



# IMF STAFF POSITION NOTE

February 19, 2010  
SPN/10/04

## Capital Inflows: The Role of Controls

Jonathan D. Ostry, Atish R. Ghosh, Karl Habermeier,  
Marcos Chamon, Mahvash S. Qureshi, and Dennis B.S. Reinhardt

INTERNATIONAL MONETARY FUND

Research Department

**Capital Inflows: The Role of Controls**

Prepared by Jonathan D. Ostry, Atish R. Ghosh, Karl Habermeier, Marcos Chamon,  
Mahvash S. Qureshi, and Dennis B.S. Reinhardt

February 19, 2010

**DISCLAIMER: The views expressed herein are those of the author(s) and should not be attributed to the IMF, its Executive Board, or its management.**

JEL Classification Numbers: F21, F32

Keywords: capital inflows, capital controls, financial crisis

Authors' E-mail Addresses: [jostry@imf.org](mailto:jostry@imf.org), [aghosh@imf.org](mailto:aghosh@imf.org),  
[khabermeier@imf.org](mailto:khabermeier@imf.org), [mchamon@imf.org](mailto:mchamon@imf.org),  
[mqureshi@imf.org](mailto:mqureshi@imf.org), and  
[dennis.reinhardt@graduateinstitute.ch](mailto:dennis.reinhardt@graduateinstitute.ch)

Contents	Page
I. Introduction and Overview .....	4
II. Responding to Capital Inflows .....	6
III. Inflows, Fragilities, and Controls—Some Stylized Facts .....	11
IV. Conclusions .....	15
References .....	25
 Box	
1. Country Experiences with Controls on Short-Term Capital Inflows .....	14
 Figure	
1. Coping with Surges in Capital Inflows: Macroeconomic and Prudential Considerations .....	7
 Table	
1. Selected Cases of Control Measures on Capital Inflows .....	16
Appendix 1. Inflows, Fragilities, and Controls—Some Empirics .....	18

## I. INTRODUCTION AND OVERVIEW<sup>1</sup>

With the global economy beginning to emerge from the financial crisis, capital is flowing back to emerging market economies (EMEs). These flows, and capital mobility more generally, allow countries with limited savings to attract financing for productive investment projects, foster the diversification of investment risk, promote intertemporal trade, and contribute to the development of financial markets. In this sense, the benefits from a free flow of capital across borders are similar to the benefits from free trade (see *Reaping the Benefits of Financial Globalization*, IMF Occasional Paper 264, 2008), and imposing restrictions on capital mobility means foregoing, at least in part, these benefits, owing to the distortions and resource misallocation that controls give rise to (see Edwards and Ostry, 1992, for an example of how capital controls interact with other distortions in the economy).

Notwithstanding these benefits, many EMEs are concerned that the recent surge in capital inflows could cause problems for their economies. Many of the flows are perceived to be temporary, reflecting interest rate differentials, which may be at least partially reversed when policy interest rates in advanced economies return to more normal levels. Against this backdrop, capital controls are again in the news.<sup>2</sup> A concern has been that massive inflows can lead to exchange rate overshooting (or merely strong appreciations that significantly complicate economic management) or inflate asset price bubbles, which can amplify financial fragility and crisis risk. More broadly, following the crisis, policymakers are again reconsidering the view that unfettered capital flows are a fundamentally benign phenomenon and that all financial flows are the result of rational investing/borrowing/lending decisions. Concerns that foreign investors may be subject to herd behavior, and suffer from excessive optimism, have grown stronger; and even when flows are fundamentally sound, it is recognized that they may contribute to collateral damage, including bubbles and asset booms and busts.

The question is thus how best to handle surges in inflows that may pose both prudential and macroeconomic policy challenges. The tools are well known and include fiscal policy, monetary policy, exchange rate policy, foreign exchange market intervention, domestic prudential regulation, and capital controls. Clearly, the appropriate policy mix is likely to depend on the state of the economy (i.e., how close it is to potential); the level of reserves (is further accumulation desirable/appropriate?); the quality of existing prudential regulation (can prudential tools effectively tackle the boom/bust credit/asset price cycle); the scope to allow the currency to strengthen (is the currency already overvalued?); and the likely persistence of the inflows (with permanent inflows less likely to warrant a policy response than transitory inflows).

---

<sup>1</sup> We thank Olivier Blanchard and José Viñals for their guidance on this project and Chikako Baba, Reza Baqir, Suman Basu, and Annamaria Kokenyne for contributions to the paper.

<sup>2</sup> Recent cases include Brazil and Taiwan Province of China. The IMF's Articles of Agreement recognize that members generally may exercise such controls as are necessary to regulate international capital movements (Article VI, Section 3). However, the general right of members to regulate international capital movements is qualified by members' obligations subject to IMF surveillance under Article IV.

This paper reviews the arguments on the appropriate management of inflow surges and focuses in particular on the conditions under which controls may be justified. A key conclusion is that, if the economy is operating near potential, if the level of reserves is adequate, if the exchange rate is not undervalued, and if the flows are likely to be transitory, then use of capital controls—in addition to both prudential and macroeconomic policy—is justified as part of the policy toolkit to manage inflows. Such controls, moreover, can retain potency even if investors devise strategies to bypass them, provided such strategies are more costly than the expected return from the transaction: the cost of circumvention strategies acts as “sand in the wheels.”

A key issue of course is whether capital controls have worked in practice. Our sense is that the jury is still out on this, and it is difficult to get the data to speak loudly on the issue. Controls seem to be quite effective in countries that maintain extensive systems of restrictions on most categories of flows, but the present context relates mainly to the reimposition of controls by countries that already have largely open capital accounts. The evidence appears to be stronger for capital controls to have an effect on the composition of inflows than on the aggregate volume (though empirical models linking aggregate inflows to controls are frequently subject to a host of objections, most obviously, simultaneity bias). For example, in the case of Chile and Colombia, controls do appear to have had some success in tilting the composition of inflows toward less vulnerable liability structures (e.g., De Gregorio and others, 2000; and Cardenas and Barrera, 1997).

Looking at the current crisis, our own empirical results suggest that controls aimed at achieving a less risky external liability structure paid dividends as far as reducing financial fragility. An interesting twist is that some foreign direct investment (FDI) flows may be less safe than usually thought. In particular, some items recorded as financial sector FDI may be disguising a buildup in intragroup debt in the financial sector and will thus be more akin to debt in terms of riskiness. This point resonates well with the experience of emerging Europe during the recent crisis.<sup>3</sup>

A significant caveat, however, to the use of capital controls by individual countries, relates to the potential for adverse multilateral consequences. In the present circumstances, global recovery is dependent on macroeconomic policy adjustment in EMEs, which could be undercut by capital controls, notably in cases where currencies are undervalued. Widespread adoption of controls by EMEs could exacerbate global imbalances and slow other needed reforms—a critical concern at present, when sustained global recovery hinges on a rebalancing of global demand and the sources of growth in individual countries. In addition, controls imposed by some countries may lead other countries to adopt them also: widespread adoption of controls could have a chilling longer-term impact on financial integration and globalization, with significant output and welfare losses. Multilateral dimensions clearly need to be taken into account in assessing the merits of controls at the individual country level.

---

<sup>3</sup> The vulnerability of emerging Europe in the wake of the recent crisis and the region’s heavy dependence on foreign banking groups, particularly those from western Europe for capital, necessitated efforts (culminating in the Initiative for Coordination of European Banks) to induce parent banks to maintain exposures to their subsidiaries.

The remainder of this paper is organized as follows. Section II explains the rationale for capital controls as part of the package of policies to cope with surges in capital inflows. Section III examines the empirical evidence from past studies, and from the current crisis, on the effectiveness of controls, including in buttressing prudential regulation. Section IV concludes.

## II. RESPONDING TO CAPITAL INFLOWS

Although capital flows to developing and emerging market countries are generally welcome—providing lower-cost financing and indicating market confidence in the fundamentals of the economy—sudden surges can complicate macroeconomic management and create financial risks. On the macroeconomic front, the concern is that the surge will lead to an appreciation of the exchange rate and undermine competitiveness of the tradable sector—possibly causing lasting damage even when inflows abate or reverse. The main worry from the financial fragility perspective is that large capital inflows may lead to excessive foreign borrowing and foreign currency exposure, possibly fueling domestic credit booms (especially foreign-exchange-denominated lending) and asset bubbles (with significant adverse effects in the case of a sudden reversal). Can such concerns justify the imposition of controls on capital inflows—not only from the individual country’s perspective, but also taking account of multilateral considerations? The answer is *yes*—under certain circumstances. Although in practice, macroeconomic and financial fragility considerations are both relevant to a decision on whether to impose capital controls, it is analytically useful to think of each in turn (Figure 1).<sup>4</sup>

### Macroeconomic Implications

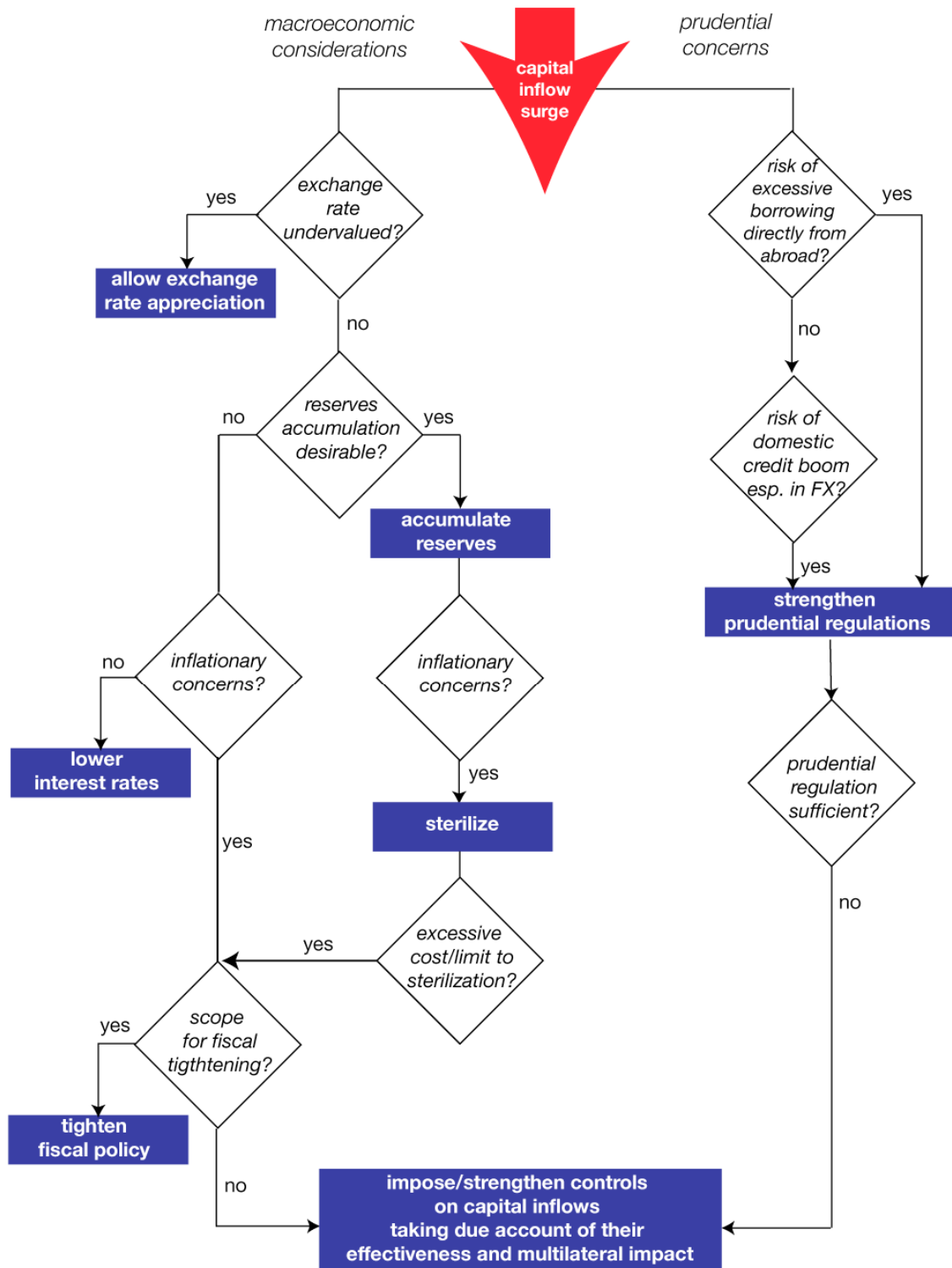
How should a country respond to an inflow surge? The appropriate policy response is likely to be multifaceted, according to the circumstances facing the country:

- ***Exchange rate appreciation.*** The first question is whether the exchange rate should be allowed to appreciate. Although countries are frequently concerned that an appreciation will damage competitiveness of the tradable sector, the multilateral context is paramount here: if the exchange rate is undervalued from a multilateral perspective, the appropriate response would be to allow the nominal exchange rate to appreciate passively in response to the capital inflows. But when the exchange rate is already overvalued (or roughly in equilibrium), and there are concerns about the impact of an appreciation on competitiveness, a more proactive policy response is required.
- ***Reserve accumulation...*** The next question is whether the country has a relatively low level of foreign exchange reserves (e.g., from a precautionary perspective) and whether some further reserve accumulation would be desirable. If so, the capital inflows may present a useful opportunity to augment the central bank’s reserve holdings.

---

<sup>4</sup> See Baqir and others (2010) for a related flowchart, and Ghosh and others (2008) for a discussion of appropriate policy responses to capital inflows and positive balance of payments pressures. On how to manage inflow surges—including major bouts of carry trade flows associated with higher equilibrium real interest rates and Balassa-Samuelson effects in the transition economies—see Lipschitz and others (2005, 2006)

Figure 1. Coping with Surges in Capital Inflows: Macroeconomic and Prudential Considerations 1/



1/ From the perspective of an individual country, without taking account of multilateral considerations; on the effectiveness of controls, see Section III.

- **...and sterilization.** If there are inflation concerns, the resulting increase in the money supply can be sterilized through open-market operations or, more generally, a corresponding decrease in domestic credit.<sup>5</sup> There are, however, limits to sterilization.<sup>6</sup> Domestic financial markets may not be sufficiently deep to absorb a significant increase in sterilization bonds, and there is a fiscal cost associated with the differential between interest paid on domestic bonds and interest earned on reserves (particularly in the current low-yield environment). Moreover, sterilization means that domestic interest rates continue to be relatively high, perpetuating inflows (especially if markets believe that, because of fiscal costs or otherwise, the policy of reserve accumulation will eventually be abandoned and the exchange rate will be allowed to appreciate).

If the central bank has exhausted the sterilization possibilities and risks losing monetary control, or if it does not want to accumulate further reserves (and assuming that further exchange rate appreciation would not be appropriate), it must try to reduce inflows through macroeconomic policies or more direct methods.

- **Monetary and fiscal policies.** The policy response would be to lower interest rates, thus reducing incentives for inflows, and to tighten fiscal policy—particularly when capital inflows are driven by fiscal expansion—thus reducing currency appreciation pressures.<sup>7</sup> However, if the economy is at risk of overheating and there are inflation pressures, reducing interest rates is not an attractive policy option, and both political considerations and implementation lags may limit the scope for fiscal consolidation.
- **Controls on capital inflows.** In the face of substantial inflows, a purely macroeconomic policy response may not suffice in some country circumstances (as described above), and controls on capital inflows may form a useful part of the policy toolkit.<sup>8</sup> This is particularly true of transitory surges, because the currency appreciation is likely to be temporary, whereas damage to the tradable sector (through hysteresis effects) may be more permanent. If the increase in flows is expected to be more persistent, by contrast, the economy should adjust to the (permanently) higher real exchange rate, particularly as

---

<sup>5</sup> Keeping credit conditions constant—so that sterilized intervention of capital inflows essentially replaces domestic credit with foreign credit—may require a greater-than-corresponding decrease in the volume of domestic credit since foreign credit will typically be offered at a lower interest rate (even adjusting for exchange rate expectations).

<sup>6</sup> Other forms of sterilization include raising reserve requirements, which does not incur a fiscal cost (especially if reserves are not remunerated), though their excessive use can lead to undesirable financial disintermediation.

<sup>7</sup> Cardarelli, Elekdag, and Kose (2007) provide evidence that real appreciation and demand growth was more contained in countries that responded to capital inflows by pursuing a tighter fiscal policy. However, there is often a political temptation to avoid making necessary fiscal adjustments and to rely instead on capital controls.

<sup>8</sup> The literature does not provide unambiguous evidence on the relative effectiveness/distortedness of price-based versus administrative controls. Countries tend to use the types of controls they are most familiar with from past practice—the obvious advantage being easier implementation for both the authorities and the banking sector.



controls lose their effectiveness over time, and thus need to be continually strengthened, leading to increasing distortions.

### **Financial Fragility**

Beyond their macroeconomic effects, capital inflows—especially certain types of liabilities—can make the country more vulnerable to financial crisis. An obvious example is debt versus equity flows, where the latter allows for greater risk sharing between creditor and borrower. Capital inflows might also fuel domestic lending booms, including foreign-exchange-denominated credit, which is especially dangerous if extended to borrowers lacking a natural hedge (e.g., households rather than exporters). More generally, it is not implausible that herd behavior and excessive optimism on the part of foreign lenders, coupled with myopic borrowers who underestimate foreign exchange and liquidity risks, can lead to foreign borrowing that is suboptimal from a financial fragility perspective. Based on these considerations, the theoretical literature yields a pecking order of capital inflows, in decreasing order of riskiness, with short-term instruments more risky than long-term ones within each category:

- Foreign-currency debt,
- Consumer-price-indexed local currency debt,
- Local-currency debt,
- Portfolio equity investment, and
- Foreign direct investment.

During “normal” times, prudential regulation of the domestic banking system, such as (possibly cyclical) capital requirements and limits on foreign exchange lending to unhedged borrowers, may suffice. But again, in the face of large capital inflows that may fuel credit booms, controls on inflows can buttress prudential regulations—particularly if it is possible to target the flows that lead to the greatest vulnerabilities.<sup>9</sup> For example, unremunerated reserve requirements on foreign exchange debt can be used to reduce external foreign exchange borrowing, and even if this encourages substitution into other forms of external debt, the risks are reduced.<sup>10</sup> Inflow taxes on short-term debt reduce the price differential between short- and long-term debt and induce longer maturities. The optimal size of the tax depends on the risk of liquidity panics, the size and social cost of the associated fiscal adjustment, and the elasticity of substitution between debt of different maturities. Financial transaction taxes are relatively more costly for short-term carry trades and may deter such flows. Minimum-stay requirements are a direct method of lengthening the maturity of liabilities.

---

<sup>9</sup> Excessive limits on banks could lead to disintermediation and proliferation of nonregulated financial institutions (Wakeman-Linn, 2007).

<sup>10</sup> Such a policy will be less effective if foreign investors circumvent the restrictions, for example, by writing currency swap contracts.

## **Other Considerations**

Even if an analysis along the lines sketched above points to the adoption of capital controls, several other factors need to be considered:

### ***Effectiveness***

The first and most obvious issue concerns the effectiveness of controls. This depends on whether the country has some existing controls and therefore the administrative apparatus is already in place. For countries that have a substantially closed capital account, strengthening controls will be easier (but there may be less need for such countries to further impede capital inflows). More relevant for present purposes is the case of countries with substantially open capital accounts, which will need to design and implement new controls and likely strengthen them over time in the face of circumvention, without creating excessive distortions. The importance of this factor is often underestimated.

### ***Controls on outflows***

Second, though the discussion here is confined to controls on inflows, relaxing controls on outflows may also have an impact on aggregate net inflows, and hence on the exchange rate and other macroeconomic variables. But the direction of that impact is unclear. On the one hand, liberalizing capital outflows can reduce net inflows as some of the inflows are offset by outflows. On the other hand, greater assurance that capital can be repatriated may make the country an even more attractive destination for foreign investors.

### ***Multilateral considerations***

As emphasized above, any decision to impose capital controls needs to take account of their multilateral repercussions.<sup>11</sup> At a most basic level, the greatest concern is that widespread use of capital controls by EMEs could have deleterious effects on the efficient allocation of investment across countries, reducing gains from intertemporal (asset) trade much as tariffs limit the gains from goods (within-period) trade.

Widespread use of controls, especially by systemically important countries, could also impede necessary steps to address global imbalances. It might allow countries to avoid appreciation where currencies are undervalued and where appreciation is needed to support global demand rebalancing. Clearly, to the degree that currencies in some countries are undervalued relative to some notion of medium-term equilibrium (see, for example, *Exchange Rate Assessments: CGER Methodologies*, IMF *Occasional Paper* 264, 2008), the first-best policy—as argued above—would be to allow currencies to strengthen in response to capital inflows; this would also have the welcome effect from a multilateral perspective of increasing current account deficits (reducing surpluses) in a manner consistent with reducing the extent of global current account imbalances. By contrast, adoption of controls by countries with undervalued currencies would be

---

<sup>11</sup> To the extent that capital inflows to EMEs are driven by the policy environment in advanced economies, they too need to take account of the multilateral implications of their policies.

likely to redirect flows to countries less able to absorb them, thus adding to systemic pressures and running the clear risk of a bandwagon response in the form of generalized financial protectionism.

In addition, the adoption of controls by some countries might lead others to follow suit: controls may thus be contagious. To the degree that capital controls complicate the management of inflows for other countries, which will likely see even more capital flowing in their direction, they can be considered a beggar-thy-neighbor policy. Finally, while these considerations generally caution against the imposition of controls, it bears emphasizing that multilateral considerations do not militate unambiguously against the imposition of controls. For instance, inasmuch as controls curtail especially risky forms of capital inflows, they may also reduce countries' precautionary demand for reserves, thus serving to reduce global imbalances and contributing to systemic stability.<sup>12</sup>

To summarize, there are two main reasons why governments might want to impose capital controls—to limit the appreciation of the exchange rate and to limit crisis vulnerability due to excessive or particularly risky forms of foreign borrowing. While other tools—macroeconomic policies and prudential regulations—should always be deployed, logic suggests that appropriately designed controls on capital inflows could usefully complement them in certain circumstances, especially in the face of temporary inflow surges. Controls would normally be temporary, as a means to counter surges. More permanent increases in inflows tend to stem from more fundamental factors and will require more fundamental economic adjustment—though of course it is not always easy to tell whether a surge is temporary or portends a persistent trend.<sup>13</sup>

### III. INFLOWS, FRAGILITIES, AND CONTROLS—SOME STYLIZED FACTS

The discussion above suggests certain circumstances under which capital controls might be useful for macroeconomic management or prudential purposes. But are they effective in practice? This section takes a look at the stylized facts, surveying existing studies and exploiting the “natural experiment” of the global financial crisis to see whether capital controls and the nature of precrisis capital flows had any bearing on how individual EMEs fared in the current crisis (further details of the empirical results are included in an appendix to this paper).

#### Existing Empirical Evidence

The effectiveness of capital controls needs to be judged against the objectives in imposing them, which may include reducing the volume of inflows and limiting the appreciation of the exchange

---

<sup>12</sup> See Ghosh, Ostry, and Tsangarides (2010) for a discussion of how reducing the precautionary demand for reserves would contribute to systemic stability by helping narrow global imbalances and avoid a sudden tipping point in the demand for major reserve assets.

<sup>13</sup> One rule of thumb is that flows that push the real exchange rate toward equilibrium are more likely to be persistent than flows that contribute to overshooting. For an analysis of the cyclical behavior of different types of capital flows, see *Country Insurance: The Role of Domestic Policies* (IMF Occasional Paper 254, 2007), pp. 8–9, which argues that banking flows are much more prone to reversal than other types of inflows (portfolio and FDI).

rate, altering the maturity composition of inflows to reduce financial fragility, and providing additional monetary policy independence.

Although individual country studies often find little or no impact of capital controls on the aggregate volume of inflows (Table 1), some cross-country analyses suggest that, at least among countries that faced some surge in inflows, those with controls experienced smaller surges.<sup>14</sup> Obviously, all other things being equal, a country with a closed capital account will experience smaller inflows than a country with a largely open capital account. The effectiveness of controls in regulating inflows thus depends on how extensive they are, whether the country maintains the necessary administrative and institutional infrastructure to enforce the controls, and the incentives investors have to try to circumvent them. The lack of convincing evidence on the effectiveness of controls in reducing the total volume of inflows therefore likely reflects (1) the relatively marginal control measures adopted by EMEs in recent years; (2) the fact that capital controls are often imposed or strengthened as part of an overall package of policy responses, making it difficult to isolate their effect; (3) difficulty in measuring the intensity of capital controls; and (4) econometric identification problems—for instance, if countries that are facing large inflows are the ones that impose controls, it is not surprising that econometric studies find no, or even a positive, relationship between controls and the magnitude of capital inflows. Further, the recent wave of capital controls has also included restrictions on derivative positions (for example, in Colombia), which highlights the deepening and sophistication of financial markets in EMEs and the potential complexity in assessing the effects of controls. Since most studies do not find much impact of controls on aggregate volumes of inflows, they usually do not find much effect on exchange rate appreciation either.<sup>15</sup>

### **Evidence from the Current Global Financial Crisis**

Empirical studies are typically more successful at finding some impact of capital controls on monetary policy autonomy<sup>16</sup> and on the composition of inflows—particularly, lengthening their maturity (Box 1, Figure 1).<sup>17</sup> This raises the question of whether limiting (certain types) of

---

<sup>14</sup> See Cardarelli, Elekdag, and Kose (2007), who find that, among countries facing inflow surges, those with controls experienced smaller inflows—2 percent of GDP in episodes with “high” capital controls compared with 4 percent of GDP in instances where the country had no or low controls. In a panel of emerging market economies, Kim, Qureshi and Zalduendo (2010) likewise find that controls are associated with smaller surges.

<sup>15</sup> See Gallego, Hernández, and Schmidt-Hebbel (1999) and De Gregorio and others (2002) for Chile; and Clements and Kamil (2009) for Colombia. Using a GARCH model, however, Edwards and Rigobon (2009) find that a tightening of controls led to depreciation of the nominal exchange rate within its band in Chile.

<sup>16</sup> De Gregorio and others (2002) find that capital controls allowed Chile’s central bank to target a higher domestic interest rate over a period of 6 to 12 months; Ma and McCauley (2008) and Hutchison and others (2009) find that interest differentials are significant and persistent in China and India, which maintain more extensive capital controls. However, Ghosh, Ostry and Tsangarides (2010) find significantly lower monetary autonomy in countries with fixed exchange rates compared with more flexible regimes, even in countries with relatively closed capital accounts.

<sup>17</sup> See Ariyoshi and others (2000), which examined the experience with capital controls of five countries (Brazil, Chile, Colombia, Malaysia, and Thailand) in the 1990s to limit short-term inflows. De Gregorio and others (2002), Cardoso and Goldfajn (1998), Cardenas and Barrera (1997), and Goh (2005) find that controls can lengthen the

(continued)

capital inflows is useful for reducing financial fragility. The recent global financial crisis provides a natural experiment in this regard, with differences in how EMEs have fared possibly shedding light on whether certain types of capital inflows pose greater risk of financial fragility, and whether controls on inflows have indeed been associated with reduced vulnerabilities. A first look at the foreign liability structure of the EMEs and their resilience in the current crisis suggests that larger stocks of *debt liabilities* and of FDI in the financial sector (“*financial FDI*”) are associated with worse growth slowdowns (Figure A1). More formal regression analysis supports this finding: countries with larger stocks of debt liabilities or financial FDI fared worse in the current crisis, whereas those with larger stocks of nonfinancial FDI fared better (Table A1). The findings in regard to debt and nonfinancial FDI conform to conventional wisdom: debt represents fixed obligations for the borrower, with limited risk sharing with the creditor, whereas FDI—especially greenfield FDI—is not only less likely to flee in a crisis, it may also be a source of fresh financing. More surprising is the greater vulnerability associated with financial FDI. Although financial FDI can be useful (many studies—e.g., Kose and others, 2006—find benefits of foreign bank ownership), the results indicate that some components of financial FDI bring added risks—for example, financial FDI may reflect lending from a parent bank to a branch or local affiliate, which may be more in the nature of debt flows than greenfield FDI.<sup>18</sup>

Why are debt and some components of financial FDI more risky? Both are strongly associated with credit booms and foreign-exchange-denominated lending by the domestic banking system, which in turn is associated with greater vulnerability (Figure A2; Table A2). This is likely to be a key channel through which such flows make the country more susceptible to crisis. Interestingly, however, the greater crisis vulnerability associated with debt liabilities holds, even when controlling for credit booms and foreign-exchange-denominated lending—perhaps because households and firms may borrow directly from abroad (or flows are intermediated through nonbank financial institutions). Accordingly, controls that limit debt inflows (and debt flows recorded as financial FDI) might usefully supplement prudential regulations aimed at curtailing domestic credit booms and unhedged foreign-exchange-denominated lending.

Empirically, there does appear to be a negative association between capital controls that were in place prior to the global financial crisis and the output declines suffered during the crisis (Table A3). Although causation is far from established, the empirical evidence suggests that the use of capital controls was associated with avoiding some of the worst growth outcomes associated with financial fragility.<sup>19</sup> Moreover, consistent with the discussion above, it is controls

---

maturity of inflows. Of course, a finding of an effect on the composition of inflows belies the lack of a finding on aggregate volumes, unless one is willing to believe that substitution between different types of capital inflows is perfect.

<sup>18</sup> Note that FDI includes loans between a parent and subsidiary, as long as the parent has a controlling interest, where controlling interest is usually taken to be an ownership stake of at least 10 percent.

<sup>19</sup> In a sample of about 200 crisis episodes in about 90 countries over 1970–2007, Gupta, Mishra, and Sahay (2007) report a similar result, namely, that drops in output during crisis episodes are significantly lower if capital controls existed before the crisis.

### Box 1. Country Experiences with Controls on Short-Term Capital Inflows

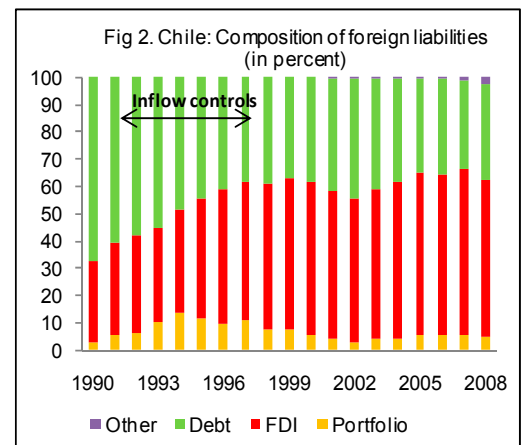
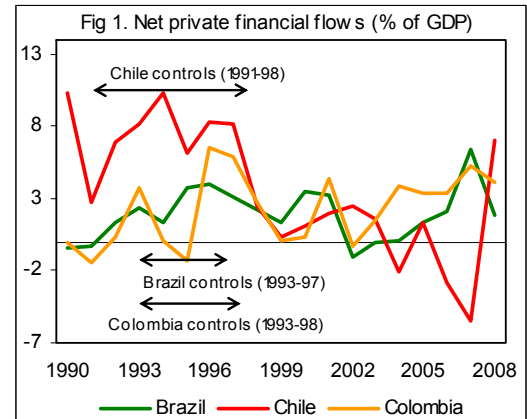
Recourse to capital controls to counter surges in capital inflows has been pervasive in emerging markets. Controls are often imposed to maintain monetary control while reducing pressures on the exchange rate and to address prudential concerns in the presence of large, short-term inflows. The effectiveness of such controls is, however, a much debated issue—country experiences have varied, depending largely on the motivation and nature of controls and on country-specific characteristics such as the administrative capacity to implement them.

**Volume of inflows:** In general, capital controls are found to have little impact on the total volume of capital inflows and thus on currency appreciation. For example, the imposition of inflow restrictions by Brazil, Chile, and Colombia in the 1990s had no significant impact on total capital inflows, nor were pressures on the exchange rate alleviated (Figure 1). In fact, over the course of their capital controls, the real effective exchange rate appreciated by about 5 and 4 percent annually in Brazil and Chile, respectively. In Thailand, the real exchange rate started appreciating within a week after controls on short-term flows were imposed in December 2006. The most recent episode of controls in Colombia (during 2007–08) was also ineffective in reducing the volume of non-FDI inflows or in moderating the currency appreciation (Clements and Kamil, 2009).

**Composition of inflows:** Controls on inflows, however, may alter the maturity structure and composition of inflows. In Chile, for example, controls seem to have been effective in altering the composition of inflows—short-term debt as a proportion of total liabilities declined, whereas the stock of FDI increased from about 34 percent in 1991 to 53 percent in 1998 (Figure 2). Cardoso and Laurens (1998) and Gregorio, Edwards, and Valdes (2000) find that the Chilean unremunerated reserve requirement (URR) was also effective in tilting the composition of inflows away from short-term maturities. Similarly, after the URR was imposed in Colombia in 1993, the maturity structure of the private external debt stock changed significantly—the share of medium- and long-term debt increased to 70 percent of the total external debt stock in 1996, from 40 percent in 1993 (Ariyoshi and others, 2000).

**Prudential concerns:** Domestic financial stability concerns raised by large capital inflows are often addressed by introducing prudential measures either with traditional (administrative and market based) capital controls or as stand-alone measures. Such measures could be effective in reducing currency mismatches as well as in limiting debt inflows. For example, Malaysia introduced prudential requirements (such as the asymmetric open-position limits of banks) along with temporary capital controls to limit short-term inflows in 1994. The measures were effective in influencing the volume as well as composition of inflows in the short term. Similarly, the strong prudential framework in place in Chile is considered to have played an important role in complementing capital controls to affect the composition of inflows (Ariyoshi and others, 2000). Croatia's imposition of prudential measures—including the marginal reserve requirement on bank foreign financing during 2004–08—in response to concerns pertaining to the high credit growth triggered by capital inflows—was also effective in reducing external bank debt in 2006–08 (Jankov, 2009).

An important issue highlighted by the experience of the EMEs is that the effectiveness of capital controls and prudential measures in terms of limiting inflows, changing their composition, and achieving the desired macroeconomic objectives hinges critically on countries' implementation capacity. In general, the controls' impact is short lived as markets adjust to them. A strong enforcement capacity as, for example, in Chile, is therefore needed to identify loopholes and prevent circumvention.



Sources: WEO database, and Lane and Milesi-Ferretti (2007) updated database.

on debt flows that are significantly associated with avoiding crises. Although further study is needed, these controls are not associated with lower average growth in the precrisis period as well.

#### IV. CONCLUSIONS

There is no surefire one-size-fits-all way to deal with the impact of potentially destabilizing short-term capital inflows. From an individual-country point of view, the usual elements of the toolkit to manage inflows include currency appreciation, reserves accumulation, adjustments in fiscal and monetary policy, and strengthening the prudential framework. In some circumstances, however, the usual macro policy remedies will not be appropriate (e.g., because inflation is a concern, so lowering domestic policy rates will be ill advised, the currency is already too strong, or reserves are more than adequate). In others, it may not be possible to quickly address financial fragility concerns through the domestic prudential framework alone. For both macroeconomic and prudential reasons, therefore, there may be circumstances in which capital controls are a legitimate component of the policy response to surges in capital inflows.

Multilateral dimensions, however, are integral to a balanced perspective on the appropriateness of using capital controls to manage inflows. While controls can be helpful to individual countries under certain conditions, their widespread use could have deleterious effects on the efficient allocation of investment across countries, and harm prospects for global recovery and growth. Greater use of controls could also lead to crowding out of less distortionary policies to manage inflows, and contribute to contagion, with countries whose individual circumstances do not justify the use of controls choosing to adopt restrictions on inflows. Widespread adoption of controls could also contribute to widening of global imbalances, especially if restrictions were implemented by countries with undervalued currencies as a means to resist appreciation. Conversely, however, inasmuch as controls reduce countries' precautionary demand for reserves by curtailing inflows of "hot money" and especially risky forms of liabilities, they could contribute to reducing global imbalances and thus enhance systemic stability. A multilateral framework governing the reimposition of controls, balancing the various considerations, could be helpful in managing possible cross-country spillovers.

The perspective of this note is thus that capital controls are a legitimate part of the toolkit to manage capital inflows in certain circumstances, but that a decision on their use should reflect a comparison of the distortions and implementation costs that they may impose and the benefits from regaining macro policy control and reducing financial fragility. There is a need for a regular reassessment to ensure that capital controls remain the appropriate response as long as these are maintained. Moreover, this note also emphasizes that any use of capital controls should internalize to the extent possible the systemic dangers that could result from widespread adoption of controls by a large number of countries.

**Table 1. Selected Cases of Control Measures on Capital Inflows**

Country	Year	Controls	Did controls on inflows:			
			Study	Reduce the volume of net flows	Alter the composition	Reduce real exchange rate pressures
<b>Brazil</b>	1993–97	- Explicit tax on capital flows on stock market investments, foreign loans, and certain foreign exchange transactions. - Administrative controls (outright prohibitions against, or minimum maturity requirements for, certain types of inflows).	Cardoso and Goldfajn (1998)	Yes (ST)	Yes (ST)	
			Reinhart and Smith (1998)	Yes (ST)	Yes (ST)	
			Ariyoshi and others (2000)	No	No	No
			Edison and Reinhart (2001)			No
			Carvalho and Garcia (2008)	Yes (ST)		
<b>Chile</b>	1991–98	- Introduced URR on foreign borrowing, later extended to cover nondebt flows, American Depositary Receipts, and potentially speculative FDI. - Raised the discount rate.	Valdes-Prieto and Soto (1998)	No	Yes	No
			Le Fort and Budnevich (1997)	No		Yes
			Larrain, Laban, and Chumacero (1997)	No	Yes	
			Cardoso and Laurens (1998)	Yes (ST)	Yes	No
			Reinhart and Smith (1998)	Yes (ST)	Yes (ST)	
			Edwards (1999)	No	Yes	No
			Gallego and Schmidt-Hebbel (1999)	Yes (ST)	Yes (ST)	No
			Ariyoshi and others (2000)	No	No	No
			De Gregorio, Edwards, and Valdes (2000)	No	Yes	Yes (ST)
Edwards and Rigobon (2009)			Yes			
<b>Colombia</b>	1993–98	- Introduced URR on external borrowing (limited to loans with maturities up to 18 months) and later extended to cover certain trade credits.	Le Fort and Budnevich (1997)	Yes (ST)	Yes	Yes
			Cardenas and Barrera (1997)	No	Yes	
			Reinhart and Smith (1998)	No	No	
			Ariyoshi and others (2000)	No	No	No
	2007–08	- Introduced URR of 40 percent on foreign borrowing and portfolio inflows. - Imposed limits on the currency derivative positions of banks (500 percent of capital).	Concha and Galindo (2008)	No	Yes	
		Cardenas (2007)	No	Yes (ST)		
		Clements and Kamil (2009)	No	Yes	No	
<b>Croatia</b>	2004–08	- Introduced prudential marginal reserve requirements on bank foreign financing.	Jankov (2009)		Yes	



**Table 1. Selected Cases of Control Measures on Capital Inflows (concluded)**

Country	Year	Controls	Did controls on inflows:			
			Study	Reduce the volume of net flows	Alter the composition	Reduce real exchange rate pressures
<b>Malaysia</b>	1994	- Prohibition against sale of short-term debt securities and money market instruments to nonresidents, and against commercial banks' engagement in non-trade-related swaps or forward transactions with nonresidents. - Ceilings on banks' net liability position. - Non-interest-bearing deposit requirement for commercial banks against ringgit funds of foreign banks.	Ariyoshi and others (2000) Tamirisa (2004)	Yes	Yes	Yes (ST) No
<b>Thailand</b>	1995–96	- URR imposed on banks' nonresident baht accounts. - Introduced asymmetric open-position limits to discourage foreign borrowing. - Imposed reporting requirements for banks on risk-control measures in foreign exchange and derivatives trading.	Ariyoshi and others (2000)	Yes	Yes	Yes
	2006–08	- URR of 30 percent imposed on foreign currencies sold or exchanged against baht with authorized financial institutions (except for FDI and amounts not exceeding US\$20,000). Equity investments in companies listed on the stock exchange were made exempt from the URR.				
<b>Cross-country evidence</b>			Reinhart and Smith (1998) Montiel and Reinhart (1999) Edison and Reinhart (2001) Binici, Hutchison, and Schindler (2009)	Yes (ST) No No No	Yes (ST) Yes (ST) No	No

Sources: Magud, Reinhart, and Rogoff (2007), and IMF staff.

Note: A blank entry refers to the cases where the study in question did not analyze the particular relationship. (ST) refers to cases where only short-term effects were detected.

## APPENDIX 1. INFLOWS, FRAGILITIES, AND CONTROLS—SOME EMPIRICS

This appendix looks at some simple empirics on how EMEs have fared in the current global financial crisis to infer (1) whether certain types of capital inflows pose greater risk of financial fragility, (2) the reasons these inflows are more risky, and (3) whether capital controls on these inflows are indeed associated with reduced vulnerabilities. The sample consists of some 37 EMEs, and their performance in the current crisis is measured as average growth in 2008 and 2009 relative to the country's historical average (real GDP growth, 2003–07).<sup>20</sup>

### *Vulnerable foreign liability structures*

Is there any relationship between a country's foreign liability structure and its resilience in the current crisis? Table A1 (column [1]) uses regression analysis to compare growth resilience in the crisis against the structure of foreign liabilities (stocks, in percent of GDP, as of end-2007)—financial FDI, nonfinancial FDI, debt, and equity. To some degree, the results conform to conventional wisdom: on average, countries with larger stocks of debt liabilities fared worse, while countries with nonfinancial FDI fared better. This is not surprising inasmuch as debt liabilities (especially in foreign exchange) imply fixed obligations for the borrower, with more limited risk sharing with the creditor. FDI, especially greenfield FDI, is not only less likely to flee in a crisis, it may also be a source of additional financing. This is not to suggest that FDI in the financial sector is necessarily bad: on the contrary, a number of studies have found positive effects of foreign bank presence in both crisis and more tranquil periods (see, e.g., Kose, Rogoff, and Wei, 2006). Nevertheless, it would appear that at least some components of financial FDI bring added risks. One reason is that, in the sample, financial FDI may be capturing lending from a parent bank to a subsidiary, which brings risks similar to those of debt flows.<sup>21</sup>

### *Channels of risk*

Why are debt and some (presumably the debt-like) components of financial FDI more risky? First, credit booms and a larger stock of foreign-exchange-denominated credit are strongly associated with greater vulnerability, as measured by a larger decline in output growth (Table A1, columns [4]–[5]). Second, these inflows are strongly correlated with both credit booms and greater foreign-exchange-denominated lending by the domestic banking system (Table A2, columns [1]–[2]).

It follows that one channel through which financial FDI and debt flows contribute to financial fragility could be by fueling domestic credit booms, including in foreign exchange. Accordingly,

---

<sup>20</sup> The full sample consists of 50 EMEs, but data limitations restrict the usable sample to a maximum of 37 countries. The results reported here are robust to the exclusion of outliers, and to alternate definitions of the dependent variable (for example, using the average real growth rate in 2008–09 as the crisis variable).

<sup>21</sup> Note that foreign direct investment includes loans between a parent and subsidiary, as long as the parent has a controlling interest, where controlling interest is usually taken to be an ownership stake of at least 10 percent.

efforts at limiting flows of debt liabilities and debt flows recorded as financial FDI can supplement prudential regulations aimed at curtailing domestic credit booms and unhedged foreign exchange lending.

Moreover, it is noteworthy that foreign debt liabilities remain significantly associated with worse growth resilience, even after controlling for domestic-banking-system credit booms and foreign-exchange-denominated lending (Table A1, columns [6]–[7]). This is because the nonfinancial private sector (corporations, households) may be able to borrow abroad directly (or intermediated through the nonbank domestic financial sector). As such, even if prudential regulation were perfectly able to curtail lending booms (including in foreign currency) by domestic banks, there could be a case for curtailing debt liabilities on the grounds that they contribute to crisis risk.<sup>22</sup>

### ***Capital controls and financial fragility***

The discussion above suggests that certain types of capital flows—debt and certain forms of financial FDI—contribute to crisis vulnerability, partly (though not exclusively) by helping fuel domestic lending booms. But is there any indication that capital controls have helped limit financial fragility? Specifically, did countries that had controls on inflows in place during the years leading up to the crisis turn out to be less vulnerable in the global financial crisis?

Although the results should not be taken as anything more than suggestive correlations, it does appear that such countries indeed fared better in the current crisis. This association shows up more clearly when considering *crises*—that is, *large* declines in output growth rates (Table A3, columns [1]–[3]).<sup>23</sup> Although causation is far from established, the empirical evidence suggests that the use of capital controls was associated with avoiding some of the worst growth outcomes associated with financial fragility.<sup>24</sup> Moreover, consistent with the discussion above, it is controls on debt flows that are significantly associated with avoiding crises. Although further study is needed, these controls are also not associated with lower average growth in the precrisis period.<sup>25</sup>

---

<sup>22</sup> Gallego and Hernandez (2003) find that controls are associated with lower leverage and greater reliance on retained earnings. However, they may have greater impact on some firms than others; Forbes (2007) argues that inflow controls in Chile imposed a financial constraint mainly on small firms.

<sup>23</sup> Table A3 reports the results of a probit regression, where the dependent variable “crisis” is defined as a real GDP growth slowdown that is in the sample’s lowest decile, corresponding to a decline in real GDP growth (average 2008–09 relative to 2003–07) of about 10 percentage points.

<sup>24</sup> In a sample of about 200 crisis episodes in about 90 countries over 1970–2007, Gupta, Mishra, and Sahay (2007) report a similar result. Specifically, they find that the fall in output during episodes of crisis is significantly lower if capital controls existed before the crisis.

<sup>25</sup> Using a panel of 50 EMEs over 1995–2005, both simple correlations between real GDP growth and capital controls yield positive but mostly statistically insignificant results; augmenting the regression with standard growth determinants (income convergence, investment, human capital, terms-of-trade shocks, trade openness, fiscal balance, population growth) also yields insignificant coefficients on capital controls; usual econometric caveats apply.

To summarize, capital controls on certain types of inflows might usefully complement prudential regulations to limit financial fragility and can be part of the toolkit. In particular, by helping fuel credit booms, especially in foreign currency, debt liabilities, including debt recorded as financial FDI, seem to bring significant vulnerabilities to the economy. Although it is difficult to find definitive evidence, notably on the causal linkages among the various variables, the simple empirics presented above are at least suggestive of these conclusions.

Table A1. Composition of Flows and Output Growth Decline, 2008–09 1/

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
<i>Foreign Liabilities 2/</i>							
Non-Financial FDI (% of GDP, 2007)	-0.071** (0.031)	-0.086*** (0.030)			-0.087*** (0.027)	-0.090*** (0.028)	-0.087*** (0.024)
Financial FDI (% of GDP, 2007)	0.195** (0.087)	0.134 (0.087)			0.002 (0.145)	0.021 (0.106)	-0.045 (0.157)
Debt Liabilities (% of GDP, 2007)	0.116*** (0.036)	0.116*** (0.032)			0.102** (0.042)	0.091*** (0.032)	0.084* (0.042)
Equity Liabilities (% of GDP, 2007)	-0.047 (0.064)	-0.039 (0.051)			-0.057 (0.065)	-0.040 (0.041)	-0.061 (0.053)
<i>Domestic Banking System Credit</i>							
FX Credit (% of GDP, 2007)			0.153*** (0.0534)		0.043 (0.069)		0.008 (0.057)
Change in Credit/GDP from 2003 to 2007				0.151*** (0.051)		0.101* (0.051)	0.100 (0.064)
<i>Other regressors:</i>							
Growth in trading partners 3/		-0.048** (0.022)	-0.018 (0.019)	-0.038** (0.016)	-0.054** (0.025)	-0.047** (0.020)	-0.053** (0.022)
Change in terms of trade 4/		-0.122 (0.099)	-0.017 (0.122)	0.0162 (0.100)	-0.084 (0.102)	-0.068 (0.101)	-0.029 (0.113)
Constant	3.49 (2.19)	0.873 (1.545)	2.857** (1.269)	1.814 (1.138)	1.532 (1.785)	1.64 (1.495)	2.253 (1.504)
Observations	35	34	30	33	30	33	29
R-squared	0.43	0.608	0.411	0.473	0.619	0.717	0.727

Note: Robust standard errors in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

1/ Dependent variable defined as average growth in 2003–07 minus average growth in 2008–09. Positive coefficient indicates that the regressor is associated with a larger decline in the real GDP growth rate.

2/ End-2007 stock (in percent of GDP) based on Lane and Milesi-Ferretti (2007) updated database. Breakdown of FDI into Financial and Non-Financial sectors based on Reinhart (2009) estimates.

3/ Average annual real growth rate in trading partners over 2008–09 weighted by average export to GDP ratio in 2003–07 (in percent).

4/ Average annual percentage change in terms of trade over 2008–09.

Table A2. Foreign Liabilities and Banking System FX-Credit and Credit Booms 1/

	Dependent variable	
	FX Credit (% of GDP 2007) 1/	Change in Credit/GDP 2/
Financial FDI (% of GDP, 2007)	1.305*** (0.346)	0.914** (0.398)
Debt Liabilities (% of GDP, 2007)	0.389*** (0.071)	0.258** (0.104)
Constant	-8.044*** (2.838)	-0.031 (0.045)
Observations	31	34
R-squared	0.75	0.31

Note: Robust standard errors in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 1, 5, and 10 percent levels, respectively.

1/ FX-denominated banking system credit (in % of GDP).

2/ Change in banking system credit/GDP over 2003-07.

Table A3. Capital Controls and Growth Crisis 1/

	[1]	[2]	[3]	[4]
<i>Controls on 2/</i>				
Overall Inflows	-2.026* (1.043)	-2.644** (1.329)		
FDI Inflows			-0.032 (1.206)	1.939 (1.583)
Equity Inflows			2.057 (1.376)	3.443** (1.722)
Bond Inflows			-4.054* (2.294)	-8.548** (3.708)
Growth in trading partners 3/		-0.010 (0.012)		-0.030** (0.014)
Change in terms of trade 4/		-0.107** (0.054)		-0.145* (0.085)
Constant	-0.712* (0.385)	-1.480* (0.812)	-0.900** (0.351)	-3.097*** (0.882)
Observations	37	37	37	37
Pseudo R-squared	0.117	0.240	0.168	0.368

Note: Robust standard errors in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10, 5 and 1 percent levels, respectively.

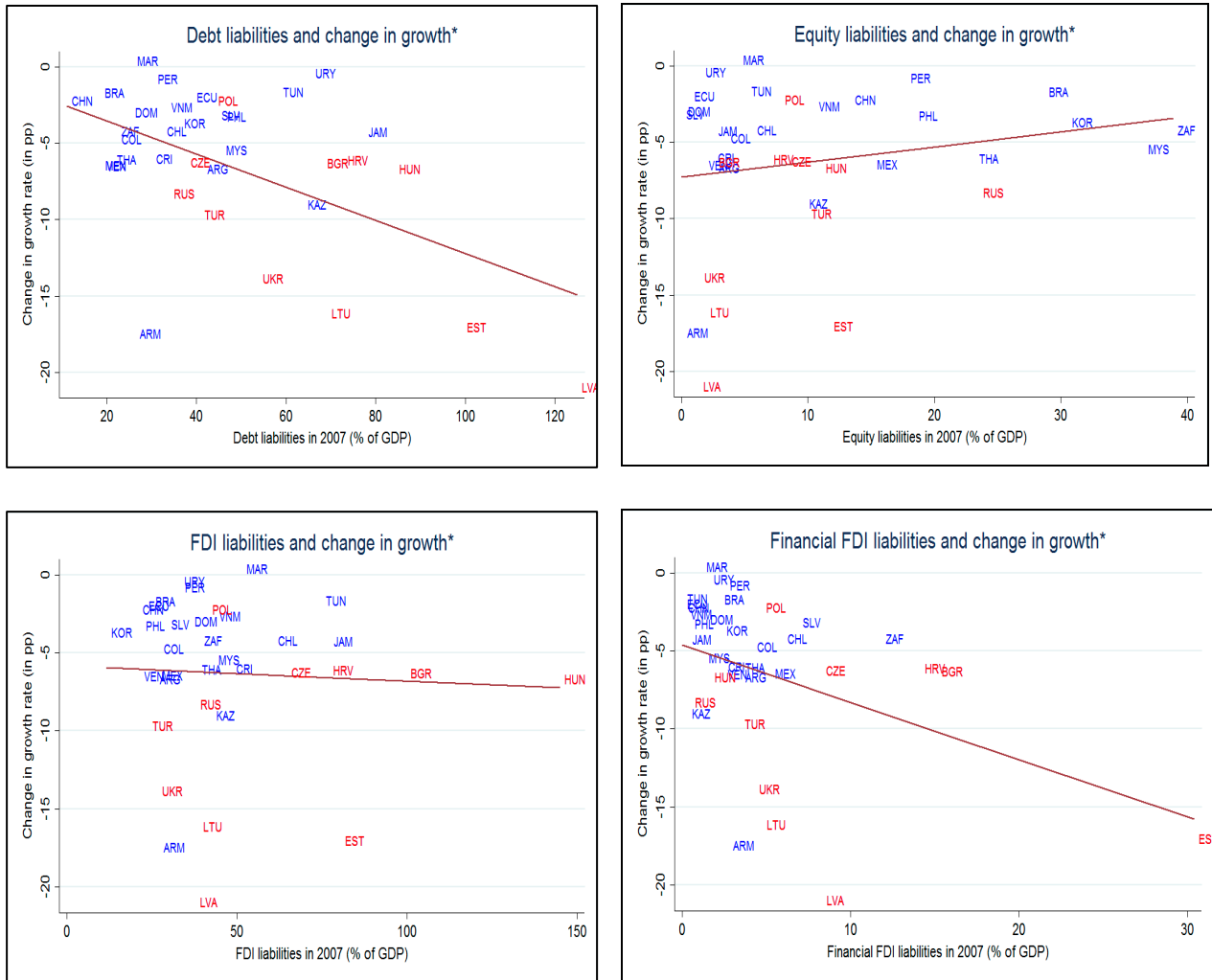
1/ Crisis is coded as equal to one if the decline in the country's real GDP growth (2008-09 relative to 2003-07) is in the lowest 10th percentile of the sample.

2/ Capital controls based on the Schindler (2009) index averaged over 2000-05 (the last year covered in the database is 2005).

3/ Average annual real growth rate in trading partners over 2008-09 weighted by average export to GDP ratio in 2003-07 (in percent).

4/ Average annual percentage change in terms of trade over 2008-09.

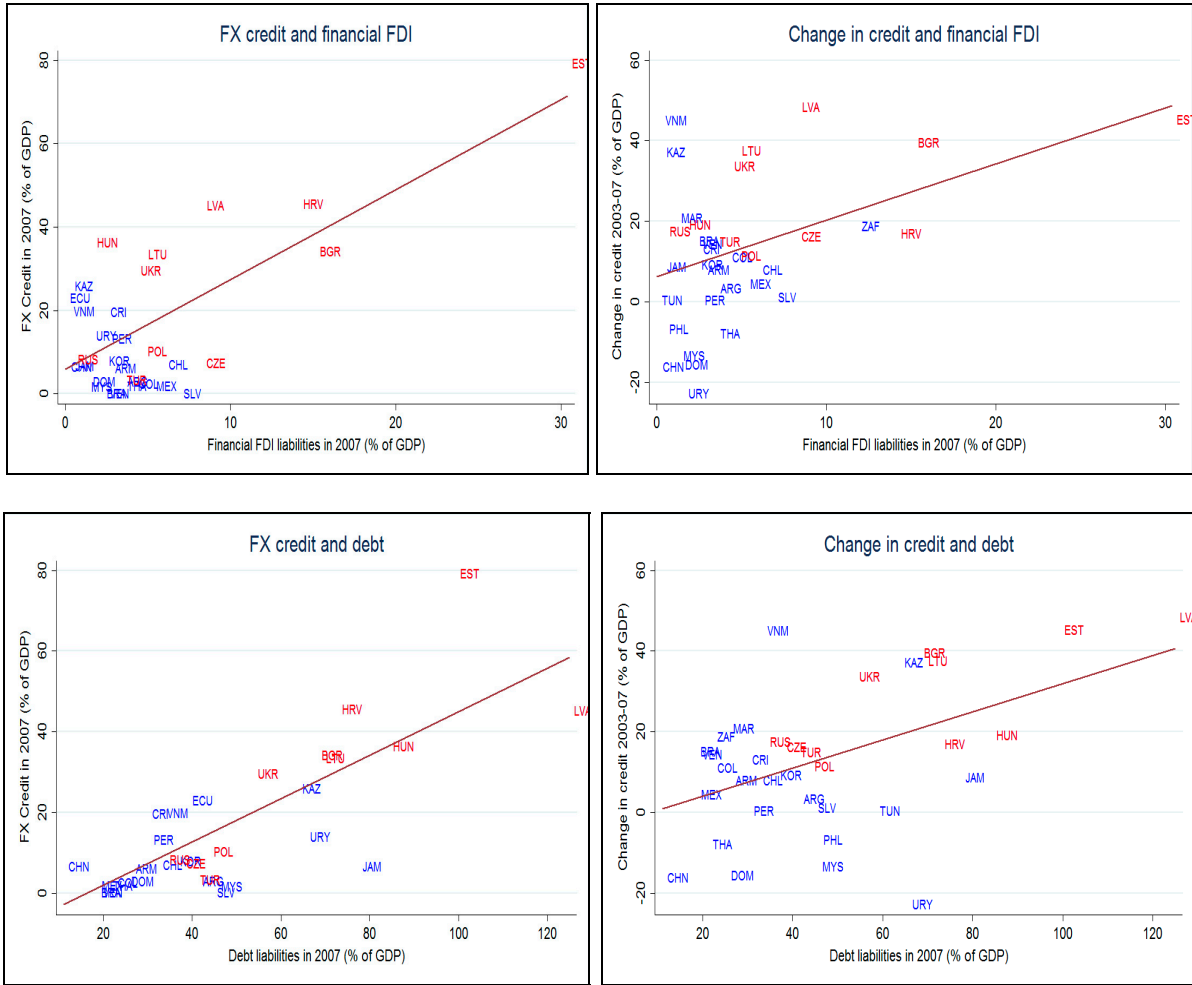
**Figure A1. Foreign Liabilities and Growth Decline (in percentage points)**



Sources: IMF World Economic Outlook database, Lane and Milesi-Ferretti (2007) updated database, Reinhart (2009) and staff calculations.

Note: \*Growth decline defined as average growth rates in 2008–09 relative to 2003–07.

**Figure A2. Foreign Liabilities and Banking System**



Source: IMF World Economic Outlook database, Lane and Milesi-Ferretti (2007) updated database, Reinhart (2009), IMF Country Desk data, Reinhart (2009), and IMF staff calculations.



## REFERENCES

- Ariyoshi, Akira, Karl Habermeier, Bernard Laurens, Inci Ötoker-Robe, Jorge Ivan Canales-Kriljenko, and Andrei Kirilenko, 2000, *Capital Controls: Country Experiences with Their Use and Liberalization*, IMF Occasional Paper No. 190 (Washington: International Monetary Fund).
- Baqir, Reza, Rupa Duttagupta, Alison Stuart, and Guillermo Tolosa, 2010, “Unorthodox Ways to Cope with Capital Inflows,” mimeo (Washington: International Monetary Fund).
- Becker, Torbjorn, Olivier Jeanne, Paulo Mauro, Jonathan D. Ostry, and Romain Ranciere, 2007, *Country Insurance: The Role of Domestic Policies*, IMF Occasional Paper No. 254 (Washington, International Monetary Fund).
- Bianchi, Javier, 2009, “Overborrowing and Systemic Externalities in the Business Cycle,” Working Paper No. 2009-24, Federal Reserve Bank of Atlanta.
- Binici, Mahir, Michael Hutchison, and Martin Schindler, 2009, “Controlling Capital? Legal Restrictions and the Asset Composition of International Financial Flows,” IMF Working Paper No. 09/208 (Washington: International Monetary Fund).
- Blanchard, Olivier, 2007, “Current Account Deficits in Rich Countries,” IMF Staff Papers, Vol. 54, No. 2 (Washington: International Monetary Fund).
- Broner, Fernando, Guido Lorenzoni, and Sergio Schmukler, 2007, “Why Do Emerging Economies Borrow Short Term?” Economics Working Paper No. 838, Department of Economics and Business, Universitat Pompeu Fabra.
- Burnside, Craig, Martin Eichenbaum, and Sergio Rebelo, 2001, “Hedging and Financial Fragility in Fixed Exchange Rate Regimes,” *European Economic Review*, Vol. 45, pp. 1151–93.
- Caballero, Ricardo, and Guido Lorenzoni, 2006, “Persistent Appreciations and Overshooting: A Normative Analysis,” (unpublished; Cambridge, Massachusetts: Massachusetts Institute of Technology).
- Calvo, Guillermo, 1998, “Capital Flows and Capital-Market Crises: The Simple Economics of Sudden Stops,” *Journal of Applied Economics*, Vol. 1(1), pp 35–54.
- Cardarelli, Roberto, Selim Elekdag, and Ayhan Kose, 2007, “Managing Large Capital Inflows,” Chapter 3, *World Economic Outlook*, October (Washington: International Monetary Fund).

- Cardenas, Mauricio, 2007, "Controle de Capitales en Colombia ¿Funcionan o No?" *Debate de Coyuntura Económica*, December (Bogotá, Colombia, Fedesarollo).
- , and Felipe Barrera, 1997, "On the Effectiveness of Capital Controls: The Experience of Colombia During the 1990s" *Journal of Development Economics*, October 1997, Vol. 54(1), pp. 27-57.
- Cardoso, Eliana, and I. Goldfajn, 1998, "Capital Flows to Brazil: The Endogeneity of Capital Controls," *IMF Staff Papers*, Vol. 45(1), pp. 161–202.
- Cardoso, Jaime, and Bernard Laurens, 1998, "Managing Capital Flows-Lessons from the Experience of Chile," IMF Working Papers No. 98/168 (Washington: International Monetary Fund).
- Carvalho, Bernardo S. de M., and Márcio G. P. Garcia, 2008, "Ineffective Controls on Capital Inflows under Sophisticated Financial Markets: Brazil in the Nineties," in S. Edwards and M. Garcia, eds., *Financial Markets Volatility and Performance in Emerging Markets* (Cambridge, Massachusetts: National Bureau of Economic Research).
- Chang, Roberto, and Andrés Velasco, 2000, "Banks, Debt Maturity and Financial Crises," *Journal of International Economics*, Vol. 51, pp. 169–19.
- Clements, Benedict J., and Herman Kamil, 2009, "Are Capital Controls Effective in the 21st Century? The Recent Experience of Colombia," IMF Working Paper No. 09/30 (Washington: International Monetary Fund).
- Concha, Alvaro, and Arturo J. Galindo, 2008, "An Assessment of Another Decade of Capital Controls in Colombia: 1998–2008," Paper for XIII LACEA Meeting (Rio de Janeiro, Brazil).
- Danielsson, Jon, and Asgeir Jonsson, 2005, "Countercyclical Capital Charges and Currency Dependent Economies," *Financial Markets, Institutions & Instruments*, Vol. 14(5), pp. 329–48.
- De Gregorio, José, Sebastian Edwards and Rodrigo Valdes, 2000, "Controls on Capital Inflows: Do They Work?" *Journal of Development Economics*, October, Vol. 63(1), pp. 59-83
- Dell'Ariccia, Giovanni, Julian di Giovanni, André Faria, Ayhan Kose, Paulo Mauro, Jonathan D. Ostry, Martin Schindler, and Marco Terrones, 2008, *Reaping the Benefits of Financial Globalization*, IMF Occasional Paper No. 264 (Washington: International Monetary Fund).

- Edison, Hali, and Carmen Reinhart, 2001, "Stopping Hot Money" *Journal of Development Economics*, December 2001, Vol. 66(2), pp. 533–53.
- Edwards, Sebastian, 1999, "How Effective Are Capital Controls?" *Journal of Economic Perspectives*, Fall 1999, Vol. 13(4), pp. 65–84.
- , and Jonathan D. Ostry, 1992, "Terms of Trade Disturbances, Real Exchange Rates, and Welfare: the Role of Capital Controls and Labor Market Distortions," *Oxford Economic Papers*, Vol. 44, pp. 20–34.
- , and Roberto Rigobon, 2009, "Capital Controls on Inflows, Exchange Rate Volatility and External Vulnerability" *Journal of International Economics*, July, Vol. 78(2), pp. 256–67.
- Eichengreen, Barry, and Ricardo Hausmann, 1999, "Exchange Rates and Financial Fragility," in *New Challenges for Monetary Policy*, Federal Reserve Bank of Kansas City, pp. 329–368.
- Forbes, Kristin, 2007, "The Microeconomic Evidence on Capital Controls: No Free Lunch," in Sebastian Edwards, ed., *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences* (Cambridge, Massachusetts, National Bureau of Economic Research).
- Gallego, Francisco, and Leonardo Hernández, 2003, "Microeconomic Effects of Capital Controls: The Chilean Experience During the 1990s," *International Journal of Finance and Economics*, Vol. 8(3), pp. 225–53.
- , and K. Schmidt-Hebbel, 1999, "Capital Controls in Chile: Effective? Efficient?" Central Bank of Chile Working Paper No. 59 (Santiago: Banco Central de Chile).
- Ghosh, Atish, Manuela Goretti, Bikas Joshi, Uma Ramakrishnan, Alun Thomas, and Juan Zalduendo, 2008, "Capital Inflows and Balance of Payments Pressures—Tailoring Policy Responses in Emerging Market Economies" IMF Policy Discussion Paper 08/2 (Washington: International Monetary Fund).
- Ghosh, Atish, Jonathan D. Ostry, and Charalambos Tsangarides, 2010, "Exchange Rate Regimes and the Stability of the International Monetary System" IMF Occasional Paper 270 (Washington: International Monetary Fund).
- Goh, Soo Khoon, 2005, "New Empirical Evidence on the Effects of Capital Controls on Composition of Capital Flows in Malaysia," *Applied Economics*, Vol. 37(13), pp. 1491–1503.

- Gupta, Poonam, Deepak Mishra, and Ratna Sahay, 2007, "Behavior of Output During Currency Crises," *Journal of International Economics*, Vol. 72, No. 2, pp. 428–50.
- Hutchison, Michael, Jake Kendall, Gurnain Pasricha, and Nirvikar Singh, 2009, "Indian Capital Control Liberalization: Evidence from NDF Markets," NIPFP Working Paper No. 2009-60 (New Delhi: National Institute of Public Finance and Policy).
- Jankov, Ljubinko, 2009, "Spillovers of the Crisis: How Different Is Croatia?" Paper presented at "Recent Developments in the Baltic Countries—What Are the Lessons for Southeastern Europe?" March 23, Oesterreichische Nationalbank, Vienna.
- Kim, Jun, Mahvash.S. Qureshi, and Juan Zalduendo, 2010, "Surges in Capital Inflows," mimeo (Washington: International Monetary Fund).
- Korinek, Anton, 2008, "Regulating Capital Flows to Emerging Markets: An Externality View" (unpublished; College Park, Maryland: University of Maryland).
- , 2009, "Excessive Dollar Borrowing in Emerging Markets: Balance Sheet Effects and Macroeconomic Externalities" (unpublished; College Park, Maryland: University of Maryland).
- Kose, Ayhan, Eswar Prasad, Kenneth Rogoff, and Shang-jin Wei, 2006, *Financial Globalization: A Reappraisal*, IMF Working Paper 06/189 (Washington: International Monetary Fund).
- Krugman, Paul, 1987, "The Narrow Moving Band, the Dutch Disease and the Competitive Consequences of Mrs. Thatcher," *Journal of Development Economics*, Vol. 27, pp 41–55.
- , 1998, "What Happened to Asia?" (unpublished; Cambridge, Massachusetts: Massachusetts Institute of Technology).
- Lane, Phillip, and Gian Maria Milesi-Ferretti, 2007, "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004." *Journal of International Economics*, Vol 73(2), pp. 223-50.
- Larraín, Felipe, Raul Laban, and Romulo Chumacero, 1997, "What Determines Capital Inflows? An Empirical Analysis for Chile," John F. Kennedy School of Government Faculty Research Working Paper Series R97-09 (Cambridge, Massachusetts: Harvard University).
- Le Fort, Guillermo, and Carlos Budnevich, 1997, "Capital Account Regulations and Macroeconomic Policy: Two Latin Experiences," Central Bank of Chile WP 06 (Santiago).

- Lee, Jaewoo, Gian Maria Milesi-Ferretti, Jonathan D. Ostry, Alessandro Prati, and Luca Ricci, 2008, *Exchange Rate Assessments: CGER Methodologies*, IMF Occasional Paper No. 261 (Washington: International Monetary Fund).
- Lipschitz, Leslie J, Timothy Lane, and Alex Mourmouras, Alex, 2005, “Real Convergence, Capital Flows, and Monetary Policy: Notes on the European Transition Countries,” in *Euro Adoption in Central and Eastern Europe: Opportunities and challenges* (Susan Schadler, ed.)
- , 2006, “Capital Flows to Transition Economies: Master or Servant?” *Czech Journal of Economics and Finance*, pp 56, 5-6.
- Ma, Guonan, and Robert N. McCauley, 2008, “Efficacy of China’s Capital Controls: Evidence from Price and Flow Data,” *Pacific Economic Review*, Vol. 13(1), pp. 104–23.
- Magud, Nicolas, Carmen Reinhart, and Kenneth Rogoff, 2007, “Capital Controls: Myth and Reality, A Portfolio Balance Approach to Capital Controls (San Francisco: Federal Reserve Bank of San Francisco).
- Miles, William, 2004, “Effectiveness of Capital Controls: the Case of Brazil,” *Review of Development Economics*, Vol. 8(1), pp. 68–80.
- Montiel, Peter, and Carmen Reinhart, 1999, “Do Capital Controls and Macroeconomic Policies Influence the Volume and Composition of Capital Flows? Evidence from the 1990’s,” *Journal of International Money and Finance*, Vol. 18(4), pp. 619–35.
- Reinhardt, Dennis B.S., 2009, “Into the Allocation Puzzle - A Sectoral Analysis,” mimeo.
- Reinhart, Carmen, and Todd Smith, 1998, “Too Much of a Good Thing: The Macroeconomic Effects of Taxing Capital Inflows,” in Reuven Glick, ed., *Managing Capital Flows and Exchange Rates: Perspectives from the Pacific Basin* (Cambridge, United Kingdom: Cambridge University Press).
- Schindler, Martin, 2009, “Measuring Financial Integration: A New Data Set,” *IMF Staff Papers*, Vol. 56(1), pp. 222–38.
- Schneider, Martin, and Aaron Tornell, 2004, “Balance Sheet Effects, Bailout Guarantees and Financial Crises,” *Review of Economic Studies*, Vol. 71, pp. 883–913.
- Tamirisa, Natalia, 2004, “Do Macroeconomic Effects of Capital Controls Vary by Their Type? Evidence from Malaysia,” IMF Working Paper No. 04/3 (Washington: International Monetary Fund).

Valdes-Prieto, Salvador, and Marcelo Soto, 1998, "The Effectiveness of Capital Controls: Theory and Evidence from Chile," *Empirica*, Vol. 25(2), pp. 133–64.

Wakeman-Linn, John, 2007, "Managing Large Scale Foreign Exchange Inflows: International Experiences" (unpublished; Washington: International Monetary Fund).