictions and prohibition on international fund transfers. Edwards (1999) notes two bases on which such measures were adopted by some emerging countries in the 1990s.

there is also the fact that the IMF began collecting information on controls applied to the different subcomponents of the capital account only in 1995 in its AREAER – previously a distinction was not made on the basis of the flow component that measures were trying to restrict. That is, in previous years (and in indexes using information from those years) a distinction was not made between controls applied on inflows and those applied on outflows, and within this dichotomy no distinctions were made between controls applied to short-term, long-term, FDI, debt, and equity flows. Edwards (2005) also attempts to build a new index based on information from post-1995 IMF AREAER reports in analyzing the relationship between restrictions and external crises. A recent and interesting attempt made at constructing an index on *de jure* restrictions on cross-border financial transactions is that of Schindler (2009) which uses a sample of 91 developed and developing countries for the period 1995-2005. The improvement of this index lies in the fact that it is able to capture an intense level of disaggregation in terms of how restrictions are levied; it is able to capture differences between inflow and outflow controls, those applied on individual assets categories, and those levied on residents and non-residents. In a review of the empirical literature on controls (section 4.3.1 of this paper), a paper by Binici, Hutchison, and Schindler (2010) will be considered which uses the dataset of Schindler (2009): the evidence from this paper as it concerns the effectiveness of controls at reducing the volume of inflows and altering their composition is however controversial in that it is opposite to the general findings and consensus in the literature.

[34] Kose and others (2009: 14-19) emphasize the important difference between *de jure* and *de facto*, i.e., legal and actual, integration. They note that though attempts have been made to more accurately measure integration and openness with *de jure* classifications, the various indexes still suffer from serious measurement problems by not accounting for the power of restrictions (i.e., the effectiveness of enforcements) and the fact that countries are more integration in global capital markets than might appear on paper (i.e., than a classification, ranking, and measuring of legal restrictions might suggest). Hence, they consider *de facto* measures of integration as more appropriate when analyzing the effects of financial globalization. There is of course debate about how to measure actual integration across countries and time. One particular measure that they seem to favour as opposed to price-based measures of asset market integration and quantity-based measures based on actual flows (gross versus net flows) is the sum of gross stocks of foreign assets and liabilities as a ratio of GDP. Using such a measure that has been constructed in the literature on financial globalization covering 145 countries over the period 1970-2004, they show the substantial differences between *de facto* and *de jure* (based on IMF binary measure) integration for all countries in the sample and for the income groups (advanced economies, emerging markets, and other developing economies). In particular, for advanced economies the dynamics of legal openness has consistently been greater than actual openness, for emerging economies legal openness has roughly stayed the same with the exception of a decline in the late 1980s and an increase in the early 1990s while actual openness has increased substantially, and for other developing economies legal openness has increased by a factor of 2 while actual openness has increased by a factor of 3.

[35] The discussion is valid in a context in which the policy of sterilizing inflows has reached its limits. See note 26 for a discussion of the limits to sterilization in the context of emerging economies.

[36] They note however that their study ignores the effects that other macro-prudential measures during that time such as a minimum stay requirement on FDI and portfolio flows might have on achieving the objectives of policymakers. The study thus limits itself to considering the URR policy without controlling for the effects (possibly also complementary in nature) of other measures that may influence capital flows.

[37] The emphasis placed in this paper on how controls affect the behaviour of capital flows is essentially one that deals with short-run considerations ranging from disturbances in advanced economies to the nature of short-run capital movement into the emerging markets. There are of course long-run considerations associated with financial integration and growth (Henry, 2007; Kose and others, 2009). Moreover, there are ways in which controls can be used to address both long-run policy objectives and structural problems related to the international financial system. In terms of the former, China's and India's use of an extensive set of inflow and outflow controls are often viewed as permanent measures that aim for greater state management of trade and financial integration with the rest of the world. And in terms of how controls can be utilized to address long-term structural problems in the international financial system, Haldane (2011) offers an interesting account of the process of financial liberalization and integration as characterized by a footrace between two major forces. On the one foot is a process of liberalization, integration, and innovation in the distribution of funds by advanced capital-exporting economies in the quest to boost returns and spread risks. On the other foot is the process of absorption by high return capital-importing economies which is characterized by a widening and deepening of their domestic capital markets. The source of financial crises, according to Haldane, resides in incongruence between the distributive capacity of advanced economy capital markets and the absorptive capacity of emerging and developing economy capital markets. While

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