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## The Effectiveness of Capital Controls and Prudential Policies in Managing Large Inflows

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Managing Large Inflows**

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## EXECUTIVE SUMMARY

IMF staff have recently sought to clarify the circumstances under which capital controls and prudential policies designed to influence cross-border capital flows (referred to together as “capital flow measures,” or CFMs) could be a part of the toolkit to manage large capital inflows. In doing so, considerable emphasis has been given to the need to ensure that these measures in fact achieve their intended objectives, which have typically included stemming currency appreciation, reducing the volume of inflows, changing their composition, providing greater room for maneuver for monetary policy, slowing credit growth, and dampening asset price bubbles.

This note considers the empirical evidence for the effectiveness of capital controls and related prudential measures, with the focus on what has been learned in the past decade.

- A review of the literature shows that capital controls (as distinct from prudential CFMs) have little effect on overall flows, although it appears that controls can change the composition of flows. In most cases, controls also have little effect on currency appreciation. There has not yet been much in-depth study of the effectiveness of prudential measures in addressing the risks from capital inflows.
- Econometric estimates on the effectiveness of capital controls covering four emerging market economies during the 2000s (Brazil, Columbia, Korea, and Thailand) further confirm that controls have met with mixed success. It also appears that the effectiveness of any given measure decays over time.
- A broader review of the experiences of 13 emerging market economies in the 2000s also does not provide unambiguous support for the effectiveness of capital controls and prudential measures. However, prudential measures appear to have had more success in stemming credit growth and addressing financial stability concerns than capital controls, but they only rarely reduced appreciation pressures and aggregate flows.

In sum, for reasons that are not yet fully understood, capital controls and related prudential measures achieve their stated objectives in some cases but not in others, and it is not possible to draw definitive conclusions. Close attention needs to be given to the choice and design of such measures, as discussed, for example, in Ostry and others (2011).

## I. INTRODUCTION

IMF staff have recently re-examined the conditions under which two sets of policies—capital controls and related prudential measures, referred to collectively as “capital flow measures,” or CFMs—might be used to address the risks posed by large capital inflows.<sup>1</sup>

In essence, this new work maintains that macroeconomic policies are appropriate tools to use in the face of capital inflows. These policies include: allowing the currency to appreciate when it is undervalued from a multilateral perspective; purchasing foreign exchange reserves if their level is not more than adequate from a precautionary perspective; and lowering policy rates (when overheating is not a concern) or tightening fiscal policy to allow space for monetary easing (consistent with inflation objectives). There is also an important role for structural policies to enhance the capacity of the economy to absorb inflows and cope with volatility, along with improved regulation and supervision of the financial sector.

Beyond this, it may be appropriate for countries to also use CFMs. These measures comprise (i) *residency-based CFMs*, often referred to as capital controls, which encompass a variety of measures affecting cross-border financial activity that discriminate on the basis of residency;<sup>2</sup> and (ii) *other CFMs* that do not discriminate on the basis of residency but are nonetheless designed to influence inflows. If a measure is not designed to influence capital inflows, it would not fall under the CFM umbrella. In general, it is often difficult to determine *ex ante* whether a particular measure constitutes a CFM; and a range of criteria, including the overall policy context and the timing of the measure, need to be considered. Within CFMs, precedence would be given to those that do not discriminate on the basis of residency.<sup>3</sup>

While this framework provides a hierarchy of measures to address the risks from large capital inflows, two other important issues need to be considered in connection with the use of CFMs:

- It is necessary to take account of their *multilateral implications*. For example, the use of a CFM might divert capital flows from one country to other countries, which may have a variety of effects, both positive and negative, on economic performance and welfare. These multilateral considerations are currently being studied in greater depth by IMF staff.

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<sup>1</sup> Ostry and others (2010) and IMF (2011b).

<sup>2</sup> For example, a measure that prevents nonresidents from buying domestic government securities would be considered a capital control.

<sup>3</sup> This prioritization of measures takes into account institutional and political economy concerns flowing from the general standard of fairness that a member expects that its nationals will enjoy as a result of its participation in a multilateral framework. For further details, see IMF (2011b), paragraph 53.

- In addition, a judgment needs to be made on the *effectiveness* of CFMs. This is ultimately an empirical question, and one that has attracted a great deal of research over the years.

The present note seeks to provide further information on the second issue, effectiveness. The question of effectiveness has been a long-standing and at times controversial topic of debate, with no definitive resolution. The note begins by summarizing the existing empirical literature concerning the effectiveness of CFMs. It then presents some new econometric estimates by IMF staff covering the experience with CFMs in the past decade, drawing also on country experiences.

Overall, this note finds that, for reasons that are not yet fully understood, capital controls and related prudential measures achieve their stated objectives in some cases but not in others. Close attention thus needs to be given to the choice and design of such measures, as discussed for example in Ostry and others (2011).

## II. WHAT DOES THE LITERATURE TELL US?

As discussed further below, the extant literature deals mainly with capital controls (CFMs that discriminate based on residency). Accordingly, the focus in this review of the literature is on the effectiveness of capital controls in countries that have already liberalized many types of international capital flows. This is the situation in which many emerging market economies find themselves today. By contrast, countries with well-established controls and strong foreign exchange enforcement capacity seem to have less difficulty controlling capital inflows, but at the cost of greater distortions. China and India are the prime examples: they have lifted controls on capital inflows only to a limited extent, and they continue to use various administrative controls, including approval procedures and quantitative limits. The comprehensive systems in China and India allow for close monitoring of flows and a calibrated tightening of controls when needed.<sup>4</sup>

There is relatively little empirical research on the effectiveness of CFMs other than capital controls in managing the risks from inflows in countries with a broadly open capital account. The pace at which countries have adopted or modified prudential measures in response to capital inflows, either instead of capital controls or together with them, seems to have picked up in the last few years. What work there is in this area is based on country cases or event studies.

The effectiveness of capital controls is measured by the achievement of specified objectives. These typically include the following: (i) reducing the total volume of inflows to prevent

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<sup>4</sup> While there are important differences between the capital controls in the two countries, they both restrict most cross-border capital transactions.

currency appreciation; (ii) altering the composition of inflows to minimize the impact of sudden stops or reversals on financial stability and exchange rate volatility; and (iii) providing additional room for monetary policy. In terms of data, studies seek to measure the effect of controls on the volume or composition (maturity, type) of the inflows, the exchange rate (changes, volatility), and the differential between domestic and foreign interest rates (market and/or policy rates).

Measuring effectiveness is often difficult because CFMs are almost always part of a broader package of policies, all of which can affect capital inflows. Indeed, there seem to be no cases in which only CFMs were used to deal with increased inflows. Disentangling the effects of different policies and quantifying the contribution of CFMs to the outcome poses difficult statistical problems. Accordingly, the results of such investigations are not clear-cut.

Circumvention further confounds attempts to measure effectiveness. Studies of the effect of CFMs on the composition of flows are particularly susceptible to this problem. Circumvention often means that targeted flows find other channels—the flow covered by a particular measure decreases but other types of flows increase. For example, in Brazil, balance of payments data indicate that the implementation of a tax on portfolio inflows was followed by lower portfolio flows but increased foreign direct investment (FDI) flows. It seems that some flows were disguised as FDI to avoid the tax.

Earlier reviews of the literature on effectiveness concluded that the evidence is mixed.<sup>5</sup> Based on the experience of a number of emerging market economies through 1999, it appeared that the principal motivation for the use of controls was to maintain a differential between domestic and foreign interest rates and to reduce pressures on the exchange rate. Controls were found to be effective initially, but countries in general could not achieve both objectives simultaneously—the interest rate differential could be maintained but the exchange rate had to be adjusted. Controls lengthened the maturity of foreign exchange inflows but were less successful in reducing the overall volume.

The conclusions of the more recent literature on effectiveness are consistent with the previous findings. Many of these papers reexamine earlier episodes that had been studied previously, but some also look at more recent experiences in one or more countries.

The key results overall are that controls on capital inflows have a stronger effect on the composition of flows and on domestic–foreign interest rate differentials than on the overall volume of inflows. However, some more recent cross-country studies suggest that countries

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<sup>5</sup> Ariyoshi and others (2000).

that are less open to financial flows experienced smaller inflow surges. Appendix I provides further details.

- Most econometric studies find no effect of controls on the overall volume of inflows. In single equation models (such as OLS, IV), some do not find a significant reduction in volume,<sup>6</sup> while others do.<sup>7</sup> For Brazil and Malaysia, vector auto-regressions (VARs) find a significant but short-lived reduction.<sup>8</sup>
- Controls can increase the maturity of inflows. Significant evidence is found for Brazil, Chile, Colombia, Croatia, Malaysia, and Thailand regardless of the econometric methods.<sup>9</sup> These studies find that short-term inflows significantly dropped after the imposition of controls, while observing no statistically significant change in long-term inflows. There is also indirect evidence that controls on equity inflows were binding in Chile, Korea, and Argentina but not in Indonesia.<sup>10</sup>
- Inflow controls had no clear effect on currency appreciation in most cases. Most studies find that an unremunerated reserve requirement (URR) on inflows in particular<sup>11</sup> had no impact—or only a small impact—on the exchange rate.<sup>12</sup> Only one study, using a GARCH model, found that a tightening of controls (a URR) led to a depreciation in the nominal exchange rate band.<sup>13</sup>
- With regard to monetary policy autonomy, inflow controls can contribute to the differential between domestic and foreign interest rates. Using a VAR framework, one study finds that Chile’s central bank was able to target a higher domestic interest rate for 6 to 12 months.<sup>14</sup> In China and India, which maintain more extensive controls,

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<sup>6</sup> De Gregorio, Edwards, and Valdes (2000) for Chile; Cardenas and Berrera (1997) for Colombia; Binici, Hutchison, and Schindler (2009) for a cross-country study.

<sup>7</sup> Coelho and Gallagher (2010) for Colombia and Thailand; Gallego, Hernandez, and Schmidt-Hebbel (2002) for Chile; Campion and Neumann (2004) for a cross-country study.

<sup>8</sup> Cardoso and Goldfajn (1998) and Carvalho and Garcia (2008) for Brazil; Goh (2005) for Malaysia.

<sup>9</sup> Cardoso and Goldfajn (1998) for Brazil; De Gregorio, Edwards, and Valdes (2000) for Chile; Cardenas and Barrera (1997), Cardenas (2007), and Clements and Kamil (2009) for Colombia; Jankov (2009) for Croatia; Goh (2005) for Malaysia; Jittrapanum and Prasartset (2009) for Thailand.

<sup>10</sup> Levy-Yeyati, Schmukler, and Van Horen (2009).

<sup>11</sup> A URR on inflows is a capital control because it applies only to non-residents’ financial transactions.

<sup>12</sup> Gallego, Hernandez, and Schmidt-Hebbel (2002) and De Gregorio, Edwards, and Valdes (2000) for Chile; Clements and Kamil (2009) and Rincón and Toro (2010) for Colombia; Coelho and Gallagher (2010) for Colombia and Thailand.

<sup>13</sup> Edwards and Rigobon (2009), for Chile.

<sup>14</sup> De Gregorio, Edwards, and Valdes (2000).

interest rate spreads remain significant and persistent over time.<sup>15</sup> This conclusion is consistent with the view that controls are more effective in countries that more heavily control capital flows.

- Another strand of the literature focuses on the microeconomic impact of inflow controls. Forbes (2007) argues inflow controls in Chile imposed a financial constraint on small firms. Gallego and Hernandez (2003) find that controls were associated with lower leverage and greater reliance on retained earnings.

An important recent meta-study by Magud, Reinhart, and Rogoff (2011) seeks to standardize the results of a significant part of the earlier literature and generally confirms these broad findings:

Capital controls on inflows seem to make monetary policy more independent, alter the composition of capital flows, and reduce real exchange rate pressures (although the evidence there is more controversial). Capital controls on inflows seem not to reduce the volume of net flows (and hence the current account balance).

Nonetheless, the divergent findings in the literature are striking, and it is important to understand them more fully.

First, and perhaps most importantly, there is no generally accepted framework for analyzing the effectiveness of capital controls. It is well known that attempts to measure effectiveness suffer from simultaneity bias: capital controls are usually tightened when capital inflows surge, creating an endogeneity problem. Many different econometric approaches have been used to address this problem, including the use instrumental variables and VAR with a variable ordering assumption. The results are also sensitive to the details of model specification, notably the choice of control variables. Of course, not all studies even go this far: many on the experience of individual countries do not use a rigorous econometric methodology but instead draw conclusions from observed changes in macroeconomic variables and the volume of capital flows—for example, Jankov (2009), Mohan and Kapur (2009), Reinhart and Smith (1998), and Thaicharoen and Ananchotikul (2008).

Second, effectiveness is more difficult to measure when low-frequency data are used. Capital controls lose their effectiveness over time, as markets find ways to circumvent them. Thus, studies that track changes in capital flows using high-frequency data (and with a close focus on the announcement or the effective date of the introduction of controls) are more likely to find some effectiveness. Some studies using daily or weekly financial variables find significant changes in stock market or forward premia when capital controls are introduced

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<sup>15</sup> Ma and McCauley (2008); Hutchison and others (2009).

or lifted—for example, Levy-Yeyati, Schmukler, and Van Horen (2009), and Hutchison and others (2009).

Third, there are good reasons why effectiveness may differ across countries or over time. Notably, the practical experience of IMF staff strongly suggests that effectiveness depends on the design or implementation of the controls. Different countries may implement or enforce the same capital controls differently, reflecting differences in administrative capacity. The level of legal compliance may also vary. These and other details of a control's design and the environment in which it is implemented are not captured by the data used in the available studies, and cross-sectional or panel data analysis will find it difficult to identify these factors in a consistent manner. For example, Campion and Neumann (2004) use panel data on seven Latin American countries and find a significant impact on the volume of flows, while a study by Binici, Hutchison, and Schindler (2009) that covers 74 countries does not find controls to be effective.

Fourth, the intensity of capital controls is measured in the literature in many different ways. Some studies use a binary variable indicating the existence of a specific measure, and some use combination of a few binary variables (see Clements and Kamil, 2009; Coelho and Gallagher, 2010). Other studies count the number of regulation changes, as in Cardoso and Goldfajn (1998). Yet others calculate tax equivalent intensity, as in De Gregorio, Edwards, and Valdes (2000). Some studies further distinguish between controls on inflows and outflows (for example, Binici, Hutchison, and Schindler, 2009). Most of the indices are based on *de jure* controls, that is, the presence of controls in domestic laws and regulations. These measures do not take into account whether and how they are implemented in practice.

Fifth, the measurement of capital flows varies. Studies with narrowly defined capital flows (that is, flows subject to the analyzed controls) are more likely to find effectiveness, in particular with respect to the compositional effect of the controls (see De Gregorio, Edwards, and Valdes, 2000).

In sum, studies ideally should adequately correct for simultaneity bias; use high-frequency data; capture important institutional features of countries such as administrative capacity and legal compliance; cover a broad range of countries; and measure the intensity of controls based on how actively they are enforced. None of the extant studies meets all of these requirements, and indeed data limitations will, for the foreseeable future, preclude combining all of these features in a single study.

### **III. CAPITAL CONTROLS IN THE 2000S—SOME NEW ECONOMETRIC EVIDENCE**

One important question is whether the findings of the literature change once country experiences and data since 2000 are more systematically taken into account. In the last decade, there have been several major surges in capital flows to emerging markets, including in central and eastern Europe, Asia, and Latin America.

The discussion here is based on Baba and Kokenyne (forthcoming–a), who provide a quantitative assessment of the effect of inflow control tightening and outflow liberalization in selected emerging market economies (EMEs) in the 2000s. The following episodes are examined: the foreign exchange tax in Brazil (2008), the URR in Colombia (2007–08) and in Thailand (2006–08), and extensive outflow liberalization in Korea (2005–08).

The analysis uses indices that track the intensity of temporary price-based capital controls and other types of capital controls, drawing on information on reported policy changes (Figure 1). The use of separate indices for temporary price-based controls and for other—more permanent—controls helps to measure the effect of these policies separately in achieving the policy objectives.

Estimation of the determinants of capital flows (Table 1) is by generalized method of moments (GMM), while the effectiveness in achieving various macroeconomic objectives is assessed using VAR. Both sets of regressions control for various country-specific and global correlates of capital flows.<sup>16</sup> As in much of the previous literature, the study gauges the success of controls in achieving four objectives: (i) stemming capital flows; (ii) lengthening the maturity of capital flows; (iii) allowing greater room for maneuver for raising domestic interest rates; and (iv) easing currency appreciation pressures.

The estimates show that the effectiveness of capital controls varies across countries:

- The volume of net capital inflows was reduced by the URR in Colombia. Colombia’s URR affected short-term flows and thus helped lengthen the maturity structure of inflows. Thailand’s URR also affected the volume of net capital flows; however, the effect materialized through increasing outflows. The foreign exchange tax in Brazil and outflow liberalization in Korea do not appear to have had a significant impact on the volume or composition of inflows.
- The price-based capital controls in Brazil and Colombia provided greater room for monetary policy to increase interest rates.
- Controls or outflow liberalization did not ease appreciation pressure in any of the countries.

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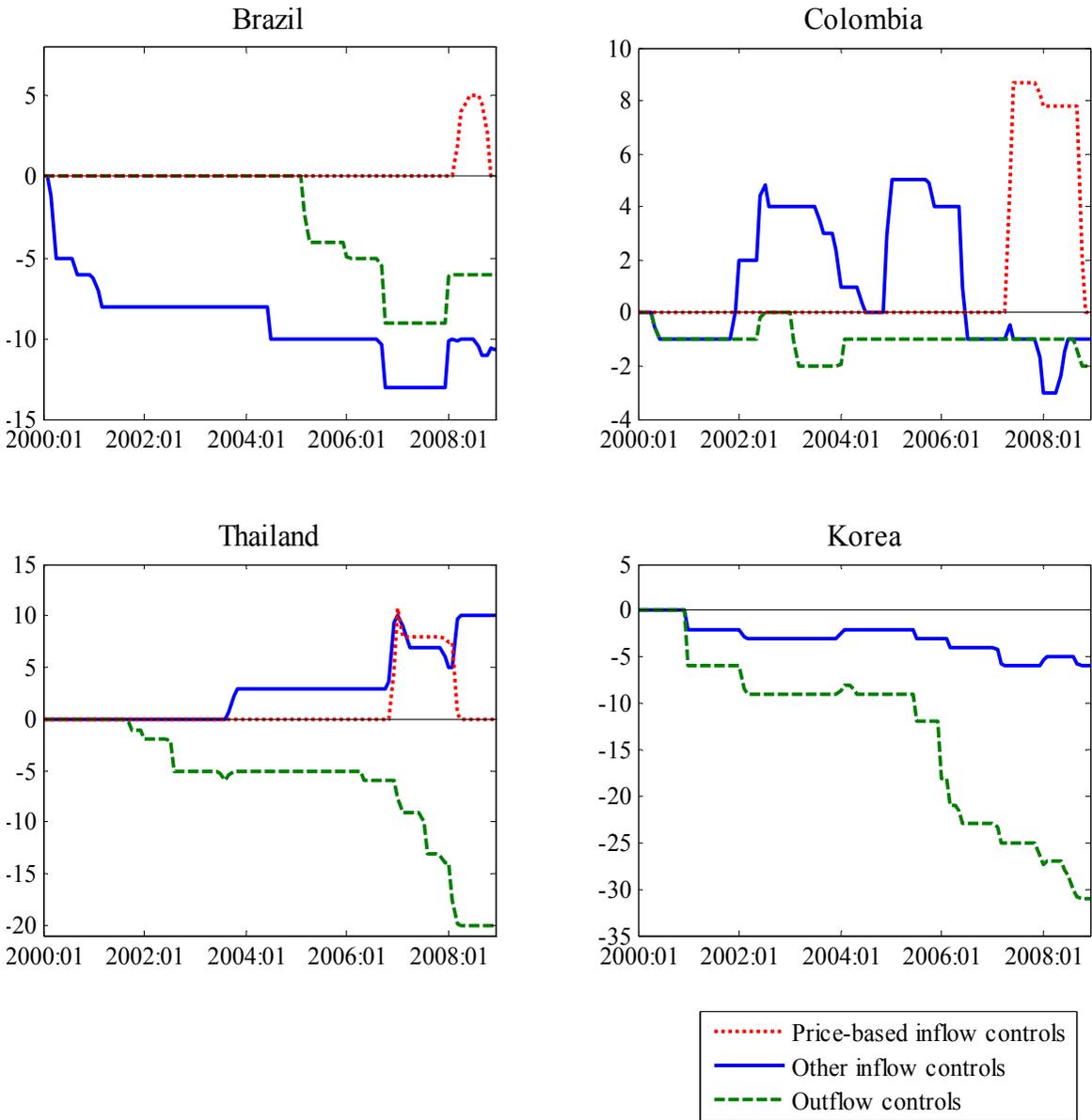
<sup>16</sup> See the note to Table 1 for the variables included in the GMM estimates. The VARs included the following endogenous variables: (i) all three indices of controls (price-based inflow controls, other inflow controls, and outflow controls); (ii) a short-term interest rate differential with the United States; (iii) net capital flows; (iv) the real exchange rate; and (v) credit growth. They also included several exogenous variables, notably domestic and U.S. business cycle indicators, the EMBI spread, ICRG index, the VIX, and the lagged current account balance.

- Thailand's general inflow controls, which were tightened just before the introduction of the URR, and the liberalization of outflows helped maintain monetary policy autonomy.

In addition, the macroeconomic impact of the inflow controls depends on their coverage, the level of capital market development, other supporting policies, and whether the capital inflow surge is short-lived or longer-lived:

- When measures target a narrow component of capital flows, even if successful on the targeted flows, they may not have a significant macroeconomic impact such as lowering the total volume of flows or easing currency appreciation pressures. For example, in Colombia, the measures successfully moderated short-term flows but could not stem the appreciation of the currency because the majority of flows— notably FDI—were exempt.
- The desired effect is even more difficult to obtain when the capital market is well developed, because investors can find more ways to circumvent the measures. This might explain why policies in Brazil, with its sophisticated derivative markets, were less effective.
- Other policies can help support effectiveness. For example, liberalizing outflow controls can increase outflows and help in maintaining higher domestic interest rates (Thailand).
- In all cases, the impact of the policies was short-lived. This suggests that capital controls are best suited to dealing with temporary surges in capital flows. In order to remain effective in the longer run, they need to be regularly reinforced and broadened, potentially leading to a wider reregulation of capital flows. However, reinforcing controls may increase distortions.

Figure 1. Indices of Capital Controls



Source: IMF AREAER database and authors' calculation.

Note: For indices of inflow controls and outflow controls, higher values indicate that transactions are subject to more restrictions. For the tax and URR indices, higher values indicate that the regulation applies to more types of inflows.

**Table 1. Impact of Capital Controls on the Volume of Capital Flows**

|                             | Brazil            |                   | Colombia          |                     | Thailand           |                   | Korea             |                   |
|-----------------------------|-------------------|-------------------|-------------------|---------------------|--------------------|-------------------|-------------------|-------------------|
|                             | Net               | Inflow            | Net               | Inflow              | Net                | Inflow            | Net               | Inflow            |
| Total flows                 |                   |                   |                   |                     |                    |                   |                   |                   |
| Price-based inflow controls | -0.499<br>(0.365) | -0.776<br>(0.494) | -0.044<br>(0.027) | -0.051<br>(0.022)** | -0.456<br>(0.256)* | -0.346<br>(0.346) |                   |                   |
| Inflow controls             | -1.341<br>(2.546) | -2.457<br>(3.736) | 0.045<br>(0.476)  | -0.159<br>(0.356)   | -0.611<br>(1.309)  | -2.074<br>(2.172) | 0.320<br>(1.175)  | -2.061<br>(2.778) |
| Outflow controls            | -0.398<br>(2.653) | 1.071<br>(3.152)  | -0.591<br>(1.121) | -2.098<br>(1.926)   | 1.672<br>(0.919)*  | 0.957<br>(1.200)  | -0.090<br>(0.627) | 1.619<br>(1.359)  |
| Observations                | 104               | 104               | 56                | 56                  | 34                 | 34                | 104               | 104               |
| Short-term flows            |                   |                   |                   |                     |                    |                   |                   |                   |
| Price-based inflow controls | 0.108<br>(0.422)  | -0.382<br>(0.452) | -0.029<br>(0.023) | -0.035<br>(0.016)** | -0.359<br>(0.313)  | -0.264<br>(0.283) |                   |                   |
| Inflow controls             | -0.829<br>(2.831) | -0.759<br>(2.814) | 0.133<br>(0.426)  | -0.073<br>(0.296)   | -0.390<br>(1.467)  | -1.586<br>(1.579) | -0.287<br>(1.451) | -2.189<br>(2.289) |
| Outflow controls            | 5.353<br>(3.303)  | 2.302<br>(2.911)  | 0.195<br>(1.244)  | -1.253<br>(1.168)   | 1.279<br>(1.089)   | 0.655<br>(1.050)  | -0.293<br>(0.736) | 1.100<br>(1.092)  |
| Observations                | 104               | 104               | 56                | 56                  | 34                 | 34                | 104               | 104               |

Sources: IMF staff estimates.

Note: GMM 2SLS estimates with lagged variables as instruments. Values in parentheses are White's heteroskedasticity consistent standard errors. \*\* and \* indicate the estimate is significant at the 5 percent and 10 percent level, respectively. Capital flows are expressed as a percent of GDP. The regressions include interest rates and business cycles in the respective country and in the United States, forward premium, ICRG, VIX, and current account balance. EMBI sovereign spread is additionally included for Brazil and Colombia. Period: January 2000–August 2008 for Brazil and Korea; January 2004–August 2008 for Colombia; and 2000: Q1–2008: Q2 for Thailand.

#### IV. MANAGING THE RISKS OF CAPITAL INFLOWS—CAPITAL CONTROLS AND PRUDENTIAL POLICIES

In addition to using capital controls to manage capital inflow surges, countries have employed prudential policies to cope with the risks of those surges. Whereas capital controls seek to reduce inflows or change their composition, dampen currency appreciation, or gain more room for domestic interest rate policy, prudential policies have often targeted rapid credit growth, which is a common side effect of large inflows, and which has been a major issue of concern in a number of EMEs. Capital inflows have been an important source of noncore bank funding in Croatia and Korea, for example, underpinning higher bank leverage and often rapidly growing credit.<sup>17</sup> Corporates and households may also at times borrow directly from abroad, bypassing the regulated financial sector. If excessive or poorly managed, such credit expansion can pose risks to macroeconomic and financial system stability.

As noted, prudential policies designed to influence cross-border capital flows are a subset of CFMs, but they are also often referred to as macroprudential policies. However, an emerging view holds that it is preferable to limit the use of the term “macroprudential” to measures that aim to deal with systemic risk in the financial sector rather than with macroeconomic objectives more generally.<sup>18</sup> Here, we refer simply to prudential policies, which are taken to include both micro- and macroprudential measures.

The effect of both capital controls and prudential measures on selected variables of interest was examined in 13 country cases covering the period of 2000–2008: Q2.<sup>19</sup> The countries were chosen based on IMF staff reports that identified countries with capital inflow surges and/or high credit growth. The period was deliberately limited to the years between the Asian crisis in 1997 and the recent global crisis that hit most emerging markets in 2008: Q3.

The effects of policies are evaluated in a VAR framework, as described in Baba and Kokenyne (forthcoming—a and b). Each country’s CFMs are summarized by four indices that track (i) changes in relevant prudential regulations; (ii) price-based capital controls on inflows; (iii) other capital controls on inflows; and (iv) capital controls on outflows.<sup>20</sup> The changes are weighted by the number of affected types of transactions but not by their stringency. The index of price-based capital controls tracks the policy’s tax equivalent rates.

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<sup>17</sup> See, for example, Shin and Shin (2011).

<sup>18</sup> See IMF (2011a).

<sup>19</sup> Brazil, Colombia, Croatia, India, Korea, Peru, Philippines, Romania, Russia, South Africa, Thailand, Uruguay, and Vietnam.

<sup>20</sup> Changes in prudential regulations include all prudential measures implemented during the period and may thus also include some measures that may not have been designed to influence capital flows, in the sense of IMF (2011b). This may result in some downward bias in the estimated effectiveness of prudential measures.

The VAR system is estimated with quarterly data for the period 2000: Q1 to 2008: Q2 with one lag, or with monthly data for the period January 2000 to August 2008 for countries in which it was available to allow for higher number of observations. Detailed results are provided in Appendix II.<sup>21</sup>

### **Inflow controls**

Evidence for the effectiveness of controls on capital inflows show that they worked in some instances, but not in others, for reasons that are not well understood. While controls occasionally reduced flows and provided for greater room for maneuver for domestic monetary policy, their effect was small and short-lived and not sufficient to reduce appreciation pressures. The forms of the inflow control (tax, URR, or administrative) does not seem to influence effectiveness.

The URR in Colombia (2007–08) and Thailand (2006–08) and the administrative controls in Croatia (2004–06) seem to have reduced the aggregate volume of net flows. Moreover, the URR in Colombia and Russia (2004–06) and the inflow control policy in Croatia and India temporarily lengthened the maturity of inflows. The tax on foreign exchange portfolio inflows in Brazil in 2008 was a partial success. It appears to have allowed a higher interest rate differential for two to three quarters, but it did not reduce the volume of flows or change the composition of inflows or stem appreciation pressure. Other capital controls helped curb domestic credit growth in Croatia, Peru, and Philippines.<sup>22</sup>

### **Liberalization of outflows**

The liberalization of residents' outward capital transactions generally succeeded in increasing capital outflows temporarily, but it dampened currency appreciation pressures only in Russia. Liberalization of outflows did not affect the aggregate volume of net flows. However, it helped to stem credit growth in Korea and reduced real estate price increases in South Africa. Relaxing controls on capital outflows also contributed to maintaining higher domestic interest rates in the Philippines, Russia, Thailand, and Vietnam and often lengthened the maturity of outflows.

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<sup>21</sup> The countries' major capital control and prudential measures implemented in the period are summarized in Appendix III.

<sup>22</sup> Other capital controls in Croatia include reserve requirements that are differentiated according to the residency of the depositor/creditor. These reserve requirements contributed to the building up of liquidity buffers that successfully insulated the county's banking system from liquidity stress during the global crisis.

## Prudential measures

The use of other CFMs, mainly prudential measures, in the face of capital inflow surges has been more successful in addressing concerns related to capital inflows. Prudential measures appear to have been somewhat effective in addressing the macroeconomic challenges of capital inflows. Moreover, prudential measures seem to have been effective in mitigating financial stability concerns stemming from rapid credit growth and short term inflows. Specifically:

- ***Prudential measures contributed to mitigating the macroeconomic impact of capital inflows in some cases.*** Although they helped to ease appreciation pressures in Croatia and Peru, they appear to have reduced net inflows significantly only in Peru. Prudential measures are associated with a decrease in capital inflows in Croatia; however, the effect is not significant. The implementation of prudential measures also appears to have provided greater scope for monetary authorities to set domestic interest rates in Croatia, South Africa, Thailand, Uruguay, and Vietnam.
- ***Targeted prudential measures often appear to be effective in reducing credit growth.*** The speed limits and high liquidity and reserve ratios used in Croatia in 2003–07 are a case in point. Tighter loan classification and provisioning requirements and a hike in marginal reserve requirements helped slow credit expansion in Peru in 2007–08. Korea successfully tightened prudential rules, including the extension of thin capitalization rules on foreign bank branches in 2007–08, to reduce credit growth. In India, credit growth decreased following the gradual tightening of prudential policies in 2007, but the effectiveness of these measures may have been offset by a concurrent liberalization of capital controls.<sup>23</sup> There are also some counterexamples, however. A significant strengthening of prudential measures in Colombia in 2007 and Romania in 2003–08 did not stem credit growth.<sup>24</sup> The wide-ranging tightening of prudential policies in Uruguay following the 2002–03 banking crisis did not prevent the inflow-induced rapid credit expansion that began in late 2006, although it has likely reduced credit risk in the banking sector.
- ***The effectiveness of prudential measures often depends on the accompanying macroeconomic policies.*** In Romania in 2003–08, prudential measures reduced the share of bank-intermediated flows from abroad, but strong credit growth continued as increased FDI in the banking sector funded lending to the economy against the

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<sup>23</sup> In India, the 2007 credit boom and the associated risks for banks' asset quality from surging asset prices were primarily addressed using prudential measures and adjustments in the cash reserve ratio. The analysis did not find a statistically significant effect of the prudential policies on credit growth.

<sup>24</sup> In Colombia, the measures included, for example, dynamic provisioning, marginal reserve requirements, and limits on banks' gross derivative positions.

backdrop of an open capital account and macroeconomic policies that did not rein in domestic demand.<sup>25</sup>

- ***Adding capital inflow controls to prudential measures often seems to have little additional effect on credit growth.*** The lowering of the maturity-dependent all-in cost ceiling on external borrowing and of the ceiling on interest rates on nonresidents' deposits in India, and the tax and the URR in Brazil, Colombia and Thailand, did not contribute noticeably to restraining credit growth. By contrast, inflow controls in Philippines and a hike in differentiated reserve requirements and marginal reserve requirements on nonresident liabilities in Peru and Croatia seems to have further dampened credit growth.
- ***The effectiveness of prudential measures in reducing foreign currency lending is mixed.*** Stronger prudential measures decreased banks' lending to residents in foreign currency in some countries (Croatia, Uruguay). However, prudential tightening in Korea in 2008, which also aimed to reduce unhedged foreign currency lending to households, did not result in a significant decrease in such lending to residents by local banks.
- ***Prudential measures usually did little to restrain asset prices.*** Several countries (Croatia, India, Romania, and Vietnam) introduced prudential measures to rein in stock market or real estate price increases, but these did not prove to be effective. In Vietnam, prudential policies may possibly have helped to moderate the stock market boom. The gradual tightening of targeted prudential policies began in 2005 and intensified in 2007, and they contributed to a temporary reduction in the stock price index. In addition, portfolio inflows turned negative from 2008: Q1, when the securities-related prudential regulations took effect.
- ***Prudential measures have helped to address some other financial stability concerns.*** The measures taken in a number of countries (for example, Brazil, Korea, Peru, and Romania) appear to have lengthened the maturity of capital inflows, thus helping to reduce maturity mismatches in the banking sector. Prudential measures in Colombia and Croatia may have moderated financial stability risks by reducing bank-intermediated capital inflows. The measures introduced in 2009–10 in Korea may have contributed to restraining banks' foreign borrowing, although they did not stem capital inflows overall.<sup>26</sup> In Uruguay, the composition of inflows shifted from external

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<sup>25</sup> Romania's speed limit on credit growth was expressed as a percentage of the bank's capital, and could thus be circumvented by increasing banks' equity.

<sup>26</sup> These measures were implemented following the period examined here.

borrowing to portfolio and FDI inflows, thereby improving the maturity structure and reducing the exposure of the financial sector, but leaving overheating concerns unaddressed.

## V. CONCLUSIONS

Capital inflow surges can give rise to significant risks, notably excessive currency appreciation that can damage export sectors, and credit booms and asset price bubbles that may imperil financial stability. These risks have spawned a vigorous debate on the appropriate policy response to inflow surges, and in particular on the conditions under which it would be appropriate to use capital controls and other, mostly prudential, measures that are designed to influence inflows. These two sets of measures are grouped together under the broader heading of CFMs.

A key question in this connection is how effective CFMs are likely to be once a decision has been made to use them. On this score, the evidence is mixed, although prudential measures in our country sample appear to have been somewhat more successful than capital controls. Both the economic literature, and a review of recent country experiences, support the view that these measures are successful in addressing the risks associated with inflow surges in some cases, but not in others. Moreover, their effect is usually not long-lasting.

Of course, CFMs could be repeatedly strengthened and expanded to cover additional types of transactions, with stronger enforcement. However, this might eventually result in a heavily controlled foreign exchange and financial system such as many emerging markets had in the past, and for example, China and India still have to some extent. Such an approach must therefore carefully consider the costs of overregulation or even financial repression, which include a much less efficient allocation of savings and lower long-run economic growth.

Two key areas for future research will thus be to (i) understand better which types of CFMs are effective, and which are not, along with the reasons, and (ii) develop a more reliable framework for assessing the effectiveness of CFMs in relation to the distortions and costs they give rise to. While it is feasible to achieve significant progress on the theoretical front, as in Ostry and others (2011), the economic literature suggests that it may prove far more difficult to confront any theories with the data in a way that yields clear-cut results. The number of variables at play is large, and the number of episodes available for review is quite limited. It is probable that, as in the past, decisions on whether or not to use CFMs will require considerable judgment.

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## Appendix I. Review of the Literature

| Country                                       | Year    | Controls   | Study   | Did controls on inflows:       |                       |                                     |
|---|---------|--|---|--------------------------------|-----------------------|-------------------------------------|
|   |         |  |   | 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                                  |
|   |         |  | Carvalho and Garcia (2008)                    | Yes(ST)                        |                       |                                     |
| <b>Chile</b>                                  | 1991–98 | Introduced URR on foreign borrowing, later extended to cover nondebt flows, American Depository Receipts, and potentially speculative FDI. Raised the discount rate.   | Valdes-Prieto and Soto (1998)                 | No                             | Yes                   | No                                  |
|   |         |  | Le Fort and Budnevich (1997)                  | No                             |                       | Yes                                 |
|   |         |  | Larraín, Labán, and Chumacero (2000)          | No                             | Yes                   |                                     |
|   |         |  | Laurens and Cardoso (1998)                    | Yes (ST)                       | Yes                   | No                                  |
|   |         |  | Reinhart and Smith (1998)                     | Yes (ST)                       | Yes (ST)              |                                     |
|   |         |  | Edwards (1999)                                | No                             | Yes                   | No                                  |
|   |         |  | Gallego, Hernández, and Schmidt-Hebbel (2002) | 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                                 |
| Levy Yeyati, Schmukler and Van Horen (2009)/1 |         |  |   |                                |                       |                                     |
| <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                                  |

| Country         | Year      | Controls  | Did controls on inflows:   |                                |                             |                                     |
|-----------------|-----------|---|--|--------------------------------|-----------------------------|-------------------------------------|
|                 |           |   | Study  | Reduce the volume of net flows | Alter the composition       | Reduce real exchange rate pressures |
|                 | 2007–08   | Introduced URR of 40 percent on foreign borrowing and portfolio inflows.<br>Imposed limits on the currency derivative positions of banks (500 percent of capital).  | Concha and Galindo (2009)<br>Cardenas (2007)<br>Clements and Kamil (2009)<br>Coelho and Gallagher (2010)<br>Rincón and Toro (2010) | No<br>No<br>No<br>Yes          | No<br>Yes (ST)<br>Yes<br>No | No<br>No<br>No<br>No                |
| <b>Croatia</b>  | 2004–08   | Introduced prudential marginal reserve requirements on bank foreign financing.  | Jankov (2009)  |                                | Yes                         |                                     |
| <b>Korea</b>    | 1989–2004 | Liberalization of outflows  | Chung and Ni (2002)<br>Levy Yeyati, Schmukler and Van Horen (2009)/1   | Yes(ST)/2                      |                             |                                     |
| <b>Malaysia</b> | 1994      | Prohibition on 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.<br>Ceilings on banks' net liability position.<br>Non-interest bearing deposit requirement for commercial banks against ringgit funds of foreign banks. | Ariyoshi and others (2000)<br>Tamirisa (2006)<br>Goh (2005)  | Yes<br>Yes (ST)                | Yes<br>Yes                  | Yes (ST)<br>No                      |
| <b>Thailand</b> | 1995–96   | URR imposed on bank's nonresident baht accounts.<br>Introduced asymmetric open position limits to discourage foreign borrowing.<br>Imposed reporting requirements for banks on risk control measures in foreign exchange and derivatives trading.   | Ariyoshi and others (2000)   | Yes                            | Yes                         | No                                  |

| Country                       | Year                | Controls   | Study  | Did controls on inflows:            |                                   |                                     |
|-------------------------------|---------------------|--|--|-------------------------------------|-----------------------------------|-------------------------------------|
|                               |                     |  |  | Reduce the volume of net flows      | Alter the composition             | Reduce real exchange rate pressures |
|                               | 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 exempt from the URR.<br>Capital outflows liberalized.   | Coelho and Gallagher (2010)<br>Jittrapanum and Prasartset (2009)<br>Thaicharoen and Ananchotikul (2008)  | Yes<br><br>Yes                      | No (FDI yes)<br>Yes (ST)          | No<br>No<br>Yes                     |
| <b>India</b>                  | 1993–94;<br>2004–09 | A combination of policies and measures including capital controls used to actively manage the capital account, especially debt flows.<br>Prudential regulations tightened on the financial sector's external borrowing and to curb high credit growth.<br>Cash reserve requirements.<br>Interest rate ceilings and minimum maturity requirements on nonresidents deposits. | Sen Gupta (2010)<br>Mohan and Kapur (2009)<br>Hutchison and others (2009)/3  |                                     | Yes                               | Yes                                 |
| <b>Cross-country evidence</b> |                     |  | Reinhart and Smith (1998)<br>Montiel and Reinhart (1999)<br>Campion and Neumann (2004)<br>Binici, Hutchison, and Schindler (2009)<br>IMF (2011c) | Yes (ST)<br>No<br><br>No<br><br>Yes | Yes (ST)<br>Yes (ST)<br>Yes<br>No |                                     |

*Source:* Magud and others (2011), Ostry and others (2010) 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.

1/The study finds that inflow controls were binding as evidenced by the deviation in the domestic and international price of cross-listed stock.

2/The entry refers to the effect of capital outflow liberalization.

3/The study finds that inflow controls were effective in 2003-05 by allowing wider interest rate differential.

## Appendix II. Effectiveness of Capital Control and Prudential Policies in Selected Emerging Economies in the 2000s

| Country (analyzed period) and concerns  | Policy (major measures)  | Effect on       |  |                            |                       |                      |   |
|---|--------------------------|-----------------|--|----------------------------|-----------------------|----------------------|---|
|   |                          | Volume of flows | Composition of flows   | Interest rate differential | Currency appreciation | Credit growth        | Other index                               |
| <b>Brazil</b> 3/<br>(2000: M1–2008: M8) | Tax                      | No              | No   | Yes (2-3M**, 4-5M*)        | No                    | No                   | -   |
|   | Outflow liberalization   | No              | LT outflows increased (1M**)   | No                         | No                    | No                   | -   |
|   | Prudential measures      | No              | Yes -LT inflows increased (2M** and 3M*)   | No                         | No                    | No                   | -   |
| <b>Colombia</b><br>(2000: Q1–2008:Q2)   | URR                      | Yes (1Q*)       | ST inflows decreased (1Q*)   | Yes (3-4Q**)               | No                    | No                   | -   |
|   | Inflow controls          | No              | No   | No                         | No                    | No                   | -   |
|   | Prudential measures      | No              | No   | No                         | No                    | No                   | -   |
| <b>Croatia</b><br>(2000: Q1–2008: Q2)   | Inflow controls          | Yes (2Q**)      | ST inflows decreased. (2Q**)   | No                         | No                    | Yes (1Q*)            | Stock price: No<br>FX loans: No           |
|   | Outflow liberalization   | No              | ST outflows (1Q**) and LT outflows increased(2Q*)  | No                         | No                    | No                   | Stock price: No<br>FX loans: No           |
|   | Prudential measures      | No              | Nonbank net flows initially decreased (1Q**) and then increased (2Q**), while net bank flows decreased (1Q*-2Q**). | Yes (3Q**)                 | Yes (1Q**-2Q*)        | Yes (4-5Q**)         | Stock price: No<br>FX loans: Yes (1-4Q**) |
| <b>India</b><br>(2000: Q1–2008: Q2)     | Inflow liberalization 2/ | No              | LT inflow increased (1Q*) and ST inflow decreased (1Q**).  | No                         | No                    | No, increased (1Q**) | Stock price: No                           |
|   | Outflow liberalization   | No              | No   | No                         | No                    | No                   | -   |
|   | Prudential measures      | No              | No   | No                         | No                    | No                   | Stock price: No                           |
| <b>Korea</b> 3<br>(2000: M1–2008: M8)   | Outflow liberalization   | No              | LT other inv outflows increased (1M*)<br>ST outflows decreased (1M**)  | No                         | No                    | Yes (3-4M*)          | -   |

| Country (analyzed period) and concerns        | Policy (major measures) | Effect on       |   |                            |                       |               |                             |
|---|-------------------------|-----------------|---|----------------------------|-----------------------|---------------|-----------------------------|
|   |                         | Volume of flows | Composition of flows  | Interest rate differential | Currency appreciation | Credit growth | Other index                 |
|   | Prudential measures     | No              | Yes- ST inflows decreased (2-8M**)                                      | No                         | No                    | Yes (2-10M**) | -                           |
| <b>Peru</b><br>(2000: Q1–2008: Q2)            | Inflow controls         | No              | No  | No                         | No                    | Yes (1Q*)     | -                           |
|   | Outflow liberalization  | No              | ST outflows decreased (1Q**) then increased (2Q*)                       | No                         | No                    | No            | -                           |
|   | Prudential measures     | Yes (3Q**)      | Yes-ST inflows decreased (3Q**)   | No                         | Yes (3-4Q**)          | Yes (1Q**)    | -                           |
| <b>Philippines</b><br>(2000: Q1–2008: Q2)     | Inflow controls         | No              | No  | No                         | No                    | Yes (1Q**)    | -                           |
|   | Outflow liberalization  | No              | LT outflows increased (1Q**)  | Yes (1Q*)                  | No                    | No            | -                           |
|   | Prudential easing       | No              | No  | No                         | No                    | No            | -                           |
| <b>Romania</b> 3/<br>(2000: Q1–2008: Q2)      | Outflow liberalization  | No              | ST and LT outflows increased (2Q*)                                      | No                         | No                    | No            | Stock price: No             |
|   | Prudential measures     | No              | Yes- LT inflows increased (1Q**) Nonbank other inflows increased (1Q**) | No                         | No                    | No            | Stock price: No             |
| <b>Russia</b> 3/<br>(2000: Q1–2008: Q2)       | URR                     | No              | ST inflows decreased (1Q**) and LT inflows increased (1Q**)             | No                         | No                    | No            | -                           |
|   | Outflow liberalization  | No              | No  | Yes (2Q*)                  | Yes (1Q*)             | No            | -                           |
|   | Prudential easing       | No              | No  | No                         | No                    | No            | -                           |
| <b>South Africa</b> 3/<br>(2000: Q1–2008: Q2) | Outflow liberalization  | No              | ST outflows (1Q**) increased.   | No                         | No                    | No            | House price: Yes (2Q**-3Q*) |
|   | Prudential measures     | No              | Yes-LT inflows increased (1Q**)   | Yes (1-4Q**)               | No                    | No            | House price: No             |
| <b>Thailand</b><br>(2000: Q1–2008: Q2)        | URR                     | Yes (1Q*)       | No  | No                         | No                    | No            | -                           |

| Country (analyzed period) and concerns | Policy (major measures) | Effect on       |                                  |                            |                       |               |                                  |
|--|-------------------------|-----------------|----------------------------------|----------------------------|-----------------------|---------------|----------------------------------|
|  |                         | Volume of flows | Composition of flows             | Interest rate differential | Currency appreciation | Credit growth | Other index                      |
|  | Inflow control          | No              | No                               | Yes (1-2Q**)               | No                    | No            | -                                |
|  | Outflow liberalization  | No 4/           | LT outflows increased (1Q**)     | Yes (2Q** and 3Q*)         | No                    | No            | -                                |
|  | Prudential measures     | No              | No                               | Yes (2-3Q*)                | No                    | No            | -                                |
| <b>Uruguay</b><br>(2000: Q1–2008: Q2)  | Inflow controls         | No              | No                               | No                         | No                    | No            | -                                |
|  | Outflow liberalization  | No              | LT outflow increased (1Q**)      | No                         | No                    | No            | -                                |
|  | Prudential measures     | No              | Yes-LT inflows increased (1Q**). | Yes (1Q*)                  | No                    | No            | De-dollarization : Yes (1Q**) 5/ |
| <b>Vietnam</b><br>(2000: Q1 2008: Q2)  | Inflow controls         | No              | No                               | No                         | No                    | No            | Stock price: No/6                |
|  | Outflow liberalization  | No              | ST outflows increased (1Q**)     | No                         | No                    | No            | -                                |
|  | Prudential measures     | No              | No                               | Yes (1-2Q**)               | No                    | No            | Stock price: Yes (2Q**) 6/       |

1/ The macroeconomic impact on the total volume of flows, interest rate differentials, exchange rates, and credit growth, are evaluated by VAR model assuming these variables as potentially endogenous. The impact on the composition of capital flows is estimated in a separate VAR by replacing the total volume of flows with its disaggregated flows. Asset prices and foreign exchange loans are further added individually to the benchmark VAR when a country had associated concerns. The table reports “yes” if a shock to the respective policy index finds a statistically significant impact on a target variable at the 5 percent (\*\*) or 10 percent (\*) level. Reported results indicate if the measures had a statistically significant impact on (i) decreasing the volume of net flows; (ii) increasing long-term inflows or decreasing short term inflows; (iii) maintaining the interest rate differential between international and domestic interest rates; (iv) reducing the appreciation of the currency; and (v) stemming credit growth. In the case of outflow liberalization, the reported results indicate the existence of statistically significant impact on short and long term outflows.

2/ Throughout the analyzed period, India pursued general liberalization of inflow controls, so the reported impact is in response to a liberalizing shock.

3/ The country liberalized its inflow controls with no or marginal tightening throughout the period. Hence, no result are reported for the liberalization shock.

4/ The results of the GMM analysis on the impact of capital controls on the volume of capital flows in Brazil, Colombia, Korea, and Thailand confirm the results of the VAR analysis. However, they also indicate that outflow liberalization had significant impact (at the 10 percent level) on the volume of net flows by increasing outflows in Thailand.

5/ Dollarization is measured by the share of foreign currency credits in total private credit by private banks.

6/ The impact on stock price index was analyzed with a shorter sample period with fewer control variables due to data constraints.

### Appendix III. Selected Capital Account Management Measures

| Country (analyzed period) and Concerns   | Policy—Major Measures  |
|--|--|
| <p><b>Brazil</b><br/>(2000: M1–2008: M8)</p> <p>Currency appreciation</p> <p>Credit boom</p>             | <p><i>Tax:</i> On March 17, 2008, the IOF tax was raised to 1.5 percent on the entry of foreign funds in the settlement of investments in the financial and capital markets and extended in May to similar transactions made by means of simultaneous operations. Exemptions were applied to funds related to equities, equities derivatives, public offerings, and subscription of shares. The 1.5 percent tax was eliminated in October 2008.</p> <p><i>Outflow liberalization:</i> The limits on employee stock option programs and on FDI by nonfinancial private enterprises and the approval requirement on certain personal capital transactions were lifted in March 2005. The controls on making transfers abroad by individuals or corporations were abolished in September 2006.</p> <p><i>Prudential measures:</i> The limit on banks' foreign exchange exposure was increased to 60 percent in July 2006 and reduced back to 30 percent in December 2006. The regulations on investment abroad by mutual funds were made subject to prudential rules, banks' capital requirement for foreign exchange exposure was raised to 100 percent from 50 percent and countercyclical/time-varying capital requirements were introduced in 2007.</p>   |
| <p><b>Colombia</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Credit boom</p>           | <p><i>URR:</i> Foreign portfolio investments, advance payments of more than four months, financial credits, guarantees, sureties, and financial backup facilities to residents were made subject to a six-month 40 percent URR on May 6, 2007. Foreign trade financing was made subject to a 12-month deposit of 11 percent in pesos or a deposit of 20 percent in U.S. dollars. Penalties for early withdrawal of investments subject to the URR were reduced and portfolio investments in the primary issuance of equities or in institutional funds were made exempt from the URR in December 2007. The penalties were later increased in June 2008. The URR on portfolio inflows was raised from 40 percent to 50 percent in May 2008. The URR was eliminated on October 9, 2008.</p> <p><i>Inflow controls:</i> The deposit requirement on external financing was lifted in May 2000. Nonresidents' purchase of fixed income securities was limited to 20 percent of the issuance in June, while the issuance of securities index derivatives was permitted in 2002. Controls on the use of balances deposited in nonresident foreign currency accounts were lifted in 2003. A one-year minimum holding period was introduced on nonresidents' portfolio investments from December 2004 through June 2006. A minimum stay of two years was imposed on FDI in May 2008.</p> <p><i>Prudential measures:</i> Differentiated remunerated reserve requirements were established in 2000. Limits on banks' leverage were introduced in 2001. Banks' gross exposure in the foreign exchange derivative market was limited to 500 percent of capital in May 2007 and increased to 550 percent in May 2008. Differentiated unremunerated marginal reserve requirements were levied on increases in certain accounts and debt securities in May 2007 and increased later the year; they were eliminated in November 2008. The remunerated reserve requirement was leveled at 8.3 percent, and the remuneration of the reserve requirement was reduced in July 2007. Dynamic provisioning for commercial loans was introduced in July 2007 and extended to consumer loans in 2008. Reserve requirements on accounts and debts securities was further increased in June and October 2008. Banks' profit distribution was limited in October 2008.</p> |
| <p><b>Croatia</b><br/>(2000: Q1–2008: Q2)</p> <p>Credit boom<br/>(unhedged FX lending to households)</p> | <p><i>Inflow controls:</i> Commercial banks' new foreign borrowing was made subject to a reserve requirement of 24 percent on July 1, 2004, which was later increased in March and June 2005. Residents were allowed to sell or issue securities abroad subject only to prior notification in 2006. A second-tier marginal reserve requirement of 15 percent and a third-tier marginal reserve requirement of 55 percent were introduced in January 2006 and extended to the increase in debt securities over their level of January 2006, and to the increase in funds received from nonresidents and legal persons in a special relationship with a bank in July 2006. Nonresidents' portfolio investments and account transactions were liberalized in 2006. The marginal reserve requirement was lifted in October 2008.</p>   |

| Country (analyzed period) and Concerns   | Policy—Major Measures  |
|--|--|
| <p>Currency appreciation</p> <p>Stock market boom</p>  | <p><i>Outflow liberalization:</i> Legal persons were permitted to maintain accounts with banks abroad, purchase foreign exchange for depositing in their foreign exchange accounts, and to cover payments abroad without declaration of the purpose in 2002. Residents were allowed as of June 18, 2003, to purchase certain securities and real estate abroad. Portfolio investments were fully liberalized in 2006. The limits for pension funds' foreign investments were increased and eliminated for certain securities in 2007.</p> <p><i>Prudential measures:</i> Reserve requirements on deposits in domestic and foreign currency were unified at 23.5 percent and the limit on banks' open foreign exchange position was reduced to 25 percent. The reserve ratios for deposits denominated in both domestic and foreign exchange, and the kuna component of the required reserves and its remuneration were reduced in several steps in 2001–06 with the reserve requirements reaching 17 percent in 2006. A speed limit on banks' lending growth exceeding 4 percent per quarter was implemented from January 15, 2003, through January 2004. The speed limit on credit growth exceeding 1 percent a month was reintroduced on January 1, 2007. It was replaced by an annual limit of 12 percent in February, which was then changed to monthly limits of 0.5 percent in July 2007. Credit limits were calculated separately for balance sheet and off-balance-sheet placements since May and were extended to all bank-affiliated companies in October 2007. Penalties for exceeding the speed limit were increased on January 1, 2008. The liquidity ratio on foreign exchange assets and liabilities was reduced to 32 percent in February 2005 and was expanded to include liabilities in kuna with a currency clause in October 2006. The liquidity ratio was further reduced in 2008.</p>  |
| <p><b>India</b><br/>(2000: Q12008: Q2)</p> <p>Currency appreciation</p> <p>Asset price boom<br/>(Real estate prices and stock prices)</p> <p>Credit boom</p> | <p><i>Inflow liberalization:</i> Sectoral restrictions on inward FDI were relaxed in 2001–08. The limit on the prepayment of loans to residents was increased in 2001 and eliminated in 2003. The limits on foreign institutional investors' investments were increased gradually in 2004–08 from US\$1.75 billion to US\$5 billion in government securities and from US\$500 million to US\$3 billion in corporate debt securities. Certain foreign investors were allowed to trade in all exchange-traded derivative contracts subject to prescribed limits in 2003. External borrowing exceeding US\$50 million was permitted only for financing equipment imports and infrastructure projects in 2003. Long-term trade credits for amounts up to US\$20 million were permitted in 2004. Reserve Bank of India approval was required for external borrowing up to US\$20 million in August 2007. All borrowing was subject to maximum spreads over six-month LIBOR. The maturity-dependent all-in cost ceiling on foreign loans was increased in 2004, decreased in 2007, and increased again in May 2008. The interest rates on nonresidents' rupee term deposits and foreign currency deposits were reduced in 2007. The 10-year holding period for real estate investments was eliminated in 2006.</p> <p><i>Outflow liberalization:</i> The limit on investments in employee stock option plans was increased in 2001 and lifted in 2004. Banks were allowed to invest in money market instruments and/or debt instruments abroad and offer foreign currency swaps in 2002. The limit on mutual funds' equity investments abroad was raised to US\$1 billion in 2003. The limit on resident individuals' capital transactions was increased to US\$200,000 in 2004–07. The approval requirement on residents' transfer of shares to nonresidents was removed in 2004. External borrowing for FDI abroad was allowed in 2004. Exporters were allowed to open accounts abroad in 2007 and use their foreign exchange proceeds for certain investments. The limits on Indian companies' FDI and portfolio investments were increased in 2007. The aggregate ceiling for mutual funds' foreign investment was raised to US\$5 billion in October 2007.</p> <p><i>Prudential measures:</i> Rules on residents' forward and option contracts were relaxed in 2003 and 2007. The cash reserve ratio was gradually increased to 7.5 percent from January 2004 through November 2007. The standard provisioning requirement was tightened in several steps in 2005–07, and risk weights on various loans increased in 2006. Certain risk weights were decreased in 2007 and the risk weights on housing loans were linked to the amount and the LTV of the loan in 2008. Banks were permitted to lend in foreign currency up to specific limits in 2004.</p> |

| Country (analyzed period) and Concerns  | Policy—Major Measures  |
|---|--|
| <p><b>Korea</b><br/>(2000: M1–2008: M8)</p> <p>Currency appreciation</p> <p>Unhedged FX lending</p> <p>Post-crisis, precautionary</p> | <p><i>Outflow liberalization:</i> Limits on deposits abroad were eliminated, the limit on lending to nonresidents was increased, and residents' personal capital transfers were liberalized in 2001. The ceiling on commercial credits was increased in 2002. The limit on individuals' FDI was raised to US\$3 million and on certain real estate purchases to US\$500,000 in 2005. Following further increases, they were eliminated in March 2006. The rules for the repatriation of proceeds from capital transactions were further eased and all approval requirements for capital transactions were changed to notification in January 2006. The threshold for prior notification of won-denominated loans to nonresidents was raised to W 10 billion in 2006 and to W 30 billion in 2007. Real estate purchases and establishment of bank branches abroad were further liberalized in 2007–08.</p> <p><i>Prudential measures:</i> Restrictions on lending locally in foreign exchange were eliminated in 2001. Banks' liquidity requirements were tightened in 2000–01 and in 2004. The limit on insurance companies' investments in foreign currency denominated assets was increased March 2005. Banks' net open foreign exchange position was raised from 30 percent to 50 percent in 2006. Thin capitalization rules were extended to foreign bank branches, limiting the tax deductibility of interest on borrowing from parent banks to three times the capital from six times the capital in August 2007. Limits on the use of foreign-currency-denominated loans were introduced January 28, 2008.</p>  |
| <p><b>Peru</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Credit boom</p>  | <p><i>Inflow controls:</i> The limit on the overall short position in foreign currency was increased to 5 percent of net worth in 2003 and to 10 percent in 2005. Reserve requirements were extended to increases in the foreign liabilities of financial institutions in 2008. The registration of transferring certificates of deposit with nonresidents was made subject to a commission in January 2008. The marginal reserve requirement for domestic currency deposits was increased in steps to 25 percent for residents and 120 percent for nonresidents, and an additional reserve requirement was introduced on bank liabilities in domestic currency with nonresident financial institutions in early 2008. A 9 percent reserve requirement on foreign long-term credit lines was established in July 2008.</p> <p><i>Outflow liberalization:</i> The limit on pension funds' investments in foreign securities was gradually increased from 9 percent to 30 percent from 2004 through May 2008.</p> <p><i>Prudential measures:</i> The average reserve requirement on foreign exchange deposits was reduced by 3 percentage points, and the mandatory minimum reserve requirement was lowered to 6 percent from 7 percent in 2004. Reserve requirements were increased from February 2008. The minimum unremunerated reserve requirement for both domestic and foreign currencies was increased from 6 percent to 9 percent by November 2008 and reduced to 7.5 percent a month later. The marginal reserve requirement on banks' foreign currency liabilities was raised from 20 percent in 2004 to 50 percent in September 2008. The marginal reserve requirement for domestic currency deposits of residents and nonresidents was increased from zero to 15 percent in February 2008. The rate of remuneration on the reserve requirements in foreign currency was gradually increased from 2005 to 2007. Banks were required to make additional provisions if "unhedged" borrowers were not properly identified or adequate provisions had not been already established for foreign currency loans in 2006, and they were required to consider in their lending decisions the overall exposure of borrowers with the entire financial system. Prudential limits were set on government securities in pension funds portfolios in May 2008.</p> |
| <p><b>Philippines</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Credit boom</p>                                     | <p><i>Inflow controls:</i> Conditions for investments in domestic banks were eased in 2000 and for short-term forwards on government securities in 2002. The maturity of foreign exchange forward and swap contracts was limited to the maturity of the underlying foreign exchange obligation or to the approximate due date or settlement of the foreign exchange exposure in 2003. Effective May 2007, nonresidents may not acquire 100 percent of voting stock of domestic banks. The registration requirement was lifted for certain guarantees of nonresidents, and rules on borrowing abroad were relaxed in 2008.</p> <p><i>Outflow liberalization:</i> The limit on bank's long foreign exchange position was reduced, and the maturity of foreign exchange forward and swap contracts was limited to the maturity of the underlying foreign exchange obligation or to the approximate due date or</p>  |

| Country (analyzed period) and Concerns   | Policy—Major Measures  |
|--|--|
|  | <p>settlement of the foreign exchange exposure in 2003. Investment in a bank subsidiary abroad was made subject to prior approval by the central bank. The limit on residents' FDI and portfolio investments abroad was increased to US\$12 million per investor per year in 2007 and to US\$30 million in 2008. Institutional investors' investments were subject to the same limit.</p> <p><i>Prudential easing:</i> Nonfinancial corporations were required to report monthly their purchases, sales, and daily foreign exchange positions in 2000. The liquidity reserve requirement on peso deposits was reduced to 7 percent in 2002 and gradually increased to 11 percent in 2003–06. Foreign exchange banking units of domestic banks were allowed to lend under certain conditions to resident banking units in foreign exchange in 2002. Rules on investments in foreign exchange structured products by foreign currency units of domestic banks were relaxed in 2005, and conditions for the establishment and operations of foreign currency units were eased in 2006–07. Banks' net open foreign exchange position was set at the lower of 20 percent of their unimpaired capital or US\$50 million in April 2007.</p>   |
| <p><b>Romania</b><br/>(2000: Q1–2008: Q2)</p> <p>Credit boom<br/>(unhedged FX lending to households and corporates)</p> <p>Currency appreciation</p> <p>Real estate boom</p> | <p><i>Outflow liberalization:</i> Controls on the purchase of real estate abroad, on personal capital transfers, and on banks' long-term lending to nonresidents were lifted on December 3, 2001. Residents' portfolio investments and lending abroad was liberalized in 2003. Nonresidents were allowed to issue or sell securities in January 2004. Controls on residents' account and derivatives transactions were lifted in 2005.</p> <p><i>Prudential measures:</i> The reserve requirements for lei and foreign currency deposits were unified at 22 percent in April and differentiated again in November 2002. A maturity dependent reserve requirement was introduced on foreign currency liabilities, extended to all foreign currency deposits and gradually raised to 40 percent in 2004–06. Loan classification and provisioning rules were tightened in 2003, and prudential norms on consumer and mortgage loans were introduced in 2004 (for example, limit on the monthly payment-to-net-income ratio of 30 percent, mandatory 25 percent down payment or a co-signer/insurance for consumer loans and a co-signer, insurance, or collateral for personal loans, maximum payment-to-net-income ratio of 35 percent for mortgage credit, and a maximum loan-to-value ratio of 75 percent) and further tightened in 2005. A speed limit of 300 percent of the bank's own funds was implemented on bank lending in foreign currency to unhedged borrowers from September 2005 through January 2007. Provisioning requirements on foreign exchange credits to unhedged borrowers were further tightened in 2008.</p> |
| <p><b>Russia</b><br/>(2000: Q1–2008: Q2)</p> <p>Post-crisis liquidity shortage (2004)</p> <p>Credit boom (2006-07)</p>   | <p><i>URR:</i> Differentiated URRs were implemented from August 1, 2004, through July 1, 2006: 20 percent for 365 calendar days on nonresidents' investments in government securities and 3 percent for 365 calendar days on nonresidents' other portfolio investments and lending to residents.</p> <p><i>Outflow liberalization:</i> The limit on FDI in CIS countries was increased to US\$10 million, and on resident individuals' portfolio investments to US\$75,000, in 2001. Foreign exchange lending to residents by local banks was allowed in September 2001. Rules on residents' account operations abroad were gradually relaxed from 2001 and eliminated in 2007. The 1 percent tax on purchases by resident natural persons of foreign currencies and foreign payments instruments was lifted in 2003. Residents were required to open accounts with local banks for certain capital transactions with nonresidents in 2004, and controls on purchasing real estate abroad were lifted. A URR of 50 percent for 15 calendar days was implemented from August 1, 2004, through July 1, 2006, on residents' portfolio investments abroad and lending to nonresidents except long-term loans.</p> <p><i>Prudential easing:</i> The reserve requirement for ruble liabilities to legal entities and for foreign currency liabilities to legal entities and individuals was gradually reduced to 3.5 percent in 2004. The required reserve ratios were further decreased from 4–4.5 percent to 3–3.5 percent for all types of obligations in October 2007 and in 2008.</p>   |

| Country (analyzed period) and Concerns   | Policy—Major Measures  |
|--|--|
| <p><b>South Africa</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Asset price boom<br/>(Real estate prices)</p> | <p><i>Outflow liberalization:</i> The limit on institutional investors in foreign investments was increased to 15 percent of all assets and foreign currency transfers were allowed up to 10 percent of the net inflow of funds in 2001. The asset swap requirement was eliminated in 2002, and the limit on foreign investments was gradually increased through 2008. Institutional investors were allowed to invest in rand-denominated instruments issued abroad in 2008. The limit on corporates' outward FDI was gradually raised from R 250 million in 2001 and was eliminated in 2004. Personal capital transfers and lending abroad were allowed up to R 30,000 in 2003; the limit was further increased to R 500,000 in 2008. The listing of foreign securities in the securities exchanges was allowed in 2004. The ceiling on residents investments abroad was increased to R 2 million in 2006.</p> <p><i>Prudential measures:</i> Domestic lending rules were tightened in June 2007. Rules on haircuts applied to eligible collateral were introduced, and banks were made subject to an additional capital charge to take into account concentration risk and interconnectedness in 2008. Long-term insurers' policy underwriting business was increased to 20 percent, and the investment-linked business was set at 30 percent of total retail assets under management in 2008.</p>   |
| <p><b>Thailand</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p>  | <p><i>URR:</i> A one-year URR of 30 percent was put in place for capital inflows, except for FDI and amounts not exceeding US\$20,000, on December 19, 2006. Early repatriation was subject to a refund of only two-thirds of the URR. Equity investments in the stock exchange were exempted on December 22, 2006. Further exemptions were determined in early 2007. Certain investment in property funds and long-term foreign borrowing not exceeding US\$1 million were made exempt from the URR in December 2007. The URR was lifted on March 3, 2008.</p> <p><i>Inflow control:</i> Short-term borrowing from nonresidents was limited to B 50 million, and a limit of B 300 million was introduced on nonresidents' accounts in 2003. Nonresidents' accounts carried no interest except for fixed accounts with maturities of at least six months. Banks were not allowed to issue or sell bills of exchange in baht of any maturity to nonresidents from November 15, 2006. Sell-and-buy-back transactions of debt securities and certain foreign exchange or account transactions with government debt securities were prohibited on December 4, 2006, and a B 50 million limit was extended to banks' borrowing of baht from nonresidents with maturities of less than six months. The limit on banks' borrowing or transactions comparable to borrowing from nonresidents without underlying trade or investment in Thailand was decreased to B 10 million March 3, 2008.</p> <p><i>Outflow liberalization:</i> Investments in employee stock option plans, and real estate up to a limit and lending to affiliated companies was allowed in 2002 and an aggregate limit was established on foreign investments of institutional investors in 2003. Foreign companies were allowed to issue baht-denominated bonds in 2006. Significant outflow liberalization started in 2007 by gradually increasing investment limits in Thai persons' foreign affiliates: the limit was set at US\$50 million in January 2007 and increased to US\$100 million in February 2008. The ceiling on institutional investors' foreign investments was increased to US\$50 million in January 2007. The deadline for the repatriation of foreign currency proceeds was extended from 120 days to 360 days in early 2007. In June 2007, the limit for real estate purchase and other personal remittances abroad was increased to US\$1 million, and listed companies were allowed to make outward FDI up to US\$100 million. The limits on lending abroad were increased to US\$100 million and its scope expanded in February 2008 and on real estate purchase to US\$5 million. In March 2008, banks were allowed to make swap transactions with nonresidents of up to B 300 million and portfolio investments were allowed through private funds or securities companies.</p> <p><i>Prudential measures:</i> Open position limits in accordance with Basel I were introduced in 2002. The loan-to-value ratio was limited to 70 percent on high-value real estate to prevent build-up of speculation in the real estate sector and asset price bubble in 2003. Regulation on credit card debt was tightened in 2004. A personal loan lending limit of five times of average monthly income was introduced in 2005. Asset classification and provisioning regulations were tightened in 2006 and loan loss provisioning guidelines were aligned with IAS in 2007.</p> |

| Country (analyzed period) and Concerns   | Policy—Major Measures  |
|--|--|
| <p><b>Uruguay</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Dollarization</p> <p>Credit boom</p> <p>Post-crisis, precautionary</p> | <p><i>Inflow controls:</i> Liquidity requirements on nonresident deposits were tightened in 2003, and limits on exposure to foreign banks were introduced in 2006.</p> <p><i>Outflow liberalization:</i> The limit on insurance companies' foreign investment portfolio was raised to 30 percent in 2003. The 2 percent tax on public sector institutions' purchases of foreign exchange was abolished in 2007.</p> <p><i>Prudential measures:</i> Dynamic provisioning requirement of up to 3 percent of total loans was introduced in September 2001. Currency and maturity dependent reserve requirements were increased except on foreign currency deposits exceeding 180 days in 2002. Private pension funds were required to gradually increase their foreign currency assets in 2002. The reserve requirement on local currency deposits was gradually reduced and the reserve requirement on foreign currency deposits increased in 2003. Limits on credit concentration exposures and loan classification rules were tightened in 2003. Pension funds' investments in foreign currency denominated assets were made subject to a ceiling in 2004. Limits on country risk and interbank exposure were introduced, and different risk weights for financial instruments denominated in local and foreign currency were established, in June 2005. Loan-loss provisioning and loan classification rules were tightened in 2006. Liquidity requirements were separated from reserve requirements in 2007. Residency based reserve requirements were implemented in 2008, and the rates were increased on short-term maturities. Implementation of integrated risk management system in local banks was required in July 2008.</p> |
| <p><b>Vietnam</b><br/>(2000: Q1–2008: Q2)</p> <p>Currency appreciation</p> <p>Asset price boom<br/>(Stock market boom)</p> <p>Credit boom</p>        | <p><i>Inflow controls:</i> State-owned enterprises were allowed to borrow from abroad without prior approval in 2005. All sales or issues of securities by residents abroad were made subject to approval in 2007, except bonds, on which rules on foreign borrowing applied. Foreign banks were allowed to establish subsidiaries in Vietnam in June 2007.</p> <p><i>Outflow liberalization:</i> Rules on residents' portfolio investments were eased on January 27, 2007.</p> <p><i>Prudential measures:</i> The reserve requirement on short-term foreign currency deposits was gradually lowered from 12 percent to 4 percent in 2002–03 and increased to 5 percent in 2004, and the reserve requirement on local currency deposits was decreased in 2003. The maximum open position limits on individual currencies were removed in 2002. Restrictions on the use of foreign exchange loans were introduced in 2003 and further tightened in 2008. The rules on lending to purchase securities and on the operation of securities companies and investment funds were tightened January 19, 2007. Banks' total securities-related credit exposures were limited to 3 percent of their loan portfolio in May 2007 and to 20 percent of the equity in 2008.</p>   |