

INTERNATIONAL MONETARY FUND

Liberalizing Capital Flows and Managing Outflows—Background Paper

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March 16, 2012

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I. THE PROS AND CONS OF LIBERALIZING CAPITAL FLOWS—A LITERATURE REVIEW¹

Liberalization of capital flows can benefit both source and recipient countries by improving resource allocation, reducing financing costs, increasing competition and accelerating the development of domestic financial systems. The empirical evidence, however, is mixed on the benefits, and it suggests that countries benefit most when they meet certain thresholds related to institutional and financial development. The principal cost of capital flow liberalization stems from the economic instability brought on by volatile capital flows. In extreme cases, sudden stops or reversals in capital inflows can trigger financial crises followed by prolonged periods of weak growth.

1. **Liberalizing capital flows is generally beneficial but also poses trade-offs.**

Liberalization of capital flows allows free trade in financial claims and has the potential of reducing misallocation of resources, increasing investment, and reducing corruption (Rogoff, 1999). From a theoretical perspective, liberalizing capital flows can benefit investors in both source and recipient countries by allowing a better allocation of resources across countries. This result rests on the assumptions of perfect markets and full information. The resulting efficient global allocation of saving facilitates an increase of investment in capital-scarce countries, together with an associated transfer of technology. In addition, liberalization can promote (i) cross border risk-sharing; (ii) accelerated development of domestic financial systems due to greater competition; and (iii) policy discipline, thereby enhancing growth and welfare. At the same time, liberalization can be associated with an increase in macroeconomic volatility and vulnerability to crises, especially in emerging and developing countries, and can reduce authorities' ability to pursue domestic objectives.

2. **In a canonical neoclassical model, capital should flow from rich to poor countries, where it is relatively scarce, until the marginal product of capital is equalized (e.g., Lucas, 1990).**² The fact that such large flows do not occur is often attributed to credit market failures and restrictions on capital movements. An analogy can be made between the potential gains from inter-temporal trade through capital flows, and the familiar gains from intra-temporal trade. But capital flows can involve additional risks, and many observers have questioned the validity of the analogy with commodity trade (e.g., Bhagwati, 1998).

3. **The empirical evidence on the benefits of liberalizing capital flows is fairly mixed.** A number of academic studies have examined the growth enhancing effects of capital flows liberalization by including a liberalization measure in the standard growth model regression. The results of these studies have been mixed, with about half identifying a

¹ This note was prepared by Giancarlo Gasha and Etienne Yehoue (both MCM) and Mahvash Qureshi (RES).

² Caselli and Feyrer, 2007 argue that the marginal product of capital is remarkably similar across countries taking into account lower endowments of complementary factors (e.g., human capital and total factor productivity) in poor countries, the relative price of output goods relative to capital, and a distinction between land and natural resources from reproducible capital (since only the latter can flow across countries).

significant positive relationship and the other half failing to find such an impact.³ For example, Rodrik, 1998, and Ostry and others, 2009 find no clear relationship between financial openness and economic growth, whereas Quinn and Toyoda, 2008 find that countries with open capital market tend to grow faster. Eichengreen and others, 2011 find that countries that have succeeded in avoiding crises have benefited from capital account liberalization, while countries that have not so succeeded have neither benefited nor suffered on average. The lack of consensus in these studies reflects a variety of differences, ranging from country coverage (advanced, developing, or both; cross-sectional, time series, or panel samples) to the estimation methodology applied (e.g., ordinary least squares (OLS), instrumental variables, two stage least squares, or generalized method of moments (GMM)).⁴

4. **Country characteristics can help explain the realization of benefits from capital flows.** For example, foreign capital inflows may be more conducive to economic growth in financially more developed countries (Alfaro and others, 2004) or in countries with higher human capital (Borensztein and others, 1998). Prasad and others, 2003, Dell’Ariccia and others, 2008, and Kose and others, 2009 interpret the different strands of evidence as pointing to the presence of “threshold effects” along different characteristics that determine a country’s absorption capacity.⁵ Those papers also emphasize the “collateral benefits” of capital flows, such as macroeconomic stability and the development of domestic financial markets (over and above the direct impact of inflows on the availability of financing).

5. **The main cost of capital flow liberalization is vulnerability to financial crises brought on by large and volatile capital flows.** To the extent that sudden surges complicate macroeconomic management and create financial stability risks, they can make countries more susceptible to output volatility. Vulnerabilities can arise through domestic credit booms, asset price bubbles, excessive foreign currency lending to unhedged borrowers, and a more vulnerable external liability structure. For example, Reinhart and Reinhart, 2008 find evidence in favor of a strong association between capital inflow “bonanzas” and the likelihood of debt, banking, and currency crises in emerging market countries; Barajas and others, 2007 find that credit booms are associated with episodes of banking system distress, and Mendoza and Terrones, 2008 find that crises in emerging market economies (EMEs) are associated with credit booms, which are often preceded by large capital inflows. Rancière and Tornell, 2008 present and test a model where systemic risk-taking can increase

³ Edison and others, 2001 provide a survey of these studies.

⁴ See for example, Prasad and others, 2003; Kose and others, 2009; Prasad and Rajan, 2008; and Eichengreen, 2001.

⁵ Kose and others, 2009 conclude that it is difficult to find robust evidence that financial integration is conducive to growth systematically, once other determinants of growth are controlled for. They note, however, that the weight of the evidence seems to be gradually shifting toward finding positive marginal effects on growth, especially when liberalization of capital flows is measured using the de facto or finer de jure restrictiveness measures, when the study periods are longer, and when interaction terms accounting for supportive conditions (such as good policies and institutions) are properly included in the regressions.

investment, leading to higher mean growth but also to a greater incidence of crises (relative to countries where the risk of crises is smaller but so is average growth). Studying the impact of the composition of capital inflows on firms, Tong and Wei, 2011 find that firms with greater dependence on non-foreign direct investment (FDI) capital inflows were more affected by the crisis.

6. **However, many empirical studies do not find a systematic link between crises and liberalization of capital flows.**⁶ Dell’Ariccia and others, 2008 for example, find that the relationship between financial integration and the occurrence of crises hinges on factors such as financial sector development, institutional quality, macroeconomic policy, and trade openness. Edwards, 2007 finds no evidence that higher capital account openness leads to increased crisis susceptibility but concludes that crises reduce growth more in such countries. Glick and others, 2006 use a de jure measure of capital account openness and conclude that financial liberalization reduces susceptibility to currency crisis. Blanchard, 2007, however argues that even in the absence of crises, capital flows can still lead to costly reallocations from tradable to nontradable production.

7. **A welfare theory approach developed recently emphasizes sudden stops and the real disruptions associated with capital flows.** Crisis induced capital outflows are associated with a depreciation of the currency and a fall in domestic asset prices. This dynamic is exacerbated by the fire sale of domestic assets by overleveraged domestic borrowers leading to further pressure on the exchange rate, financial stress, a debt crisis, and bankruptcies (Jeanne, Subramanian, and Williamson, forthcoming). This approach suggests that individuals will borrow excessively in foreign currency and that they fail to internalize how their liability structure will exacerbate balance sheet effects during a crisis (Korinek, 2009; 2011).

8. **Capital flow management measures (CFMs) could play a role both in reducing the likelihood of excessive capital inflow surges, and in mitigating their impact.** To the extent that capital flow related measures or prudential regulations mitigate the likelihood of excessive inflow surges, and lower the associated vulnerabilities, restrictions and regulations affecting the international flow of capital could be associated with greater crisis resilience. In line with this, Ostry and others, 2010; and Ostry and others, 2011 find that EMEs with greater restrictions on capital inflows (especially on debt liabilities) fared better during both previous crises and the most recent one. In particular, Ostry and others, 2011 examine whether controls on more risky forms of capital inflows made economies more resilient in previous crisis episodes. Their results indicate that among the EMEs that experienced crises in earlier years, those with higher economy-wide capital inflow restrictions in pre-crisis years experienced smaller growth declines when the crises occurred. Similarly, Gupta and others, 2007 examine about 200 crisis episodes in 90 countries over the period 1970–2007, and find that the fall in output during crisis episodes is significantly lower if capital controls were in

⁶ For a survey, see for example Kose and others, 2009; and Dell’Ariccia and others, 2008.

place in the years prior to the crisis. However, the finding that more open EMEs saw larger output losses during crises is different from the issue of the long-term association between financial openness and growth, the latter being the subject of a substantial body of empirical work, as discussed above. In addition, further work is needed to assess how differences in prudential policies would affect the results.

9. **The literature on capital controls often finds that controls on inflows are successful in shifting the composition of liabilities toward less risky flows.** Adequate controls on capital inflows can change the composition of foreign capital by discouraging short-term volatile debt flows and encouraging long-term stable direct investment (Fischer, 1998; Eichengreen and Mussa, 1998). A recent literature survey (Magud, Reinhart, and Rogoff, 2011) examines the effectiveness of capital controls in reducing the volume of capital flows, altering the composition of capital flows towards longer maturity flows, reducing exchange rate pressures, and allowing a more independent monetary policy. Its findings suggest that countries that maintain capital controls on inflows seem to be able to change the composition of flows towards longer term flows, have a more independent monetary policy and reduce exchange rate pressures (although the evidence with the latter is more controversial). Ostry and others, 2011 also find that capital controls on inflows and prudential regulations were associated with safer external liability structures and greater economic resilience during the global financial crisis. A new literature on welfare economics suggests that some restraints on capital inflows via well targeted and temporary capital controls can help counter the destabilizing systemic impact of booms and busts in capital flows (for example, Jeanne, Subramanian, and Williamson, forthcoming). At the same time, gradual liberalization of capital flows with adequate sequencing of other policies and reforms could reduce macroeconomic risks and achieve financial sector stability in the process (Ishii and Habermeier, 2002).

10. **The evidence of the effectiveness of capital controls on capital outflows appears fairly mixed.** Magud, Reinhart, and Rogoff's 2011 survey finds only weak evidence on the effectiveness of capital outflow controls in reducing the volume of outflows and creating more room for monetary policy, except in the case of Malaysia in 1998, where controls were implemented in response to a crisis. Studying the 1992 exchange rate mechanism crisis in Spain, Viñals, 1992 finds no evidence that controls on outflows reduced the volume of net capital outflows. Edison and Reinhart, 2001 suggest that there is no evidence that controls on outflows in Spain and in Thailand, in 1997 reduced real exchange rate pressures or made monetary policy more independent. Forbes and Warnock, 2010 find limited evidence that capital controls have an impact on sudden stops or capital flight. By contrast, Ariyoshi and others, 2000 find evidence on the effectiveness of controls in reducing the volume of net capital outflows and increasing room for monetary policy in Spain; however, they find that controls reduced real exchange pressure only in the short term. Similarly, for Thailand, they conclude that controls decreased capital outflows and exchange rate pressures, but provided more room for monetary policy only in the short term. Controls were largely successful in achieving their goals in Malaysia (Ariyoshi and others, 2000; Kaplan and Rodrik, 2002; Edison and Reinhart, 2001). Binici and others, 2010 find that better institutional and

regulatory quality in advanced economies contributes to the effectiveness of outflow controls. Using a panel vector autoregression for 13 emerging markets, Sanya and others, 2011 find that outflow controls can be somewhat effective in countries with strong fundamentals, albeit the effect takes time to materialize.

11. **Recent literature suggests that capital controls can reduce the risks of capital inflows.** The association between financial crisis and the volume and composition of capital inflows, together with stronger evidence on the effectiveness of inflow controls than on outflow controls, lend support to the assertion that controls, if any, should primarily be on inflows rather than outflows. As such, some restraints on capital inflows via well targeted and temporary capital controls can help counter the destabilizing systemic impact of booms and busts in capital flows. Ostry and others, 2011, and Jeanne, Subramanian, and Williamson (forthcoming) suggest implementing measures that are price-based, differentiated according to the contribution to systemic risk, and countercyclical (that is the intensity of controls is adjusted in response to changes in capital inflows and in public debt).

II. EFFECTS OF CAPITAL FLOW LIBERALIZATION—EVIDENCE FROM THE RECENT EXPERIENCES OF EMERGING MARKET ECONOMIES⁷

This note analyzes the experiences of EMEs that have liberalized capital flows over the past 15 years with respect to macroeconomic performance and risks to financial stability. The results of the panel data regressions indicate that greater openness to capital flows is associated with higher growth, gross capital flows, and equity returns and with lower inflation and bank capital adequacy ratios. The effects vary depending on thresholds with respect to the fiscal position and trade openness.

12. **This note focuses on the short- to medium-term effects of liberalizing capital flows on macroeconomic performance and risks to financial stability.** Specifically, the note analyzes the effects of liberalizing capital flows on economic growth, inflation, capital inflows, outflows and net flows, equity returns, and bank capital adequacy ratios. The sample of countries and the econometric strategy have been selected to capture the short- to medium-term effects. The sample is, therefore, limited to 37 countries that have liberalized capital flows in 1995–2010. Dynamic panel data specifications are used to capture the possibility of partial adjustment towards the steady state. The relatively short time dimension can be considered as the transition period from restricted to liberalized capital flows.

13. **This study uses both de jure and de facto measures of capital flow liberalization.** The de jure measure is staff's narrow restrictiveness index based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).⁸ Higher values indicate more controls. The de facto measure is defined as the sum of total foreign assets and liabilities as a ratio to GDP.⁹ The higher this measure for a country, the more liberalized it is.

14. **The de jure index is used to identify the sample of countries that have liberalized over the past 15 years.** First, only those countries are retained that have liberalized by at least 0.1 point according to the index between 1995 and 2010. Second, for a given country, only those years are retained following the start of liberalization where the index declines by at least 0.01 point. Therefore, the sample encompasses only countries that have liberalized and only those years when controls on capital flows were relaxed. About 37 countries (Table 1) satisfy the above criteria. For those countries, the mean of capital flow liberalization between 1995 and 2010 was 0.4; the maximum was 0.83; and the minimum was 0.1. This sample of countries is used in the empirical analysis. However, the actual sample for each regression varies with data availability.

⁷ Prepared by Tahsin Saadi-Sedik and Tao Sun (both MCM).

⁸ For a description of the measure see Section X.

⁹ The stock data up to 2007 were developed and described by Lane and Milesi-Ferreti, 2007. Data for 2008–10 are staff updates (see also Section X).

Table 1. Countries that Liberalized During 1995–2010

Countries							
Afghanistan	Botswana	Chile	Haiti	Jordan	Papua New Guinea	São Tomé and Príncipe	Swaziland
Algeria	Bulgaria	Cyprus	Honduras	Korea	Romania	Senegal	Uganda
Armenia	Burundi	Dominica	Hungary	Malta	Russia	Seychelles	
Azerbaijan	Cambodia	Ghana	Iraq	Mauritania	Saint Kitts and Nevis	Slovakia	
Bosnia	Cape Verde	Guyana	Israel	Nigeria	Samoa	Slovenia	

Source: IMF staff.

Methodology

15. **The effects of liberalizing capital flows was assessed using the following methodology.**¹⁰ Various panel data specifications were used to estimate the impact of liberalization on the following variables: capital outflows, inflows, and net flows; real GDP growth per capita; inflation; equity returns and capital adequacy ratios. The most general specification is:

$$Y_{jit} = \alpha_j + \beta_{j1}Y_{jit-1} + \beta_{j2}ka_{jit} + \beta_{j3}Z_{jit} + \mu_{ji} + v_{jit} \quad (1)$$

Where the subscript *i* denotes the *i*th country (*i*=1, ...,37), the subscript *t* denotes the *t*'th year (*t*=1995, ..., 2010), and the subscript *j* denotes the specific equation for each indicator of interest (*y_j* represents the specific equation for growth, inflation, capital flows, etc). The approach includes country fixed effects, μ_i , to take account of unobserved heterogeneity among countries.¹¹ The variable *ka* is the measure of capital flows liberalization, *Z* is a set of control variables, and *v* the error term.

16. **The dynamic specifications capture the potential inertia in the dependent variables.** The presence of the lagged dependent variable in the equations means that all the estimated coefficients represent short-run effects, which are the focus of the note. The long-run effects can be derived by dividing each coefficient by one minus coefficient of the lagged dependent variable (1- β_1).

17. **Two econometric issues arise in estimating the above equation.** First, some independent variables may be endogenous because of potential simultaneity or reverse

¹⁰ The main data sources are the World Economic Outlook (WEO) database; International Financial Statistics (IFS) database; World Development Indicators database; Bloomberg L.P.; Haver Analytics; and Datastream.

¹¹ For example, the fixed effect takes account of all time-invariant country specific factors, including geography, climate, ethno-linguistic characteristics and unchanging political and legal systems.

causality. Second, with a fixed-effect estimator, the lagged dependent variable is, by construction, correlated with the error term and is, therefore, endogenous.¹² As a robustness check, system GMM estimators were also used with all right hand variables treated as endogenous.

18. **Following Kose and others, 2009 the full sample is separated into two sub-samples using thresholds.** Countries meeting these threshold conditions are presumed to be better able to reap the growth and stability benefits of financial globalization. Kose and others, 2009 identified four groups of threshold conditions: financial market development, institutional quality and governance, macroeconomic policies, and trade integration. In this analysis, a composite threshold is created by first normalizing, then averaging the above four individual indicators: measures for financial development (ratio of market capitalization to GDP or private sector credit to GDP), quality of bureaucracy and corruption, ratio-to-GDP of fiscal balances, and ratio-to-GDP of trade openness (X+M).¹³ However, these data are available only for a few countries in the sample. Therefore, to incorporate as many sample countries as possible, a composite indicator is created using only the last two subcomponents (fiscal balance and trade openness). Then, the median of the index is taken as a threshold to separate countries into two groups: those with an index higher than the median are “above threshold” countries and those with an index lower than the median are “below threshold” countries.¹⁴

Results

19. **The relationship between the liberalization of capital flows and various dependent variables using the fixed effects estimator are summarized in Table 2.**¹⁵ In particular, the econometric analysis, based on the sample of countries that have liberalized over the past 15 years, suggests that more liberalization is associated with:

- *Higher real GDP growth per capita.* The coefficients of liberalization are significantly negative (a decline in the index means liberalization of capital flows). The results indicate that a 0.1 point decline in the index implies about a 0.2 percentage point increase in growth.

¹² The bias is negligible if the time horizon is long.

¹³ To create a single indicator, first each variable is normalized as follows: $\text{Index} = (\text{actual value} - \text{minimum value}) / (\text{maximum value} - \text{minimum value})$. Then sub-indices are aggregated using the arithmetic mean.

¹⁴ Therefore, “below threshold” refers to countries with low fiscal balances and trade openness and “above threshold” refers to countries with high fiscal balances and trade openness.

¹⁵ Since the actual effects of liberalizing capital flows is highly dependent on the liberalizing country’s circumstances, the results should be interpreted with caution.

- *Lower inflation rates.*¹⁶ The coefficients of liberalization are significantly positive. A 0.1 point decline in the index implies about 0.6 percentage point decrease in inflation.
- *Higher equity returns.* The coefficients of equity liberalization index are significantly negative. A decline in the index of 0.1 point implies an increase in equity returns of about 3.2 percentage points.
- *Lower bank capital adequacy ratios.* A decline in the index of 0.1 point implies a decrease in the capital adequacy ratio of about 0.4 percentage point. This may be due to a higher credit and asset expansion associated with the liberalization of capital flows. Furthermore, an increase in riskier assets following the liberalization of capital flows may put downward pressure on capital ratios.
- *Higher capital inflows and outflows.* The coefficients of liberalization are significant. A 0.1 point decline in the index implies a 1.3 percentage point increase in inflows and a 1.2 percentage point increase in outflows. However, the effect of liberalization on net flows is not statistically significant.

20. Tables 3 and 4 summarize the relationship between the liberalization of capital flows and various dependent variables for the sub-samples of countries “above threshold” and “below threshold,” respectively:

- For countries “above threshold,” the main findings in the full sample are generally confirmed, with a few differences. For example, the coefficients of liberalization are larger than those in full samples, indicating a larger role of capital flow liberalization in countries “above threshold.” In other words, countries that are above the thresholds reap more benefits of liberalization. However, the coefficient is not significant in the inflation regression.
- For countries “below threshold,” several interesting points stand out. First, the coefficients of liberalization are not significant in most regressions, including in the growth regression, indicating a limited role of liberalization of capital flows for countries “below threshold.” Second, the impact of liberalization on inflation is significant as in the full sample, and the coefficient is higher. This suggests that liberalizing capital flows has an impact on inflation only in countries below threshold, probably because inflation is already low in the sample “above threshold.”¹⁷

¹⁶ Similar results were obtained by Gruben and McLeod, 2002, and Gupta , 2008. Using an illustrative model, Gupta, 2008 shows that opening the capital account significantly lowers policy maker’s incentive to generate an inflationary shock. Theoretical and empirical evidence suggest a strong negative relationship between financial openness and inflation.

¹⁷ This is consistent with the argument that countries with more trade openness have lower inflation (Romer, 1993).

21. **The results are robust to using alternative estimation approaches or different capital flow liberalization measures.** Several other econometric specifications of panel data have been estimated; including pooled ordinary least squares (POLS)¹⁸ and system GMM (Arellano and Bover, 1995 and Blundell and Bond, 1998). The results are broadly similar to those obtained with the fixed effects estimator. Furthermore, similar results were obtained for nondynamic specifications (excluding the lag of dependent variables). Using the de facto measure of liberalization of capital flows and staff's broad restrictiveness index on capital flows leads to broadly similar results.¹⁹

¹⁸ For the POLS, we used nondynamic specifications (excluding the lagged dependent variable).

¹⁹ In the growth regression, the de facto measure had a positive sign but was not significant at conventional levels.

Table 2. Panel Regressions—Full Sample

	Growth	Inflation	Equity returns	CAR	Capital inflows	Capital outflows
Capital flows restrictiveness index	-2.31* (-1.82)	5.80*** (3.76)		3.60** (1.98)	-13.08*** (-3.02)	12.39*** (4.04)
Interest rate	-0.04 (-0.89)			-0.14 (-1.59)	-0.01 (-0.05)	0.10 (0.75)
REER (growth)	0.04 (1.51)					
Credit to private sector (growth)	0.04*** (2.72)		0.98*** (3.18)	0.03* (1.75)		0.04 (1.09)
Country risk (change)	0.12* (1.78)				-0.28 (-1.28)	-0.02 (-0.11)
Real GDP per capita (growth)		0.03 (0.38)	0.53 (0.35)	-0.01 (-0.15)	0.08 (0.43)	
NEER (growth)		-0.25*** (-6.31)	0.29 (0.55)	0.08* (1.72)	0.14 (1.30)	-0.13 (-1.54)
Inflation			-1.76* (-1.91)	0.05 (0.66)	0.09 (0.59)	-0.13 (-1.03)
Equity flows restrictiveness index			-32.98* (-1.82)			
VIX index (change)			-4.33*** (-6.48)		0.02 (0.17)	0.10 (0.99)
Constant	3.46*** (4.56)	3.94*** (6.19)	24.15** (2.09)	6.92*** (4.91)	8.60*** (4.07)	-8.08*** (-4.28)
Number of countries	24	37	13	16	23	24
Number of observations	215	433	120	100	252	237
R-squared	0.38	0.11	0.33	0.40	0.29	0.45

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Staff calculations.

Table 3. Panel Regressions—Above Threshold Sample

	Growth	Inflation	Equity returns	CAR	Capital inflows	Capital outflows
Capital flows restrictiveness index	-2.71* (-1.80)	2.21 (1.04)		5.5* (1.9)	-24.48*** (-3.05)	16.33*** (3.47)
Interest rate	-0.08 (-1.29)			-0.12 (-0.76)	-0.13 (-0.42)	0.19 (0.83)
REER (growth)	-0.00 (-0.09)					
Credit to private sector (growth)	0.09*** (3.37)		0.67 (1.14)	0.00 (0.10)		0.11 (1.42)
Country risk (change)	0.10 (1.17)				-0.23 (-0.58)	-0.12 (-0.40)
Real GDP per capita (growth)		-0.26*** (-4.48)	-0.04 (-0.05)	0.10 (0.99)	0.26 (1.27)	-0.22 (-1.46)
Inflation		-0.05 (-0.43)	2.98 (0.95)	0.24 (0.91)	-0.01 (-0.02)	
Equity flows restrictiveness index			-36.45 (-1.47)			
VIX index (change)			-4.22*** (-4.26)		0.11 (0.43)	0.08 (0.43)
Constant	3.41*** (3.67)	4.95*** (5.18)	33.04* (1.72)	6.87*** (2.58)	13.87*** (3.07)	-11.32*** (-3.50)
Number of countries	18	30	9	9	17	18
Number of observations	117	246	61	51	127	134
R-squared	0.51	0.10	0.41	0.23	0.26	0.48

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Staff calculations.

Table 4. Panel Regressions—Below Threshold Sample

	Growth	Inflation	Equity returns	CAR	Capital inflows	Capital outflows
Capital flows restrictiveness index	0.61 (0.18)	8.99*** (3.04)		2.17 (1.09)	2.39 (0.55)	10.25*** (3.02)
Interest rate	0.06 (0.64)			-0.05 (-0.65)	0.06 (0.39)	0.06 (0.54)
REER (growth)	0.09* (1.94)					
Credit to private sector (growth)	0.00 (0.07)		0.78* (1.95)	0.01 (0.57)		-0.01 (-0.45)
Country risk (change)	0.10 (0.93)				-0.24 (-1.50)	0.09 (0.88)
Real GDP per capita (growth)		-0.02 (-0.16)	-1.44 (-0.73)	-0.04 (-0.56)	0.02 (0.13)	
NEER (growth)		-0.20*** (-3.97)	0.62 (0.74)	0.07* (1.89)	-0.04 (-0.45)	0.01 (0.26)
Inflation			-1.94 (-1.58)	-0.06 (-0.89)	-0.14 (-0.94)	0.12 (1.20)
Equity flows restrictiveness index			-24.01 (-0.73)			
VIX index (change)			-4.38*** (-4.89)		-0.00 (-0.05)	0.11* (1.90)
Constant	2.76* (1.70)	0.75 (0.72)	47.38** (2.56)	4.34*** (2.69)	3.90** (1.98)	-6.67*** (-4.28)
Number of countries	14	24	8	8	15	14
Number of observations	98	188	59	49	125	103
R-squared	0.03	0.37	0.29	0.74	0.08	0.16

Note: *** p<0.01, ** p<0.05, * p<0.1

Source: Staff calculations.

III. FINANCIAL OPENNESS IN EMERGING MARKET ECONOMIES AND THE GLOBAL CRISIS²⁰

This note examines the effect of financial openness on growth in EMEs during the recent global financial crisis. Countries with greater de facto openness suffered larger growth declines, particularly if they were open to bank-intermediated flows.

22. **EMEs with greater de facto financial openness suffered larger growth declines in the recent crisis, particularly if they were open to bank-intermediated flows.** Various regressions of the determinants of growth declines were prepared.²¹ Most regressions found de facto openness to bank-intermediated flows and pre-crisis surges in such inflows to be significant predictors of growth declines. Banks' pre-crisis leverage and credit growth was often found to be significant as well. Other measures of de facto openness were also found to be significant, albeit somewhat less frequently. This suggests that openness, particularly openness to bank-intermediated flows, created vulnerabilities.

23. **This finding is in line with the literature on the determinants of the growth effects of the recent crisis.** For example, Llaudes and others, 2010 show that the impact of the crisis was more pronounced in EMEs with greater financial linkages. Ostry and others, 2011 find that EMEs with higher de jure openness saw more pre-crisis capital inflows and experienced larger growth declines. A related strand of the literature identifies initial vulnerabilities such as pre-crisis credit and domestic demand growth, the size of the current account deficit and financial leverage as important determinants of crisis intensity (Berg and others, 2011; Berkmen and others, 2009; Blanchard and others, 2010; Claessens and others, 2010; Lane and Milesi-Ferretti, 2010; Frankel and Saravelos, 2010), while others find few robust predictors of the growth impact of the crisis (Rose and Spiegel, 2010; Rose and Spiegel, 2011). While the conclusions on financial globalization and growth in EMEs are mixed in the literature, many empirical studies have established a strong association between surges in capital inflows and their composition and the likelihood of debt, banking, and currency crises in EMEs, as discussed further in Section I.

24. **The analysis assesses the determinants of a decline in growth in EMEs during the global financial crisis using simple cross-country regressions.** It studies both the initial and the cumulative effects in a sample of 48 EMEs with access to capital markets. The initial effect is captured through the difference between observed growth in 2009 and both the pre-crisis growth forecast and the peak-to-trough growth decline. These two measures have been used in the literature and have different merits. In using the difference between observed and forecast growth, the analysis follows Berkmen and others, 2009; and Blanchard

²⁰ Prepared by Ricardo Llaudes, Christian Saborowski, Sarah Sanya, and Hans Weisfeld (all SPR). The authors thank Pelin Berkmen, Gaston Gelos, Robert Rennhack, and James Walsh for kindly sharing their data.

²¹ Measures of countries' openness to bank-intermediated flows and of surges in pre-crisis bank-intermediated inflows are Bank for International Settlements (BIS) foreign claims (stocks and changes) and net bank inflows (flows and changes in flows).

and others, 2010. The main advantage of this approach is that it is not affected by differences in cyclical positions between countries (or any trends that were already in place prior to the crisis). The peak-to-trough decline in real GDP, previously used by Llaudes and others, 2010 and IMF, 2010b allows for country specific timing of the crisis impact. The cumulative impact is captured as the cumulative difference between observed growth during 2009–11 and the pre-crisis forecast.

25. **The main explanatory variables of interest—de jure and de facto indicators of capital flow restrictiveness—are complemented by an array of controls reflecting pre-crisis conditions.** The majority of the control variables capture conditions before the onset of the financial crisis. This timing attenuates endogeneity concerns. The growth decline in partner countries is the only contemporaneous variable included in the regressions. This variable captures foreign demand and is exogenous to the individual, mostly small EMEs in the sample. Table 5 provides data definitions and sources.

26. **Regression results for the initial growth impact can be summarized as follows (Tables 6–8).**

- Among bank-related variables, higher levels and larger increases of foreign claims are consistently significant predictors of growth decline across different regression specifications. Pre-crisis bank leverage and bank credit are also sometimes significant, and regularly so when variables accounting for inflows are excluded.
- Among nonbank related variables, higher overall capital inflows are also often significant predictors of growth declines, and in some cases, they remain significant even after controlling for bank-related inflows. Measures of de jure openness (the Chinn-Ito and staff’s narrow restrictiveness indices) and FDI inflows (not shown) generally do not matter.²²
- Among variables related to the real sector, decline in foreign demand during the crisis is a significant determinant of growth decline, while the pre-crisis current account is not.

²² The de jure measures of openness used reflect restrictions on both inflows and outflows. When a version of staff’s narrow index reflecting only inflow restrictions was used instead, this index was found to be insignificant as well.

Table 5. Data Definitions and Sources

VARIABLE NAME	DESCRIPTION	SOURCE
Overall vulnerability index (Spring 2007)	VEE is an index that measures vulnerabilities from the financial sector, real and corporate sector, external sector and the public sector.	IMF
External vulnerability index (Spring 2007)	The external sector component of the VEE. The external component measured is reserve adequacy, external debt, current account balance, and exchange rate misalignment.	IMF
BIS claims		
BIS foreign claims (percent of GDP, 2007)	BIS foreign claims as a ratio of GDP in 2007. BIS foreign claims are defined as the sum of cross-border claims of domestic banks and their foreign offices plus local claims of their foreign offices in all currencies; excluding or netting out inter-office positions.	BIS, WEO
Leverage (2007)	Domestic credit (demand deposits+ time deposits) using the 2007 level of all variables.	IFS
Real credit growth 2003–07 (in percent)	Change in domestic credit between 2003 and 2007 deflated with inflation.	IFS
Pre-crisis current account balance (percent of GDP)	Current account balance in 2007, divided by GDP.	WEO
Trading partner peak to trough growth decline	Percentage change in seasonally adjusted quarterly real GDP for each country's trading partners' peak to its trough during the crises (2008: Q3 to 2009: Q1).	Global Economic Environment WEO
Country specific peak to trough change	Percentage change in seasonally adjusted quarterly real GDP from each country's peak to its trough during the crises (2008: Q3 to 2009: Q1).	WEO
De jure openness measures		
Staff's narrow restrictiveness index (2007)	This index is based on capital account restrictions in the IMF AREAER on various subcategories of the financial account including those for individual asset categories, for inflows, outflows, and for residents and nonresidents (Section X).	AREAER (2007)
Chinn and Ito Index (2007)	This index measures capital account restrictions based on the IMF AREAER and also measures the intensity of capital controls by controlling for how long these controls have been in place. By design the index also measures "extensity" of capital controls because it incorporates information on exchange restrictions, capital account restrictions, current account restrictions and surrender requirements on exports proceeds (Section X).	Chinn-Ito (2008)
De facto openness measures		
Foreign assets and liabilities (percent of GDP, 2007)	Sum of total foreign assets and total foreign liabilities/nominal GDP using the 2007 levels of all variables.	WEO/ balance of payments statistics
Net capital inflows (2003–07 average, percent of GDP)	Sum of the average FDI (net), other inflows (net) and portfolio flows (net) during 2003–07 /nominal GDP.	WEO/IFS

Net portfolio inflows (2003–07 average percent of GDP)	The sum of portfolio investment assets and liabilities/nominal GDP. All variables are 2003–07 averages. Portfolio flows comprise equity and debt securities in the form of bonds and notes, money market instruments and financial derivatives, such as options that are not included in the categories of direct investment and reserve asset.	WEO/IFS
Net other investments (2003–07 average, percent of GDP)	The sum of other inflow assets and liabilities/nominal GDP. All variables are 2003–07 averages. Other investment includes positions and transactions other than those included in direct investment, portfolio investment, financial derivatives and employee stock options, and reserve assets.	WEO/IFS
Net FDI inflow (2003–07 average, percent of GDP)	The sum of direct investment assets and liabilities/nominal GDP. All variables are 2003–07 averages. A direct investment is: reinvestment in earnings, direct investment flows in kind, mergers and acquisitions, transactions and positions involving debt or equity securities that give significant degree of influence on the management of an enterprise that is resident in another country.	WEO/IFS
Bank inflows (2003–07), (percent of GDP). Bank assets + bank liabilities/nominal GDP	Sum of bank assets and liabilities/nominal GDP. All variables are 2003–07 averages. Assets and liabilities related to the banking sector.	WEO/IFS

Table 6. Peak-to-Trough Decline in Growth

(In percent, unless otherwise indicated)

Dependent variable: Peak-to-trough decline in growth (country specific timing)												
	Reg a	Reg b	Reg c	Reg d	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	
Chinn & Ito index 2007	-0.63											
	0.646											
Staff's narrow de jure restrictiveness index 2007		2.771										
		2.522										
Foreign assets and liabilities (% GDP) 2007			-0.002*									
			0.001									
Capital inflows 2003-2007 (avg.), % GDP				-0.049**	-0.052**	-0.013	-0.016	-0.018	-0.032	-0.003		
				0.024	0.02	0.014	0.036	0.015	0.038	0.037		
BIS Foreign claims (% GDP) 2007					-0.310***	-0.216***	-0.215***	-0.230***	-0.225***	-0.275***	-0.231***	
					0.076	0.046	0.051	0.045	0.053	0.054	0.05	
Ratio of BIS Foreign claims (% GDP) 2003-07						-0.015***	-0.015***					
						0.004	0.004					
Leverage 2007						-0.024*	-0.025*	-0.026*	-0.028*		-0.033**	
						0.015	0.015	0.015	0.015		0.015	
Real credit growth 2003-07 (in %)						-0.006	-0.006	-0.014	-0.015		-0.017*	
						0.009	0.009	0.01	0.011		0.01	
Trading partner peak-to-trough growth decline						1.318**	1.318**	1.388**	1.388**	1.772***	1.291**	
						0.502	0.509	0.527	0.534	0.515	0.536	
Pre-crisis current account, % GDP							-0.014		-0.062	0.175		
							0.144		0.16	0.149		
Constant	-5.194***	-7.043***	-5.339***	-5.043***	-2.547***	5.085**	5.140**	4.171**	4.417**	1.534	4.676**	
	1.017	1.501	0.962	0.98	0.937	1.987	1.955	2.014	2.004	1.44	2.021	
Adj R-squared	0.004	0.01	0.008	0.067	0.355	0.58	0.567	0.497	0.483	0.437	0.502	
Obs	48	48	48	46	45	41	41	41	41	42	42	

Robust standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

Source: Staff calculations.

Table 7. Growth Impact in 2009

(In percent, unless otherwise indicated)

Dependent variable: Actual growth in 2009 minus pre-crisis projection for 2009 growth											
	Reg a	Reg b	Reg c	Reg d	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Chinn & Ito index 2007	-0.749										
	0.57										
Staff's narrow de jure restrictiveness index 2007		2.158									
		2.344									
Foreign assets and liabilities (% GDP) 2007			-0.001								
			0.001								
Capital inflows 2003-2007 (avg.), % GDP				-0.066***	-0.067***	-0.036***	-0.051	-0.040***	-0.064	-0.035	
				0.024	0.018	0.01	0.039	0.013	0.042	0.034	
BIS Foreign claims (% GDP) 2007					-0.252***	-0.160***	-0.155***	-0.172***	-0.163**	-0.206***	-0.231***
					0.079	0.048	0.056	0.05	0.06	0.053	0.05
Ratio of BIS Foreign claims (% GDP) 2003-07						-0.012***	-0.012***				
						0.003	0.003				
Leverage 2007						-0.016	-0.017	-0.018	-0.02		-0.033**
						0.012	0.012	0.012	0.012		0.015
Real credit growth 2003-07 (in %)						-0.005	-0.006	-0.012	-0.013		-0.017*
						0.006	0.006	0.008	0.009		0.01
Trading partner peak-to-trough growth decline						1.710***	1.710***	1.767***	1.766***	2.060***	1.291**
						0.48	0.478	0.492	0.486	0.524	0.536
Pre-crisis current account, % GDP							-0.066		-0.105	0.105	
							0.161		0.173	0.149	
Constant	-5.905***	-7.592***	-6.412***	-5.488***	-3.430***	3.952**	4.204**	3.205*	3.621*	1.518	4.676**
	0.839	1.46	0.883	0.754	0.788	1.842	1.86	1.793	1.861	1.428	2.021
Adj R-squared	0.021	0.001	0.018	0.168	0.386	0.628	0.619	0.564	0.556	0.518	0.502
Obs	48	48	48	46	45	41	41	41	41	42	42

Robust standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

Source: Staff calculations.

Table 8. Cumulative Growth Impact over 2009–2011

(In percent, unless otherwise indicated)

Dependent variable: Actual growth in 2009-11 minus pre-crisis projection for 2009-11 growth											
	Reg a	Reg b	Reg c	Reg d	Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7
Chinn & Ito index 2007	-1.155										
	0.916										
Staff's narrow de jure restrictiveness index 2007		1.97									
		3.843									
Foreign assets and liabilities (% GDP) 2007			0.001								
			0.002								
Capital inflows 2003-2007 (avg.), % GDP				-0.152***	-0.152***	-0.108***	-0.088	-0.114***	-0.104	-0.067	
				0.03	0.027	0.023	0.079	0.025	0.082	0.065	
BIS Foreign claims (% GDP) 2007					-0.256**	-0.142	-0.15	-0.157	-0.16	-0.221**	-0.118
					0.121	0.102	0.103	0.104	0.109	0.096	0.155
Ratio of BIS Foreign claims (% GDP) 2003-07						-0.015***	-0.015***				
						0.005	0.005				
Leverage 2007						-0.008	-0.006	-0.01	-0.009		-0.046*
						0.02	0.02	0.021	0.021		0.026
Real credit growth 2003-07 (in %)						-0.015	-0.015	-0.023	-0.023		-0.037**
						0.013	0.014	0.014	0.015		0.017
Trading partner peak-to-trough growth decline						1.818*	1.818*	1.889*	1.889*	2.231**	1.73
						0.976	0.997	0.978	0.996	1.032	1.136
Pre-crisis current account, % GDP							0.089		0.04	0.312	
							0.32		0.333	0.258	
Constant	-6.528***	-8.519***	-7.816***	-4.627***	-2.455*	5.154	4.818	4.243	4.083	2.678	6.831*
	1.358	2.482	1.5	1.28	1.444	3.371	3.413	3.248	3.345	2.65	3.447
Adj R-squared	0.014	0.015	0.021	0.329	0.393	0.493	0.479	0.47	0.454	0.441	0.331
Obs	48	48	48	46	45	41	41	41	41	42	42

Robust standard errors in parentheses

* p<0.1, ** p<0.05, *** p<0.01

Source: Staff calculations.

IV. INTERNATIONAL AGREEMENTS AND LIBERALIZATION OF CAPITAL FLOWS²³

This note reviews international agreements that create obligations with respect to capital flows. While many of these agreements provide substantial flexibility for the management of capital flows, others provide less such flexibility, thereby limiting countries' ability to impose CFMs in case of need.

27. **The Organization for Economic Cooperation and Development (OECD) Code of Liberalization of Capital Movements (the Code) establishes comprehensive obligations with respect to international capital movements.** The Code is the only legally binding instrument that focuses comprehensively and exclusively on international capital movements. It is comprehensive in a number of respects. First, it serves to liberalize the making of both inward and outward investments, as it establishes obligations not only with respect to the ability of nonresidents to engage in capital transactions in a local market, but also with respect to the ability of residents to engage in such capital transactions abroad. Second, it covers almost all types of capital transactions. Third, the obligations apply not only to transactions but also to the payments and transfers associated with these transactions.

28. **The obligations of the Code do not extend to transactions between residents, including post-establishment obligations.**²⁴ Thus, while OECD members would be obligated under the Code to allow a nonresident to obtain a controlling interest in a local enterprise, the Code generally does not establish obligations with respect to how the host country may regulate the activities of these enterprises. This is not the case for example, for bilateral investment treaties (BITs). Furthermore, the Code does not require OECD members to allow capital transactions between residents, for example, certain derivative transactions between resident banks and other residents.

29. **The Code also provides a very broad level of temporary derogation for economic purposes.** Specifically, it allows members to derogate temporarily from their obligations and impose capital controls for balance of payments reasons, and also allows them to impose controls for reasons arising from "serious economic and financial disturbances." The Code, however, does not have a provision similar to Article XI of the General Agreement on Trade in Services (GATS) that specifically defers to Fund members' rights and obligations under the Fund's Articles.

²³ Prepared by Jean-Baptiste Le Hen and Hans Weisfeld (both SPR), and Katharine Christopherson, Kyung Kwak, Nadia Rendak, and Gabriela Rosenberg (all LEG).

²⁴ Post-establishment refers to a nonresident starting to do business in a jurisdiction party to the Code, e.g., by establishing a subsidiary or a branch, or by acquiring an equity interest in a local legal entity.

30. **Many other international agreements on trade liberalization of a multilateral, regional, and bilateral nature create obligations to liberalize capital flows associated with financial services.**²⁵ For instance, when a country undertakes to open its market for cross-border supply of a particular financial service, there is typically a simultaneous commitment to permit the capital flows that are associated with this service. In this context, however, the country does not make an across-the-board commitment to liberalize capital movements. Further, the agreement generally does not create obligations with respect to “autonomous” capital flows, i.e., flows not associated with financial services.

31. **The GATS is the main multilateral agreement establishing obligations to liberalize capital flows associated with financial services.** Under the GATS’ flexible “positive list” approach, countries enumerate the areas of financial services and associated capital flows in which they wish to make commitments, as well as limitations on each commitment. Under the GATS, World Trade Organization (WTO) member countries are obliged to apply the most-favored nation and national treatment principles to financial services and the associated capital flows.²⁶ CFMs, including capital controls, in areas where member countries do not commit to liberalization, are fully GATS-compliant.

32. **The GATS is fairly flexible in that it includes provisions allowing countries to derogate from their liberalization commitments on capital flows.** Pursuant to these provisions, countries facing exceptional circumstances such as balance-of-payments difficulties may apply temporary restrictions on payments and transfers (“balance-of-payments safeguards”). The GATS also includes a “prudential carve-out” that gives WTO members the right to take prudential measures. In addition, it accommodates members’ domestic policy making, as it excludes from its coverage the services supplied in the conduct of monetary or exchange rate policies.

33. **Preferential trade agreements (PTAs) and BITs can also create obligations to liberalize capital flows associated with financial services.** In many PTAs, these obligations exceed those created by the GATS. This is true, in particular for the PTAs employing a “negative list” approach. Under this approach, countries have to list all nonconforming measures prior to an agreement’s entry into force. Once the agreement comes into effect, areas in which no measures were listed and which are covered by the agreement will be automatically fully liberalized. BITs typically obligate their members to provide fair and

²⁵ Financial services comprise banking, insurance, and other services.

²⁶ Under the WTO agreements, countries cannot normally discriminate between their trading partners. The most-favored-nation (MFN) principle means that if a member grants someone a special favor (such as a lower customs duty rate), it has to do the same for all other WTO members. Some exceptions are allowed. For example, countries can set up a free trade agreement that applies only to goods traded within the group—discriminating against goods from outside. They can also give developing countries special access to their markets. The national treatment principle is a commitment by a country to treat enterprises operating on its territory, but controlled by the nationals of another country, no less favorably than domestic enterprises in like situations.

equitable treatment to foreign investors. The protections afforded by these treaties usually extend to international transfers of funds pertaining to an investment. Thousands of BITs have been signed.²⁷

34. **Many PTAs and BITs provide only limited flexibility for the management of capital flows.** In particular, they often do not provide for prudential carve-outs, balance of payments safeguards, or exceptions that may be needed to conduct monetary and exchange rate policies.

35. **Finally, many countries have concluded regional agreements that contain obligations concerning capital flows, with varying degrees of flexibility.** This is the case, for instance, for members of the European Union (EU), the Association of South East Asian Nations (ASEAN), and the East African Community (EAC):

- *The EU generally prohibits member countries from imposing restrictions on capital flows.* This applies to capital flows both between EU member states and between member states and third countries. Derogations from this obligation apply under a limited number of conditions. For example, if the European Council so determines, member states may impose limits on movements of capital to or from third countries in exceptional circumstances. Also, member states may implement measures necessary for the prudential regulation of the financial system.
- *The ASEAN has adopted a flexible approach in pursuing gradual liberalization of capital flows.* While enumerating certain areas of economic activities where no capital controls should exist beyond 2015, the ASEAN Economic Community Blueprint provides that liberalization be done “in accordance with member countries national agenda” and “readiness of the economy.” Further, members may impose restrictions on capital transactions in certain circumstances, e.g., when capital movements threaten to cause serious disturbances.
- *The EAC also pursues liberalization of capital flows.* It obliges members to fully liberalize capital transactions by 2015. However, members may maintain restrictions beyond this date in certain contexts, e.g., to enable banking supervision. In addition, safeguards measures can be imposed to address balance of payments difficulties.

²⁷ Advanced economies’ investment relations among themselves are governed mainly by two instruments, namely, the Code and the OECD National Treatment Instrument. The National Treatment instrument differs from the Code, which seeks, inter alia, a nondiscriminatory right of establishment of foreign-controlled enterprises. Another difference is that the Code is legally binding on adhering countries, whereas the National Treatment Instrument is not; for adhering countries, national treatment of foreign-controlled enterprises on their territories constitutes a voluntary undertaking. However, it was underpinned in 1988 by a unanimous pledge of all adhering countries to refrain from introducing new exceptions (*standstill pledge*).

36. **The challenges posed by the limited flexibility under some of the agreements should be weighed against the agreements' potential benefits.** The limited flexibility afforded by some of the bilateral and regional agreements may create challenges for the management of capital flows. Nonetheless, such agreements could be a step toward broader liberalization, and in calm times they may contribute to inflows and growth in recipient countries, at the risk of creating more instability when policies are misaligned or when the global economy experiences a crisis.

V. KOREA — GRADUAL LIBERALIZATION OF CAPITAL FLOWS²⁸

During the 2000s, Korea undertook a measured approach to capital flow liberalization in order to support development of its financial markets in tandem with economic growth. This approach contributed to economic growth as well as financial market development.

Nevertheless, risks built up resulting in significant financial stress during the global crisis.

37. Korea’s approach to liberalizing capital flows was developed within its long-term plans for financial and foreign exchange market structural reform. Increased access to global capital markets was seen as an important facet of increasing the depth and liquidity of the domestic financial markets. Against this background, during the 2000s Korea pursued a gradual and systematic liberalization of capital flows as follows:²⁹

- *Complete the implementation of the foreign exchange transaction liberalization plans initially announced in 1998.* The authorities aimed to liberalize the foreign exchange system to the level of the upper-middle income OECD members by 2011. From 1999, most of the transactions related to overseas business activities by financial institutions and companies were liberalized. From 2001, the authorities eliminated remaining ceilings on current account transactions by individuals; eased the obligation of repatriation of overseas claims; eliminated restrictions on nonresidents' domestic currency deposits; and streamlined the process of securities investment by foreigners.
- *Promote Korea as a financial hub and internationalize the won.* In April 2002, the authorities announced the “Plan for the Development of the Korean Foreign Exchange Market” to help Seoul become a financial hub for Northeast Asia. This effort was extended in 2006 by the “Foreign Exchange Liberalization Plan.” Under the plan, the authorities eased the regulations on individuals’ external payments; allowed securities insurance companies to participate in the interbank foreign exchange market; and liberalized the export of Korean won banknotes.
- *Address the challenges posed by volatile capital flows while promoting overseas corporate expansion.* In 2005, the authorities announced an “Overseas Investment Activation Plan” which relaxed some of the controls on capital outflows.³⁰ In 2006, the authorities eased the limits on individuals’ investments abroad and further

²⁸ Prepared by Burcu Aydin and Sonali Jain-Chandra (both APD).

²⁹ The sources of information on measures to liberalize capital flows in this note are the Bank of Korea and the AREAER.

³⁰ In 2005, the limits on insurance companies’ foreign exchange denominated assets, and individuals’ overseas real estate acquisition and direct investment were increased. These limits were further increased in 2006, in addition to those on the net open position of foreign exchange banks and relaxing the repatriation requirement on overseas claims. Furthermore, permission requirements for capital transactions were converted to notification requirements.

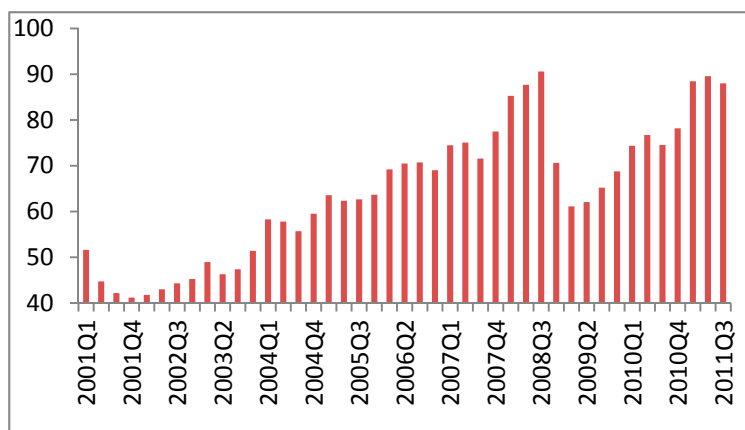
liberalized financial institutions' transactions with nonresidents in domestic currency. In 2007, “Measures to Boost Corporate Expansion Overseas and Encourage Overseas Direct Investment” were announced to promote foreign currency outflows. In 2008, the drying-up of foreign inflows led to an easing of controls on banks' foreign exchange borrowing to boost liquidity in domestic money markets.³¹

38. **Capital flow liberalization was complemented by macroeconomic policy and financial reforms.** Fiscal policy was generally prudent, monetary policy delivered price stability and a more flexible exchange rate regime was introduced. Macroeconomic policies were supported and reinforced by domestic financial reforms, including the development of foreign exchange and corporate bond markets.

39. **Capital flow liberalization contributed to the development of the economy and the financial sector in Korea.** The process helped increase the depth and liquidity of the spot and forward foreign exchange markets, and thus, enabled Korean enterprises to meet their financing and hedging needs. In addition, an easing of restrictions on residents' investments abroad helped Korean firms increase their direct overseas investment and explore global growth opportunities.

40. **The Korean economy became increasingly more open.** Trade, measured as the share of exports and imports in GDP, rose from around 55 percent of GDP to more than 90 percent through the 2000s (Figure 1). The increasing global dominance of its key export sectors—such as shipbuilding, automobiles and electronics—contributed to large foreign exchange inflows relative to the size of the economy and financial system. This, in turn, led to liberalization of outflows, especially in the years leading up to the global financial crisis (Figure 2).

Figure 1. Korea: Trade as a Share of GDP, 2001–2011
(In percent)

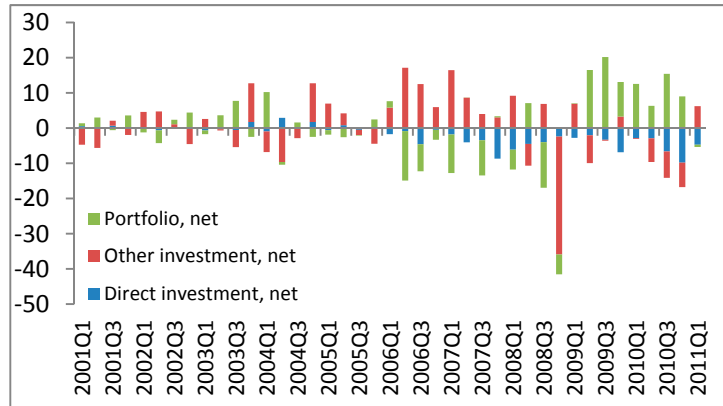


Source: CEIC Data Company Ltd.

³¹ The authorities abolished the 110 percent limit on overbought or long positions of nondeliverable forwards between foreign exchange banks and foreign financial institutions.

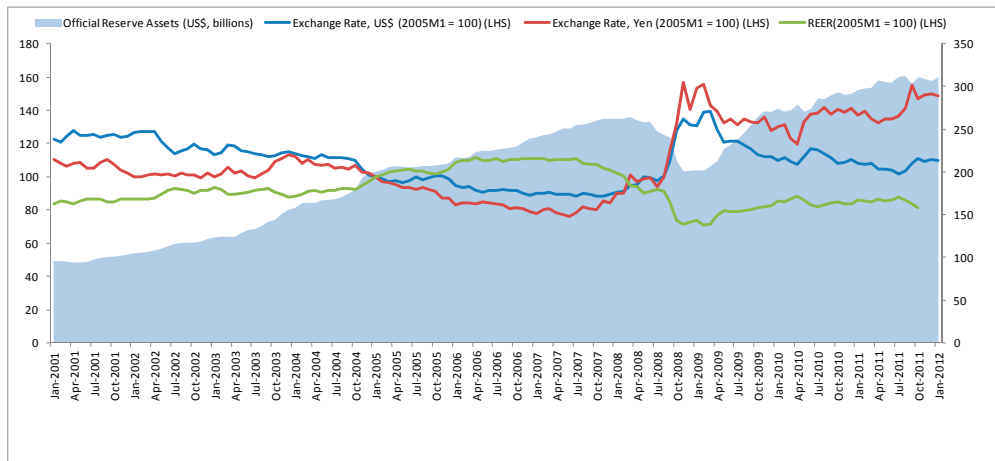
41. **Despite being generally well sequenced, capital account liberalization was also associated with the buildup of external vulnerabilities.** Ahead of the crisis, expectations of trend appreciation in the won exchange rate created a large demand for hedging by exporters, particularly those with lengthy production cycles or low import contribution such as shipbuilders. The lack of commensurate demand for hedging by the importers in turn led to a large build-up of short-term external debt in the banking system, as banks sought to square their positions (Figures 3 and 4). As a result, the system as a whole became highly leveraged. These vulnerabilities led to Korea facing stress in both dollar funding and foreign exchange markets during the post-Lehman global liquidity squeeze, despite a level of reserves perceived to be comfortable.

Figure 2. Korea: Capital and Financial Account, 2001–2011
(In billions of U.S. dollars)



Sources: CEIC Data Company Ltd., Bank of Korea, and staff calculations.

Figure 3. Korea: Official Reserves and Exchange Rate Dynamics, 2001–2012

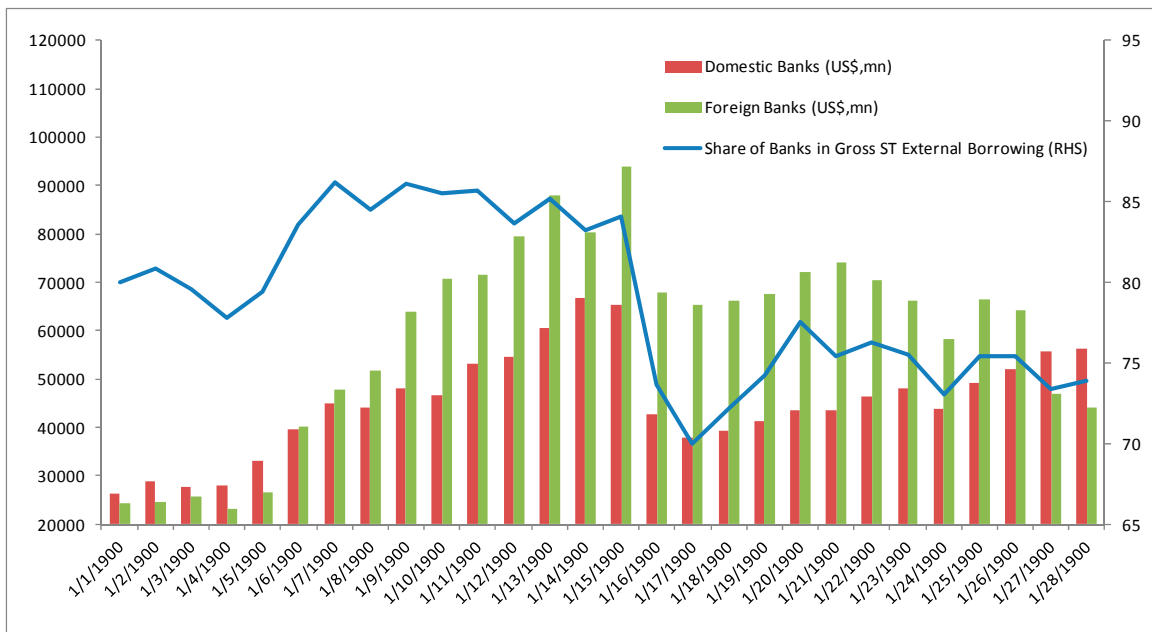


Source: CEIC Data Company Ltd

Note: For exchange rates, January 2005 = 100; official reserves are in billions of U.S. dollars.

42. **In order to address these vulnerabilities, the authorities put in place a number of regulatory measures starting in 2010.** The measures include (i) a 100 percent cap on the ratio of won denominated loans to deposits to reduce reliance on noncore funding sources; (ii) leverage caps on banks' foreign exchange derivative positions; (iii) tighter foreign exchange liquidity standards aimed at mitigating maturity mismatches (complemented by more frequent stress tests); (iv) stricter regulation of domestic foreign currency lending; (v) the introduction of a macroprudential stability levy on the balances of banks' nondeposit foreign currency liabilities; and (vi) reinstatement of a withholding tax on foreign investors' interest income on government bonds. The measures have generally led to reduced external vulnerability; in particular, the limits on foreign exchange derivative positions have contributed to containing banks' short-term external debt.

Figure 4. Korea: Short-Term External Borrowing, 2005–2011



Source: CEIC Data Company Ltd.

VI. ICELAND—CAPITAL CONTROLS AND CRISIS³²

Comprehensive capital controls were imposed following the onset of a severe crisis in 2007–08. The controls, complemented by other policies, ultimately provided Iceland with significant policy space. The authorities intend to lift controls gradually as conditions allow.

43. **Capital controls were prompted by the onset of a systemic financial crisis.** The demise of Icelandic commercial banks, which had very large short-term liabilities to foreign investors (600 percent of GDP) posed a significant threat of a disorderly exit of foreign creditors. This would very likely have led to exchange rate overshooting, which would have been devastating to the private sector which had large currency mismatches, and possibly irreversible damage to the public sector's access to finance, notwithstanding Iceland's history of sound fiscal policy. The krona depreciated by some 30 percent between December 2007 and March 2008, and Iceland's net foreign asset position deteriorated from -112 percent of GDP in 2007 to -629 percent in 2010.

44. **Capital controls were imposed in November 2008 following the collapse of the three largest banks.** The controls replaced the de facto limitations that the Central Bank of Iceland (CBI) had imposed on foreign exchange transactions in the immediate wake of the crisis, and reversed almost 15 years of open capital account policies.³³ The primary objectives of the controls were to maintain the stability of the krona and prevent the depletion of reserves, while avoiding restrictions on current payments and transfers and FDI. These objectives were to be achieved by stemming capital flight and ensuring the repatriation of foreign exchange revenues, mainly export proceeds.

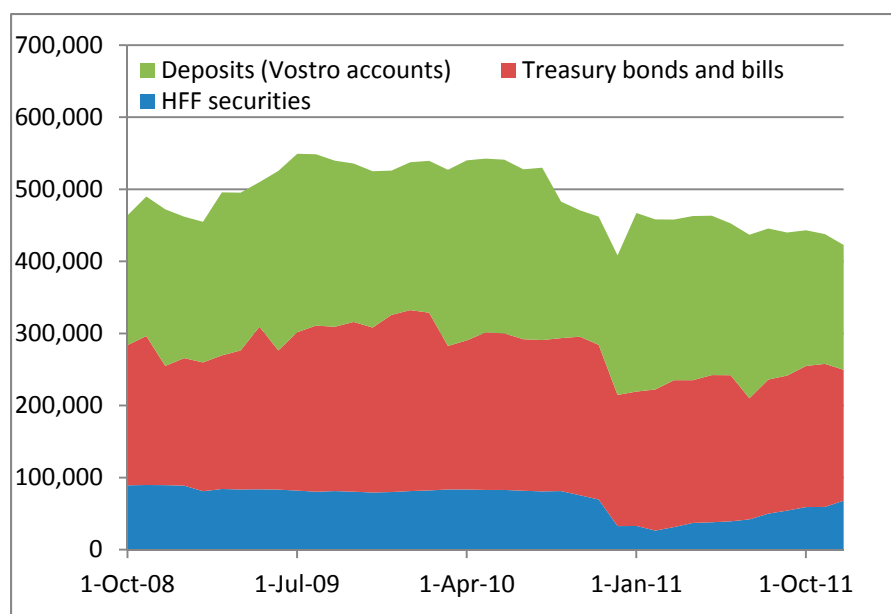
45. **All foreign exchange transactions unrelated to current transactions were prohibited, with only limited exceptions.** Nonresidents' krona assets, including deposits and securities, were blocked and proceeds from them could not be converted into other currencies and transferred abroad (Figure 5). Most of these offshore krona assets were held on accounts with nonresident banks.³⁴ Companies with more than 80 percent of their revenues and expenses abroad were exempt from the controls.

³² Prepared by Alexandre Chailloux (EUR).

³³ Capital controls were introduced by the amendment of the foreign exchange law and foreign exchange rules issued by the central bank.

³⁴ There is no reliable information on the ultimate owners of the assets. Hence, they may also include residents.

Figure 5. Iceland: Offshore Krona Assets, October 2008–October 2011
(In billions of krona)



Sources: Central Bank of Iceland and staff calculations.

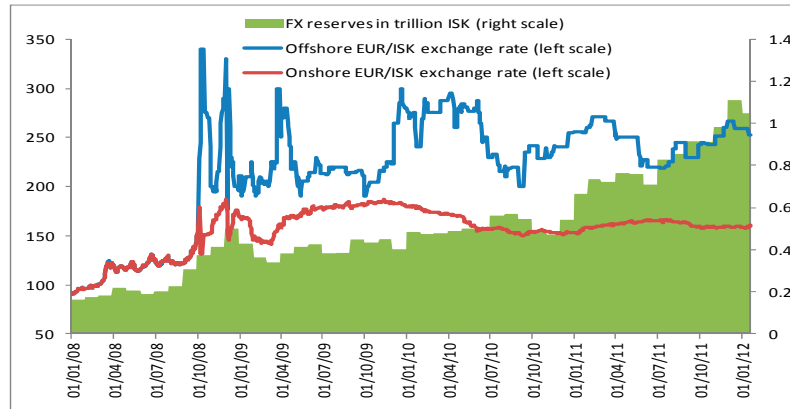
46. **A thin offshore krona market emerged with the introduction of the controls.** The krona traded offshore at a more than 50 percent discount versus the onshore rate. Operations in the offshore krona market included both legitimate and illegitimate transactions. Legitimate krona asset sales between nonresidents led to a concentration of the offshore krona positions in the hands of a small number of large investors. Residents with foreign exchange assets were attracted by the large discount in the offshore market, although capital transactions between residents and nonresidents were not permitted.

47. **Leakages in the controls and enforcement difficulties boosted the offshore krona market.** Both residents and nonresidents exploited opportunities to circumvent the restrictions. They were motivated by doubts that capital controls would be quickly liberalized, expectations of a depreciation of the onshore krona rate, extreme uncertainty about the speed and strength of an eventual economic recovery, and the fragility of the newly rebuilt banking sector. The initial regulation left cross-border krona transactions unrestricted for residents, opening significant loopholes. In particular, nonresidents used overseas banking operations to sell their krona holdings to residents, who took advantage of the large spread between the offshore and onshore exchange rate. Effective enforcement was hindered by insufficient information on cross-border transactions including on nonresidents' investments.

48. **The controls were continuously tightened and monitoring and enforcement strengthened to reduce circumvention.** In particular:

- *Ringfencing of nonresident krona holdings with foreign banks.* Krona transfers between krona accounts in domestic and foreign banks were subjected to the same restrictions as foreign exchange operations in October 2009. This amendment significantly reduced leakages, as evidenced by the stabilization, and eventual appreciation, of the onshore krona and a widening of the onshore-offshore spread in the fall of 2009 (Figure 6). This ultimately allowed the CBI to begin purchasing foreign currency to build up its non-borrowed reserves.
- *Purchases of big-ticket items abroad.* The exemption applying to foreign exchange operations related to trade in goods and services allowed the purchase of big-ticket items abroad, such as luxury sport cars or real estate. These purchases were then reversed shortly thereafter, allowing residents to pocket the spread between the onshore and offshore krona rate. A specific provision was introduced to stop such transactions.
- *Foreign exchange travel allowance.* Individuals purchased currencies up to the maximum threshold repeatedly in different bank branches. The regulation was adjusted so that individuals would be allowed to purchase foreign exchange only from their regular banks upon presentation of their plane tickets.
- *Invoicing in krona.* Exporters invoiced in krona based on offshore rates to benefit from higher euro rates offered in the offshore market and to avoid the obligation to sell their currencies to Icelandic banks at the onshore rate. The obligation to invoice exports in foreign currencies and thus to use the onshore rate for the conversion of export proceeds closed this loophole in April 2009.
- *Nonresident financial institutions' access to the equity market.* Since offshore krona could be used in these transactions, residents sold such assets to offshore krona holders at a higher price than the value of the assets and paid the difference to the buyer in foreign exchange abroad. These transactions allowed residents to circumvent the ringfencing of the offshore krona holdings by receiving offshore krona (purchased at the offshore rate) in their domestic bank account legitimately. This loophole was closed in June 2010, when the use of offshore krona holdings was restricted to cash and securities eligible for central bank operations.

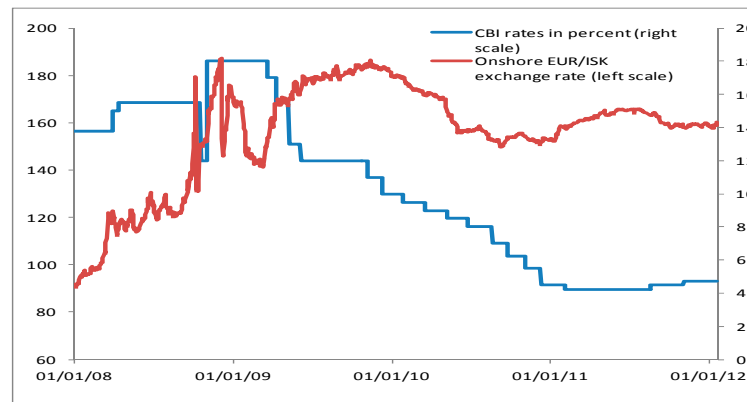
Figure 6. Iceland: Exchange Rate Developments and International Reserves, 2008–2011



Sources: Central Bank of Iceland and staff calculations.

49. **The increasingly effective implementation of capital controls provided Iceland with significant policy space and was a core element of stabilization policies.** Capital controls helped stabilize the exchange rate and thus supported price, external, and domestic stability.³⁵ They also secured relatively inexpensive access to finance for the treasury, as real rates on domestic public borrowing remained low due to the captive offshore krona holdings (Figure 7). Capital controls also insulated monetary policy from increasing country risk premia on international markets and allowed the CBI to ease monetary policy during 2009–11.

Figure 7. Iceland: Krona Exchange Rate (Onshore) and Central Bank of Iceland Policy Rates, 2008–2011



Sources: Central Bank of Iceland and staff calculations.

³⁵ The controls helped safeguard domestic stability by preventing a large krona depreciation, which would have severely affected corporations and households with unhedged foreign currency liabilities.

50. **The stabilization gains achieved by using capital controls nonetheless came at a cost, albeit one that is difficult to measure.** Since Iceland's growth is reliant on foreign investment, especially in the energy intensive sectors, controls on new capital inflows in foreign exchange were lifted early on. However, investment remained subdued. Capital controls—even if they do not constrain new investment—apparently carry some stigma, which may dissipate only slowly.

51. **Cognizant of the distortions of capital controls, the authorities intend to lift them gradually, as conditions allow.** The authorities repeatedly stressed the economic costs of keeping controls for too long, especially in a context of an improving economic environment. A liberalization strategy was published in March 2011.³⁶ This strategy is conditions-based, rather than time-specific, and involves several steps and various methods of liberalization. The key conditions include (i) government access to international capital markets; (ii) a strengthening of the banking sector; (iii) improved financial sector supervision; and (iv) a sufficient level of international reserves.

52. **Controls will be removed sequentially.** The strategy will gradually allow holders of offshore krona either to sell krona for foreign exchange or to invest in a broader array of longer-term investments. In the first steps of liberalization, auctions have aimed to match holders of offshore krona wishing to exit with new investors, who have been allowed to bring foreign currency into Iceland at an exchange rate more depreciated than the onshore rate to be invested in assets that must be held for a minimum period of five years. This will help mitigate the impact of liberalization on Iceland's international reserves. In the second step, offshore krona holders will be allowed to convert their krona into foreign currency, subject to an exit levy. Once the overhang of offshore krona is largely cleared and the conditions for liberalization are in place, controls on residents can be lifted.

53. **Lifting the capital controls is a key policy challenge for Iceland.** Given the size of the offshore krona market, along with pent-up demand for foreign assets by residents and the potentially large cross-border payments from the bankruptcy estates of the old banks, managing the liberalization process will require a gradual and cautious approach. In this regard, the authorities recently took additional steps to help ensure that cross-border payments from the estates of the old banks will not destabilize the balance of payments.

³⁶ The strategy was drafted under the aegis of an inter-agency committee with representatives of the relevant ministries, the CBI, the banking supervision agency, and the Prime Minister's Office.

VII. RUSSIA—LIBERALIZATION OF CAPITAL FLOWS AND THE CRISIS³⁷

Capital controls implemented after the 1998 crisis were not fully effective. The capital account was re-liberalized during 2004–06, but high oil prices and procyclical policies led to heavy inflows and overheating, culminating in a sudden stop during 2008–09. This time, controls on outflows were not used, and a full-fledged financial crisis was avoided by large-scale central bank support that bought time for balance sheet adjustment.

54. **Capital outflow controls introduced during the 1998 crisis were not fully effective.** Reflecting growing concerns about fiscal sustainability, Russia faced increasing foreign exchange pressures from late 1997. As pressures grew, the official exchange rate band was abolished in September 1998, followed by a further large depreciation of the ruble, and a sharp increase in inflation.³⁸ A selective debt moratorium was imposed, accompanied by various capital controls. In particular, the trading of short-term treasury bills was suspended, the maturity of domestic debt compulsorily lengthened, and transfers abroad by nonresidents restricted. Despite the controls, capital outflows reached about US\$17 billion in the second half of 1998.³⁹ International reserves remained under pressure and the ruble continued to depreciate until early 1999. Policies aimed at the fundamental problems, including new revenue measures, a unification of currency markets, and bank restructuring, eventually restored stability.

55. **A new foreign exchange law re-liberalized the capital account in 2004.**⁴⁰ Originally, the new law also imposed unremunerated reserve requirements (URR) on specific transactions, administered through a cumbersome system of special accounts, but these elements were repealed two years later, together with several other capital controls that had remained after the 2004 law. While still lagging most advanced countries, the 2004–06 reforms made Russia’s regulation of capital flows less restrictive compared to other BRICS (Brazil, Russia, India, China, and South Africa, Figure 8).

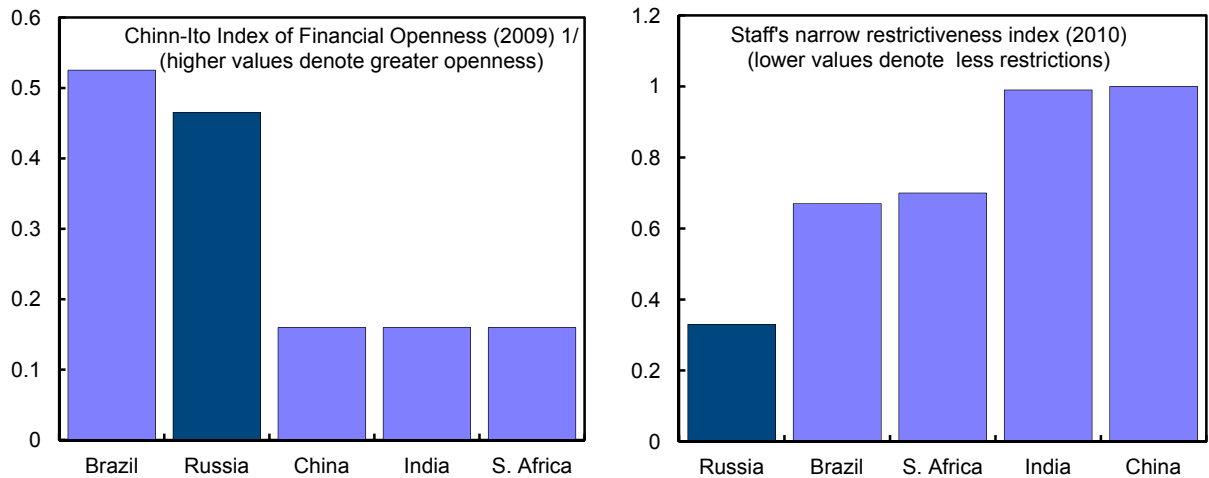
³⁷ Prepared by David Hofman (EUR).

³⁸ Overall, the ruble depreciated from a pre-crisis RUB/US\$ 6 to more than RUB/US\$ 20 in December 1998.

³⁹ See Ariyoshi and others, 2000, pp. 61.

⁴⁰ The new law allowed all foreign exchange transactions, unless expressly prohibited, made ruble balances of nonresidents freely transferable, and lifted restrictions on advance import payments, among other reforms.

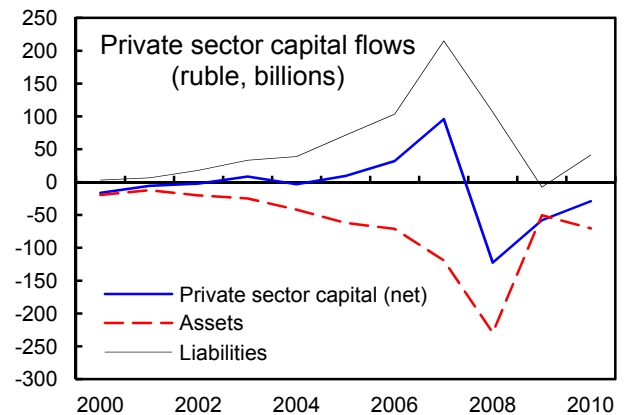
Figure 8. Russia: BRICS—De Jure Capital Flow Restrictiveness



Source: Chinn and Ito (2008, updated data). See Section X.
1/ Maximum index value is normalized at one.

56. **Capital flows increased sharply, including from offshore funds held by residents.** Capital flows surged during 2004–08, resulting in a short period of net inflows—a relatively unusual circumstance in Russia’s recent history (Figure 9). Available data on the sources of FDI in Russia, accounting for about two-fifths of total capital flows, show that inflows from Cyprus—a well-known haven for Russian capital—account for over a quarter of inward FDI with further considerable flows originating from other off-shore financial centers (Figure 10 and Table 9). This suggests that a significant part of the capital flows was from funds held offshore but owned by Russian nationals.⁴¹ These flows may reflect different motivations, and exhibit different behavior, compared to capital flows of nonresidents.⁴²

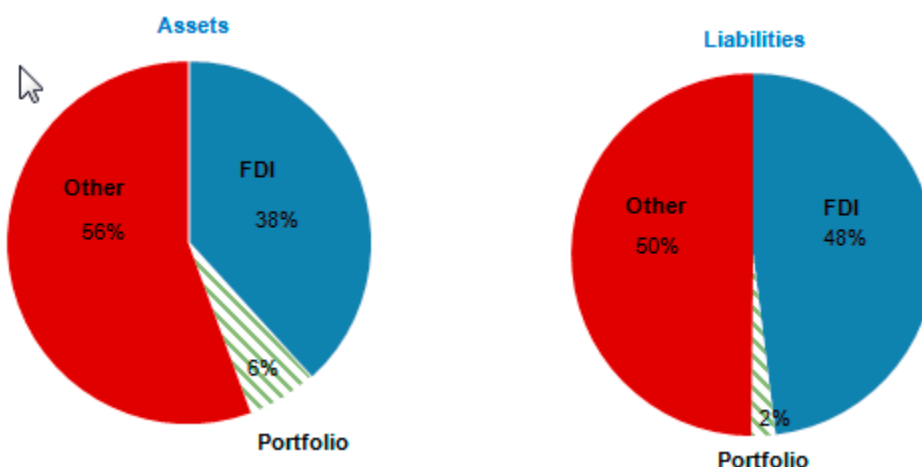
Figure 9. Russia: Private Sector Capital Flows, 2000–2010
(In billions of rubles)



⁴¹ Data limitations hamper disentanglement of these flows from those of foreign investors.

⁴² See for example, Broner and others, 2010 and Forbes and Warnock, 2011.

Figure 10. Russia: Composition of Capital Flows, 2004–2010



Sources: IMF and Central Bank of Russia.

57. **Capital inflows were driven by push and pull factors.** Russia benefited from a general surge in capital flows to emerging markets. In addition, world oil prices rose sharply during 2004–08, boosting Russia’s export earnings (Russia is the one of the world’s largest oil exporters) and propelling domestic growth. Growth was boosted further by high returns on investment, owing to a scarcity of capital, large scope for catch-up gains in productivity, and still low financial leverage—all factors that helped attract capital inflows. The combination of rising oil prices and the central bank’s policy of controlled ruble appreciation created the perception of a one-way bet and encouraged carry trade. Capital inflows were fueled further by large-scale borrowing by state-owned companies, which enjoyed implicit sovereign guarantees and, consequently, low spreads.

Table 9. Russia: Inward Foreign Direct Investment by Country of Origin, 2010

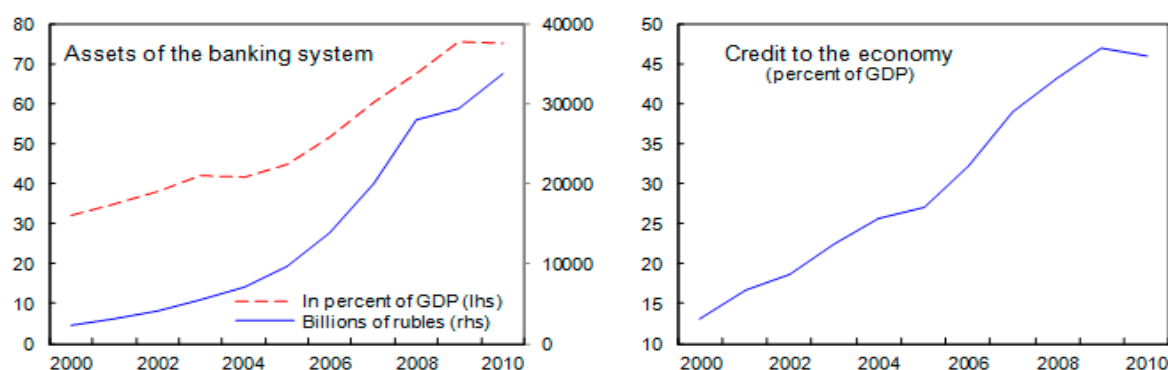
	Million of USD	Percent of total
Total Inward FDI	42,868	100
<i>of which</i>		
Cyprus	12,276	28.6
Netherlands	3,604	8.4
Germany	3,193	7.4
Luxembourg	2,893	6.7
France	2,603	6.1
Ireland	2,326	5.4
British Virgin Islands	2,197	5.1
Bahamas	2,065	4.8
Sweden	1,798	4.2
Austria	1,544	3.6
United Kingdom	1,142	2.7
Other	7,227	16.9

Source: Central Bank of Russia.

58. **Meanwhile, external developments and economic policies led to imbalances and rising vulnerabilities.** High oil prices, capital inflows, financial deepening, and rising investment initially formed a virtuous cycle—boosting output growth to an average of 7 percent per year during 2003–07. However, increasing capital inflows led to large interventions in the foreign exchange market as the central bank attempted to slow the pace

of ruble appreciation. These interventions were unsterilized and thus caused an overly loose monetary stance that fueled inflation. Meanwhile, fiscal policies gradually turned procyclical, as political pressures to spend more of the oil wealth became harder to resist. Expansionary policies further boosted very rapid real credit growth, which peaked at 36 percent per year during 2006–07. By the end of 2007, the Russian economy was overheating. Bank assets quadrupled from 2003 to 2008 and credit rose sharply (Figure 11). Risk management of financial institutions failed to keep up with this rapid expansion leading to rising vulnerabilities. Persistent regulatory and supervisory shortcomings allowed for steadily deteriorating lending standards. Substantial foreign-currency borrowing left Russian banks and corporates particularly vulnerable to a reversal of inflows and a depreciation of the ruble.

Figure 11. Russia: Financial Sector Expansion, 2000–2010



Sources: IMF and Central Bank of Russia.

59. **The 2008 crisis and the related collapse of oil prices hit Russia hard.** The economy went into a deep recession, with GDP falling by 7.8 percent in 2009. Capital flows reversed sharply, with outflows reaching US\$130 billion (or 8 percent of annual GDP) in the fourth quarter of 2008 on account of large portfolio withdrawals, a flight into foreign currency cash holdings, rising bank net asset positions, and net loan repayments by the corporate sector. The massive capital outflows put severe pressure on the ruble, which depreciated by about 30 percent against the euro-dollar currency basket (and 15 percent in real effective terms) during December 2008–January 2009.

60. **The financial sector was significantly affected.** The combination of the loss of foreign funding sources, the depreciation of the ruble, and the recession quadrupled nonperforming loans (NPLs) to 10 percent of total loans and revealed significant vulnerabilities in banks and gaps in oversight.⁴³ A full-fledged banking crisis was avoided, owing, in particular to large-scale foreign exchange intervention and massive liquidity

⁴³ Information on NPLs is based on official data; real NPLs are probably higher.

support to banks by the central bank. However, credit growth collapsed as banks tried to repair their balance sheets.

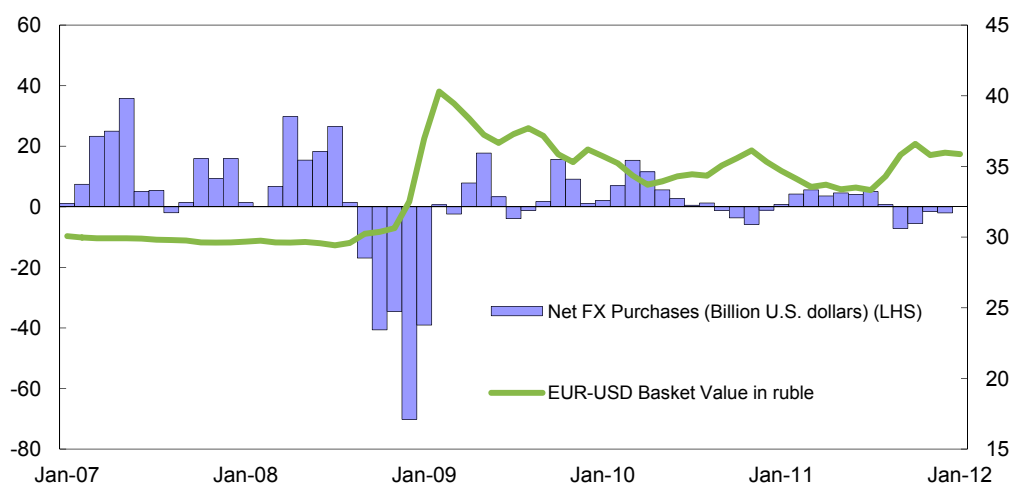
61. Unlike in 1998, the liberal regime on capital flow was broadly maintained.

During the crisis, the authorities made it a point not to resort to capital controls. Instead, the central bank drew on its sizable reserve buffer to delay and smooth the ruble depreciation, thereby allowing the private sector some time to unwind foreign exchange exposures (Figure 12). While central bank intervention in the foreign exchange market contributed to lessening the impact of the crisis, the financial sector remains burdened with large NPLs. Stronger supervision and prudential regulatory framework in the pre-crisis years might have helped to contain excessive risk taking in the banking sector and reduce the balance sheet effects of the capital flow reversal.

62. Capital flows have remained muted in the aftermath of the crisis, with funds flowing out on a net basis during 2009–11.

In early 2011, Russia reintroduced a differentiation of reserve requirements for liabilities to residents and nonresidents, with the aim of discouraging potential renewed capital inflows into Russia. In the event, however, net outflows intensified in 2011.

Figure 12. Russia: Foreign Exchange Interventions and Nominal Exchange Rate, 2007–2011



Source: IMF and Central Bank of Russia.

VIII. UKRAINE—EXPERIENCE WITH CAPITAL CONTROLS DURING THE CRISIS⁴⁴

The 2008 crisis hit Ukraine through a sharp deterioration in the terms of trade, a collapse of exports, and a reversal of capital flows. A number of capital controls were introduced to stem outflows and defend the exchange rate. The effectiveness of controls was mixed reflecting their design and a lack of fully supportive policies.

63. **The pre-crisis boom in Ukraine was accompanied by accumulation of significant vulnerabilities, particularly in the private sector.** Bank lending grew rapidly but bank risk management and lending standards and supervisory oversight did not keep pace. Much of this lending was in foreign-currency, including to unhedged borrowers, encouraged by a de facto fixed exchange rate regime, which led to currency mismatches on borrowers' balance sheets. Consumer loans and mortgage lending increased considerably, fueling import and real estate prices that surged well past levels in countries with comparable income levels. Banks financed this credit boom partly through wholesale funding, increasing their liquidity risk as loan-to-deposit ratios approached 150 percent. Largely unsterilized foreign exchange interventions by the National Bank of Ukraine (NBU) to absorb significant capital inflows (both to banks and the corporate sector) helped to build international reserve cushions (US\$38.1 billion at end-August, 2008) but also contributed to the procyclicality of macroeconomic policies, exacerbating overheating.

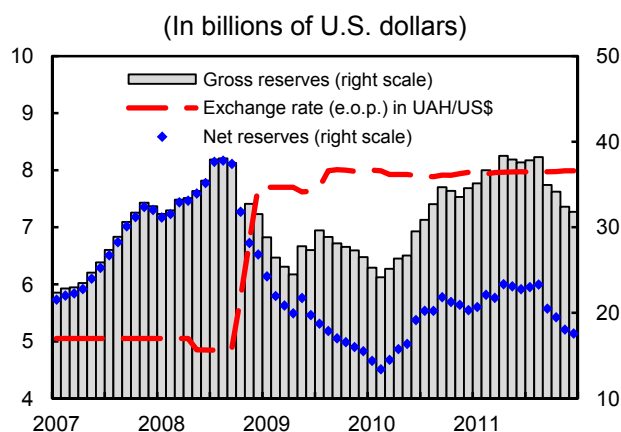
64. **The 2008 crisis hit Ukraine's open economy through a sharp deterioration in the terms of trade, a collapse of exports, and a reversal of capital flows.** Ukraine's external terms-of-trade suffered a double blow. Global metals prices, which had increased three-fold since 2003, fell by 50 percent in the second half of 2008 and early 2009. On the import side, Russia phased out its gas subsidies for Ukraine, increasing gas prices by 45 percent. In addition, capital flows turned sharply negative from the third quarter of 2008. Inflows that averaged 11 percent of GDP in the four quarters leading up to the peak of the boom gave way to outflows of 14 percent of GDP in the following four quarters.

65. **The external shocks exposed the fragility of the domestic economy and led to a banking and currency crisis.** Banks largely halted new lending and sources of new funding dried up.⁴⁵ Western banks cut their exposure to Ukrainian banks, and the banking system came under considerable strain. Weakened confidence in the banking system set off a deposit run that quickly developed into a full-blown banking crisis. Deposit withdrawals accelerated after the sixth largest bank was put into receivership. In the following months, banks lost some 20 percent of the deposit base, several systemic banks required intervention, and many other banks' capital turned out to be below the regulatory minimum. The deposit run was matched by a run on the hryvnia, triggering a currency crisis. In late-2008, the exchange rate

⁴⁴ Prepared by Ruben Atoyán (EUR).

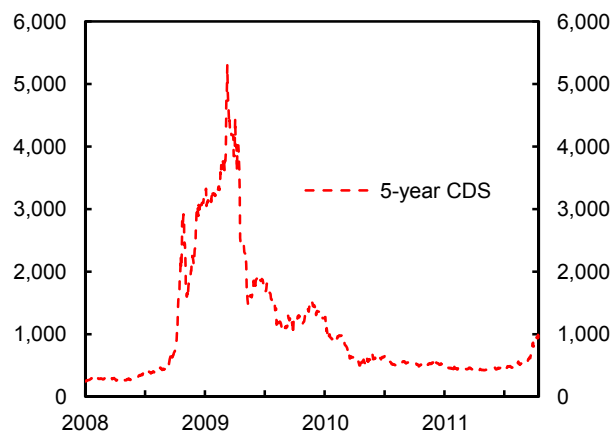
⁴⁵ External debt rollover ratio in the banking system is estimated to have dropped from an average of 260 percent in 2006-07 to about 60 percent in 2009.

Figure 13. Ukraine Exchange Rate and International Reserves, 2007–2011



Source: National Bank of Ukraine.

Figure 14. Ukraine: Sovereign Credit Default Swap Spread, 2008–2011



Source: Bloomberg.

peg collapsed under the combined pressures in the capital and trade accounts.

Notwithstanding considerable foreign exchange intervention by the NBU to ease external pressures, the hryvnia depreciated by some 35 percent, while the NBU lost about a quarter of its foreign exchange reserves (Figure 13). With sovereign credit default swap spreads spiking to over 5,000 bps and a four-notch downgrade to CCC+ by S&P, the government was essentially cut out of international capital markets (Figure 14).

66. During the peak of the crisis, the NBU introduced a number of regulatory measures—including exchange controls—to help stem outflows and defend the exchange rate:

- *Banks' open foreign exchange positions.* A revision of the methodology removed off-balance sheet items and foreign exchange provisions against bad foreign exchange loans from the net open foreign exchange position and required that they be calculated for each currency separately. This left many banks (particularly foreign banks) over the regulatory limit, forcing them to sell large amounts of foreign currency in the foreign exchange market.
- *Restrictions on banking activities.* These included limits on early withdrawal of time deposits, a ban on early repayment of foreign exchange loans, limits on hryvnia transactions by nonresident banks, restrictions on the timing of payment order execution, and, for a short time, a limit between bid and ask exchange rates of 5 percent replaced by a 1.5 percent limit on the deviation of the foreign exchange sale price from the official exchange rate.⁴⁶ The authorities also banned foreign exchange

⁴⁶ Limits on nonresident banks' hryvnia transactions included limits on (i) the allocation of interbank hryvnia deposits with authorized banks; (ii) transferring hryvnia to a different correspondent account of the same nonresident bank with another authorized bank; and (iii) interbank transactions with other nonresident banks through their correspondent accounts opened with authorized banks.

forward transactions. At the same time, the NBU suspended the 20 percent URR on banks' short-term external borrowing to facilitate the rollover of external credit lines.

- *Capital controls on foreign investments.* In particular, a mandatory five-day waiting period was introduced for nonresidents to convert local currency from investment transactions to foreign exchange and transfer abroad.
- *Other measures.* These included a legislative ban on lending in foreign exchange to unhedged borrowers, ceilings on the monthly transfer by natural persons of foreign currency out of the country, and controls on advance payments for imports that do not enter the territory of Ukraine.

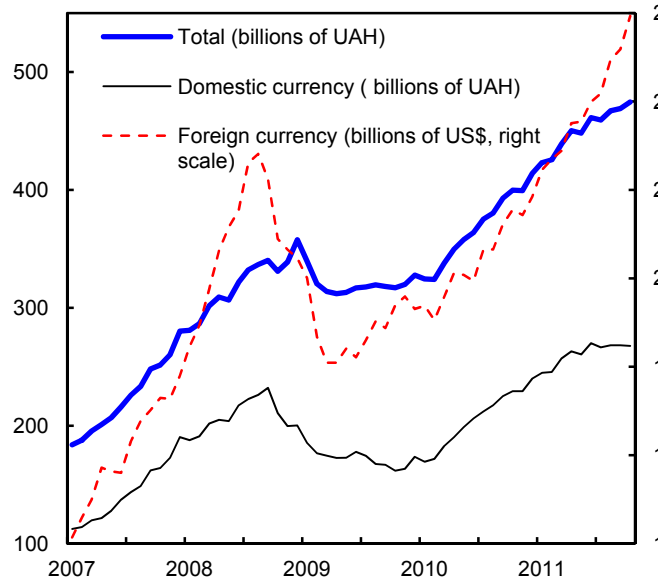
67. **Ukraine's experience with capital controls introduced during the crisis was mixed.** In the context of an IMF-supported program, the authorities agreed that these controls could at most provide temporary relief, given circumvention and significant distortionary impacts. While some of the measures may have helped to reduce exchange rate pressures at the peak of the crisis, they did not fully avert the need for sizable NBU interventions. The effectiveness of the capital controls was undermined by policy slippages, including inconsistent monetary policy implementation that constrained the authorities' ability to promptly restore confidence in the financial system, fueling capital flight.⁴⁷

68. **The controls affected the investment climate in Ukraine.** They impaired banks' ability to conduct their business and went against international good practices, likely deterring foreign investors from operating in Ukraine. Balance sheet risks may have increased due to (i) the revision of the methodology for calculating banks' open foreign exchange position that increased banks' short positions, exposing them to foreign exchange risk in case of hryvnia devaluation; and (ii) the ban on foreign exchange forward transactions, which undermined the private sector's ability to hedge against foreign exchange exposures. Phasing out these measures proved to be extremely difficult—even after confidence in the banking system and hryvnia had been restored—owing to their potential effect on the foreign exchange market and NBU reserves.

⁴⁷ Large liquidity support to banks—including insolvent—fueled capital flight.

69. **Furthermore, some of the controls may have accelerated outflows.** Controls on the early withdrawal of time deposits likely reinforced concerns about the stability of the banking system and exchange rate volatility, contributing to the outflow of over 20 percent of deposits between October 2008 and March 2009 (Figure 15).

Figure 15. Ukraine: Deposits in the Banking System, 2008–2011



Sources: National Bank of Ukraine and staff calculations.

IX. EFFECTIVENESS OF CAPITAL OUTFLOW CONTROLS⁴⁸

This note investigates the effectiveness of changes in controls on capital outflows in EMEs. Specifically, it analyzes whether a tightening of outflow controls reduces net capital outflows, thereby reducing devaluation pressures and providing “breathing space” to policymakers. There is some evidence that controls are effective in countries with better-than-median macroeconomic conditions.

70. Little is known about the effectiveness of outflow controls. The existing empirical work consists mainly of case studies. These studies find only limited evidence for the effectiveness of outflow controls (Magud and others, 2008). Miniane and Rogers, 2007 provide econometric analysis of the effectiveness of outflow controls and find capital controls to be ineffective in insulating countries from foreign monetary policy shocks. However, this study does not distinguish between inflow and outflow controls. Binici and others, 2010 focuses on outflow controls and finds that they are somewhat effective, and more effective in advanced economies than in other countries, possibly due to advanced countries’ better institutional and regulatory quality. A weakness of this paper is its treatment of capital controls as exogenous determinants. Since controls tend to be introduced in response to capital flows, they are likely endogenous.

71. The estimation of this note uses a panel vector autoregression (PVAR) approach. This approach, previously used by Miniane and Rogers, 2007, allows treatment of all variables as potentially endogenous.⁴⁹ The sample comprises the 31 EMEs for which quarterly data are available for the period 1995 to 2010 (Table 10).⁵⁰ Capital outflow controls are gauged by staff’s narrow de jure restrictiveness index, which distinguishes outflow from inflow controls and is available for a large sample of countries.⁵¹ The baseline specification includes the restrictiveness index on outflows along with five other variables including industrial production, the three-month interest rate, inflation (year-on-year), real exchange rate (the national currency per U.S. dollar), as well as a variable capturing net capital flows as a share of GDP (Table 11).⁵² Net inflows are divided into gross inflows and gross outflows

⁴⁸ Prepared by Christian Saborowski, Sarah Sanya, and Hans Weisfeld, (all SPR) and Juan Yopez (Indiana University).

⁴⁹ Some studies of capital controls tried to address endogeneity by using GMM. The consistency of GMM hinges on the assumption that instruments are not weak. This assumption is violated when the variables show high persistence, as is very likely in the case of capital controls.

⁵⁰ The sample was selected on the basis of data availability at the required frequencies and starting before the Asian crisis to include the period when many EMEs implemented capital outflow controls to prevent capital flight. We excluded countries with capital control indices that were zero throughout the sample period.

⁵¹ For the description of the index see Section X.

⁵² The capital flows variable is defined as net flows in FDI plus net flows in portfolio investment plus net flows in other investment and is sourced from the IFS. Extrapolation methods were used for data not available at quarterly frequency. For the capital control index, the annual value was assigned for each quarter in that year.

(as well as net flows of assets and net flows of liabilities) to get a better understanding of how a control tightening affects inflows and outflows as well as investment flows by residents and nonresidents.

72. The effectiveness of outflow controls is assessed through impulse response functions. After estimating the PVAR using OLS, a Choleski decomposition of the variance-covariance matrix yields impulse response functions for each of the variables in the model.⁵³ These indicate the reactions over time of each variable in the system to an unexplained shock to one of the variables.⁵⁴ The recursive ordering of the variance-covariance matrix, which is necessary to identify the structural shocks, entails the key assumption that a shock to the restrictiveness index will affect other variables only after one quarter, while it can be contemporaneously affected by all variables.⁵⁵ It is worth emphasizing that the identification of exogenous shocks to the outflow control variable is difficult in our setup for a variety of reasons including that, especially in times of crisis, both outflow controls and capital flow variables are likely to be affected by the same types of shocks. The results are therefore to be viewed with some caution.

73. There is no evidence that changes in capital controls affect net flows in the full country sample.⁵⁶ Figure 16 shows impulse responses of different capital flow measures to a two standard deviation increase in the capital control index. The solid lines represent the impulse responses obtained from the OLS point estimates, the dashed lines one standard deviation bands around the point estimates, and the dotted lines two standard deviation

⁵³ The estimation allows for one lag in each of the endogenous variables in the model. The results are qualitatively robust to a change in the number of lags in the specification.

⁵⁴ The impulse responses are the same for all countries because the PVAR assumes all countries to have the same intercept and slope coefficients.

⁵⁵ The benchmark recursive ordering is as follows: (1) industrial production; (2) real exchange rate; (3) interest rate; (4) inflation; (5) net capital flows; and (6) capital outflow restrictiveness index. The intuition for this ordering is that policymakers observe the behavior of interest rates, exchange rates, capital flows and other variables before deciding whether or not to make controls more or less stringent. Once implemented, however, capital controls take time to implement, which is why they are assumed not to affect other variables during the same quarter in which they are established de jure. In contrast, changes in industrial production can affect all other variables contemporaneously; net capital flows only affect outflow capital controls contemporaneously, and the rest of the variables only with a one period lag; the interest rate affects all variables contemporaneously except industrial production and the real exchange rate, and the real exchange rate affects all variables contemporaneously but industrial production. The results in this section are robust to different orderings of the variables in the VAR.

⁵⁶ The effectiveness of controls is assessed through their effect on net rather than gross flows because in a near crisis situation due to sudden stop or capital flight the immediate goal of imposing controls is to reduce net outflows rather than gross flows. Additional criteria for assessing the effectiveness of capital controls are the reactions of interest rates and the exchange rate: when outflow controls are tightened, controls are deemed successful if net inflows increase, while interest rates fall without inducing a depreciation of the real exchange rate.

bands.⁵⁷ While outflow controls successfully reduced gross outflows, they also appear to have reduced gross inflows more, leading to a fall in net inflows (that is, the opposite of the intended effect). The fall in gross inflows is mirrored to a large extent in the fall of net liabilities flows indicating a decline in nonresidents' interest in investing in the domestic economy, either because the controls impose direct limitation on the repatriation of their investments or due to the perceived increased risk of repatriation. This highlights the risk associated with outflow controls. Since the impulse responses are symmetric by construction, the reaction of variables to a tightening of outflow controls is the mirror image of the reaction to a relaxation of controls. Thus, the estimation also finds that a relaxation of outflow controls does not result in lower net inflows.

74. However, changes in outflow controls appear to be effective in countries with better-than-median macroeconomic conditions. An index of macroeconomic fundamentals is constructed and used to assess the effects of outflow controls in countries with strong fundamentals only. Countries are ranked along four dimensions—growth, inflation, fiscal and current account balances—and a country's overall rank is the simple average of its four ranks along those dimensions (Table 11). Only countries ranked above the median overall are retained. For these countries, a control tightening (by two standard deviations) increases net inflows at the peak by 1 percent of GDP, and net inflows remain elevated for more than a year (Figure 17a).⁵⁸ Further, the tightening of outflow controls allows policymakers to reduce interest rates by about 0.5 percentage points without having to accept exchange rate depreciation. However, the full effect takes time to materialize. Net flows increase only after two periods following the tightening of controls. As noted previously, due to symmetry of the impulse responses, the results displayed in Figures 17a and 17b are consistent both with the hypotheses that a tightening of controls leads to an increase in net inflows and that an easing leads to a reduction in net inflows.⁵⁹

75. The finding that the effectiveness of controls increases when macroeconomic conditions are favorable could reflect two different underlying mechanisms. First, good fundamentals could be correlated with strong institutions and the authorities' ability to impose sufficiently strong controls. In the sample, however, this channel could not be confirmed. A strong correlation between strong fundamentals and strong institutions could not be found, and when fundamentals were replaced by indicators of institutional quality,

⁵⁷ The one and two standard deviation confidence bands are constructed using nonparametric techniques. Following Runkle, 1987 bootstrapping was done by generating initial conditions for each country. In order to prevent possible cross-country correlations, residuals were sampled from the entire population. In order to correct for the inherent bias present in nonparametric bootstrapping methods, we use Kilian, 1998 bootstrap after bootstrap bias correction procedure. Kilian's bootstrap errors have been shown to have very good properties even when working with nonstationary data (Pesavento and Rossi, 2007).

⁵⁸ Figure 17b shows that net inflows increase due to a larger decline in gross outflows than in inflows.

⁵⁹ Several emerging markets such as Brazil, South Africa, and Thailand have recently liberalized capital outflow controls to reduce net inflows, see IMF, 2011.

results changed so that the evidence of effectiveness of outflow controls was lost. Second, controls tend to add a one-time limited cost to an international transfer, either directly or as cost of circumvention. This additional cost might sway investors when the incentive to withdraw the investment is not sufficient to offset the cost owing to reasonably strong macroeconomic conditions in the country imposing controls and reasonable returns on the investment. This mechanism, while plausible, has not been tested empirically.

76. **Results are robust to changes in the periods examined.** The above results were derived from the behavior of the variables during the entire sample period. To examine the effectiveness of outflow control tightening in times of net outflows, and conversely, the effectiveness of easing outflow controls in periods of net inflows, these periods would ideally be separated out. However, this would leave too few observations. Therefore, when studying the effectiveness of outflow control tightening, only those periods were kept in the sample where either residents or nonresidents (or both) engaged in transactions that resulted in net outflows. Similarly, when studying the effectiveness of easing outflow controls, only those periods were kept in the sample during which either residents or nonresidents (or both) engaged in transactions that resulted in net inflows. Figures 18 and 19 illustrate that the results are robust to these variations. In fact, the responses of net capital flows tend to be even more pronounced than the responses on the entire sample period.

Table 10. Definitions and Sources of Variables

Variable	Description	Source
Capital flows	Net assets and net liabilities (see footnote 8). In percent of GDP.	IFS
Outflow control index	Index of financial openness (range: 0–1, from least to most regulated).	Fund staff's narrow de jure index
Consumer price index		IFS
Nominal exchange rate	End-of-period. LCU per U.S. dollar.	IFS
Industrial production Index	Seasonally adjusted.	IFS
interest rate	Nominal. Three month.	Haver
GDP growth	In 2005 U.S. dollars. Percent change.	WEO
Inflation	End-of-period. Percent change.	WEO
Fiscal balance	Percent of GDP.	WEO
Current account balance	Percent of GDP.	WEO
Real exchange rate	Nominal XR*CPI(US)/CPI.	WEO

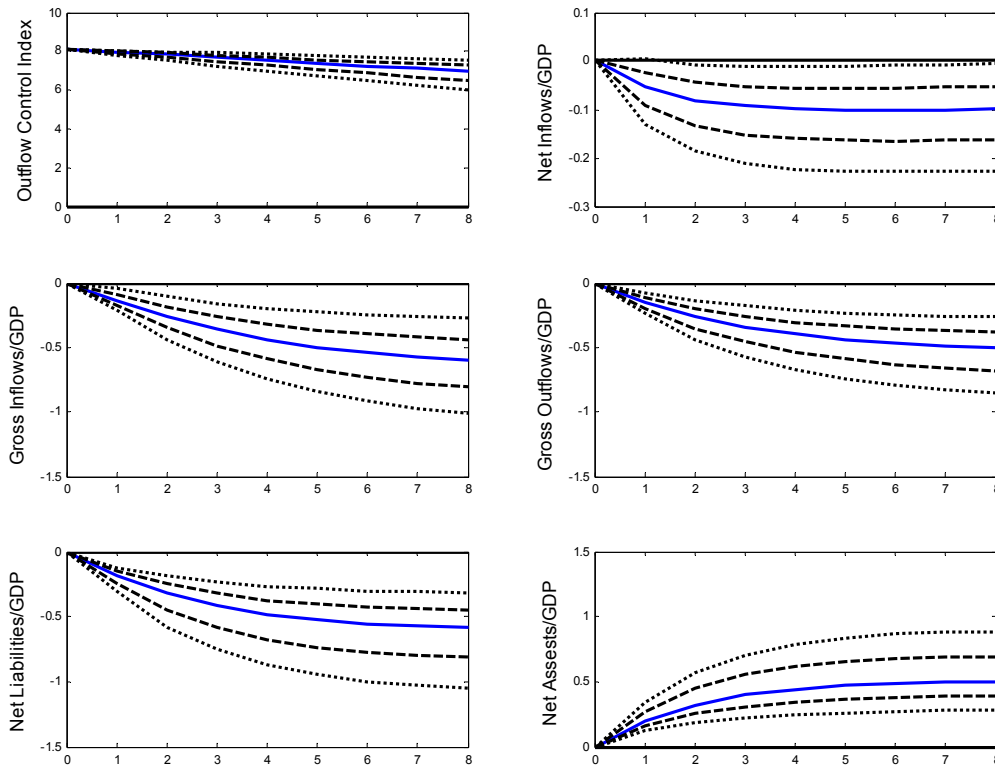
Table 11. Ranking of Countries in Terms of Macroeconomic Fundamentals

Country	GDP Growth	Inflation Rate	Fiscal Balance	Current Account Balance	Average Rank
Singapore	4	1	1	1	1.8
China	1	5	15	5	6.5
Korea	12	8	3	7	7.5
Malaysia	9	3	18	2	8.0
Chile	16	12	5	15	12.0
Thailand	23	6	13	6	12.0
Morocco	21	2	12	14	12.3
Bangladesh	5	17	21	13	14.0
Kazakhstan	6	31	2	19	14.5
Philippines	15	16	19	10	15.0
Bolivia	22	15	17	9	15.8
Israel	18	11	24	12	16.3
Indonesia	19	29	11	8	16.8
Russia	25	34	4	4	16.8
Lithuania	13	4	22	32	17.8
India	3	20	35	16	18.5
Venezuela	32	33	10	3	19.5
Argentina	24	18	28	11	20.3
South Africa	26	19	14	22	20.3
Colombia	27	24	16	20	21.8
Iceland	30	14	9	35	22.0
Croatia	28	7	26	29	22.5
Poland	14	22	32	27	23.8
Sri Lanka	8	26	36	25	23.8
Czech Republic	33	10	33	26	25.5
Mexico	35	28	23	17	25.8
Brazil	29	27	30	18	26.0
Turkey	17	35	31	23	26.5
Bulgaria	36	36	6	31	27.3
Romania	31	32	27	30	30.0
Hungary	34	25	34	28	30.3

Source: IMF World Economic Outlook.

Figure 16. Impact of Outflow Control Tightening—Full Country Sample

The figure shows impulse response functions based on three separate specifications, each of which includes the five control variables discussed in the text along with one or two capital flow measures (each row belongs to one specification). The impulse responses indicate that net inflows fall in response to a control tightening, driven by a fall in gross inflows that is larger than the fall in gross outflows. The fall in inflows is driven by a decline in nonresidents' investments entering the economy, while residents invest less abroad. Thus, in the full sample, outflow control tightening is not effective.

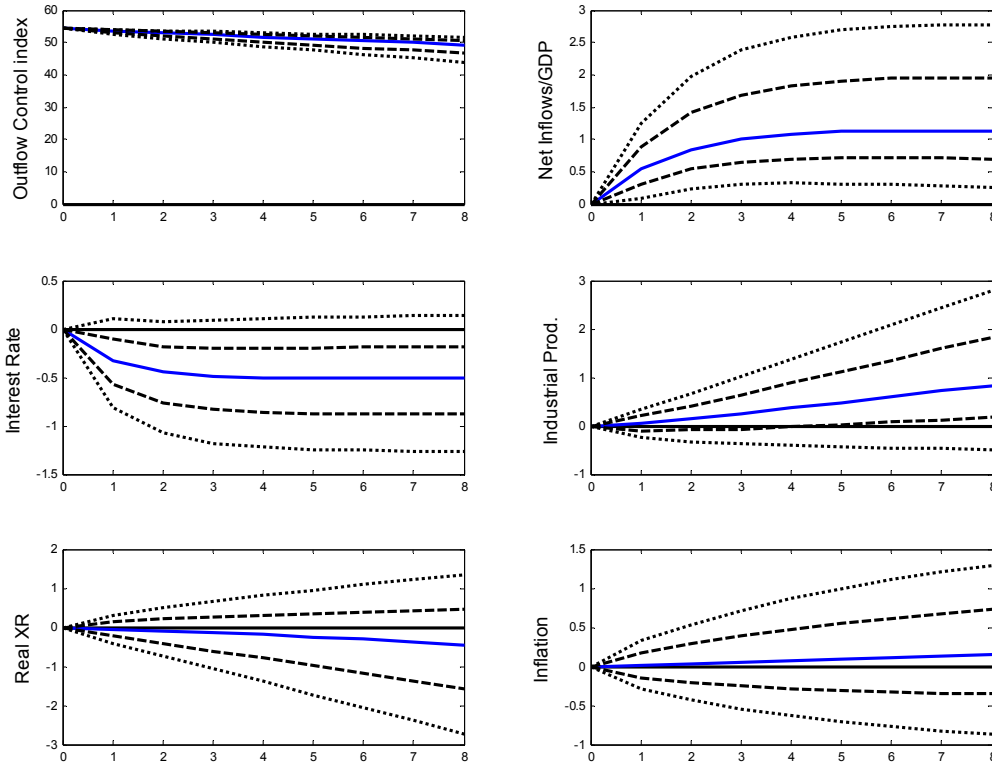


Source: See Table 10.

Note: Solid lines are OLS point estimates. Dashed lines are 1 standard deviation confidence bands. Dotted lines are 2 standard deviation bands. 'Outflow control index' indicates the percent change in staff's narrow de jure restrictiveness index on outflow controls (a positive value indicates a tightening of controls); the remaining variables are measured as changes of the respective flows in percent of GDP. The horizontal axis indicates quarters.

Figure 17a. Impact of Outflow Control Tightening—Countries with Better-than-Median Fundamentals, Macroeconomic Variables

The figure shows impulse response functions of all variables in a specification including the five control variables discussed in the text along with the net inflow measure. The impulse responses show that tightening of controls leads to an increase in net inflows. At the same time, interest rates fall, while the real exchange rate remains essentially unchanged. Thus, outflow control tightening is effective in the limited sample of countries.

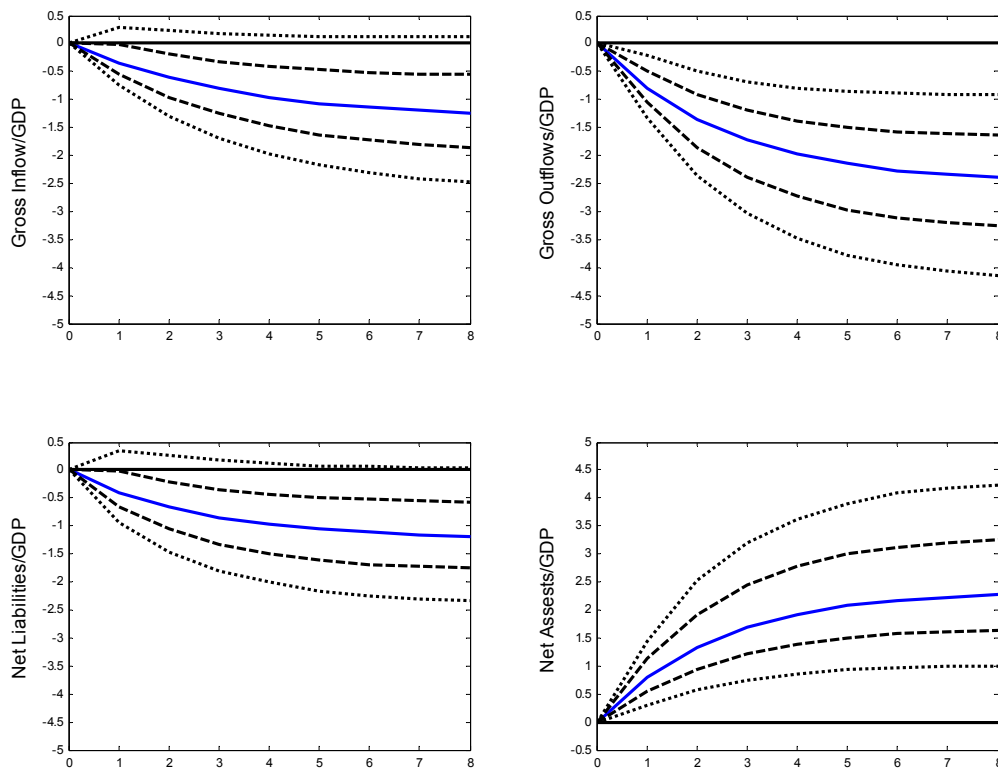


Source: See Table 10.

Note: Solid lines are OLS point estimates. Dashed lines are 1 standard deviation confidence bands. Dotted lines are 2 standard deviation bands. ‘Outflow control index’ indicates the percent change in staff’s narrow de jure restrictiveness index on outflow controls (a positive value indicates a tightening of controls). Net inflows over GDP are measured as changes in percent of GDP. Interest rate is measured as changes in percentage points (in the nominal interest rate per year). Industrial production, the real exchange rate (‘Real XR’) and inflation are percent changes (a negative response of the real exchange rate represents an appreciation of the currency). The horizontal axis indicates quarters.

Figure 17b. Impact of Outflow Control Tightening—Countries with Better-than-Median Fundamentals, Capital Flows

Complementing Figure 17a, this figure shows impulse response functions based on two separate specifications, each of which includes the five control variables discussed in the text along with two capital flow variables (each row belongs to one specification). The impulse responses indicate that in response to a tightening of outflow controls, both gross inflows and gross outflows fall, while outflows fall by a larger magnitude. The fall in gross inflows is driven by a decline in nonresidents' investments in the economy, while gross outflows decrease as residents invest less abroad.

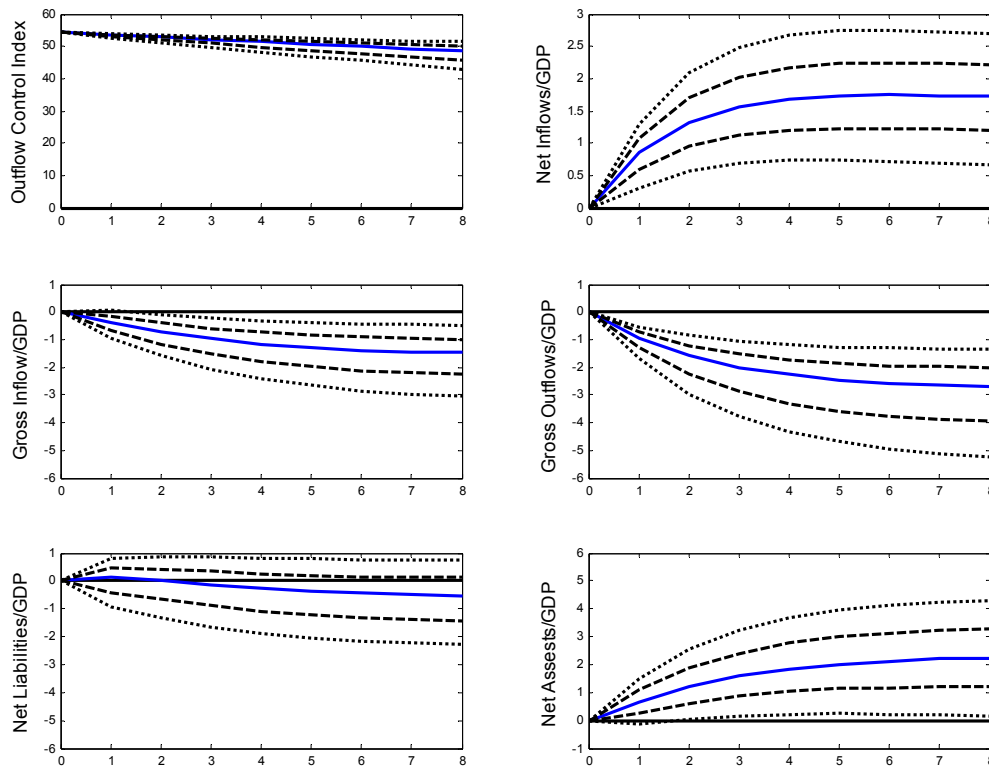


Source: See Table 10.

Note: Solid lines are OLS point estimates. Dashed lines are 1 standard deviation confidence bands. Dotted lines are 2 standard deviation bands. All variables are measured as changes in percent of GDP. The horizontal axis indicates quarters.

Figure 18. Impact of Outflow Control Tightening—Countries with Better-than-Median Fundamentals in Net Outflow Periods

The figure shows impulse response functions based on three separate specifications, each of which includes the five control variables discussed in the text along with one or two capital flow variables (each row belongs to one specification). The impulse responses indicate that net inflows rise in response to control tightening, driven by a fall in gross outflows that is larger than the fall in gross inflows. The fall in gross inflows is driven by a decline in nonresidents' investments in the economy, while gross outflows decrease as residents invest less abroad. Thus, in the sample restricted to countries with good fundamentals and to periods where transactions by either residents or nonresidents (or both) resulted in net outflows, outflow control tightening is effective.

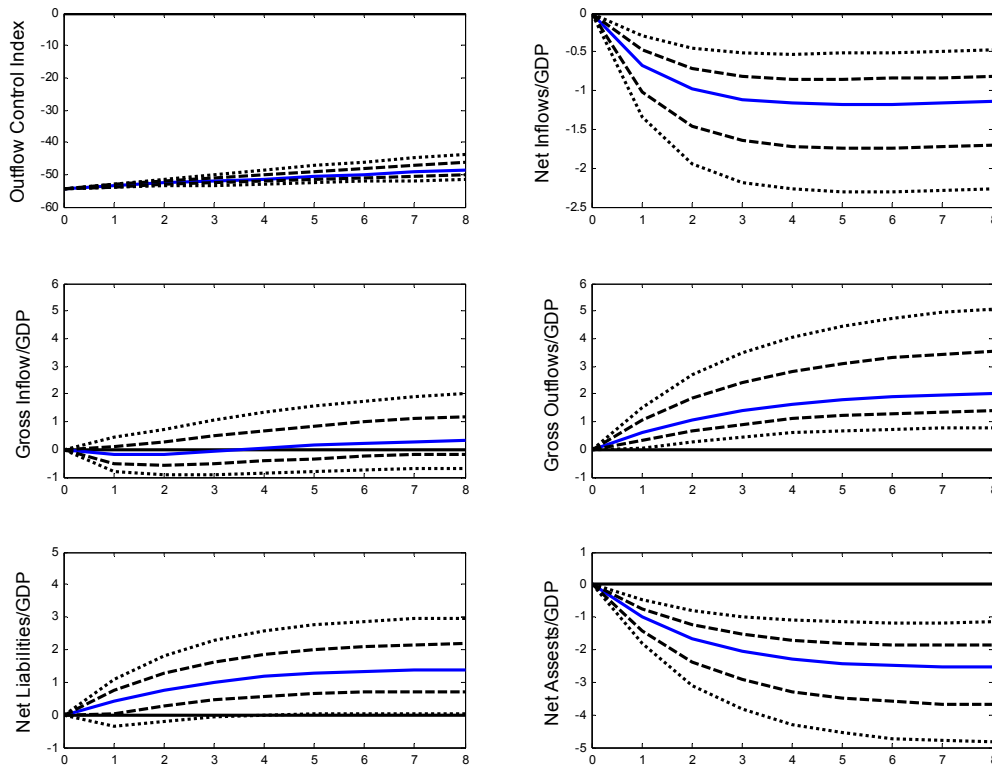


Source: See Table 10.

Note: Solid lines are OLS point estimates. Dashed lines are 1 standard deviation confidence bands. Dotted lines are 2 standard deviation bands. 'Outflow control index' indicates the percent change in staff's narrow de jure restrictiveness index on outflow controls (a positive value indicates a tightening of controls); the remaining variables are measured as changes in the respective flows in percent of GDP. The horizontal axis indicates quarters.

Figure 19. Impact of Outflow Control Tightening—Countries with Better-than-Median Fundamentals in Net Inflow Periods

The figure shows impulse response functions based on three separate specifications, each of which includes the five control variables discussed in the text along with one or two capital flow variables (each row belongs to one specification). The impulse responses indicate that net inflows fall in response to an easing of outflow controls, driven by an increase in gross outflows. The increase in gross outflows appears to be driven mainly by residents increasing their investments abroad. Thus, in the sample restricted to countries with good fundamentals and to periods where transactions by either residents or nonresidents (or both) resulted in net inflows, the easing of outflow controls is effective.



Source: See Table 10.

Note: Solid lines are OLS point estimates. Dashed lines are 1 standard deviation confidence bands. Dotted lines are 2 standard deviation confidence bands. 'Outflow control index' indicates the percent change in staff's narrow de jure restrictiveness index on outflow controls (a positive value indicates a tightening of controls); the remaining variables are measured as changes in the respective flows in percent of GDP. The horizontal axis indicates quarters.

X. MEASURING OPENNESS TO CAPITAL FLOWS⁶⁰

Studies assessing the effects of capital controls face the challenge of measuring countries' openness to capital flows. This note briefly describes the de facto and de jure indices used in this background paper. Most of these indices are also commonly used in the literature.

77. **Two types of complementary measures (de jure and de facto measures) are used to analyze the trends of capital flow liberalization in this paper.**⁶¹ The empirical work on the liberalization of capital flows uses an array of measures to capture countries' restrictions on cross-border capital flows. However, these measures have their limitations. For example, de facto indices may reflect the effect of factors in addition to those of controls on capital flows. By their nature, de jure indices do not capture properly the intensity of the controls' enforcement or incremental changes in the controls' restrictiveness. In this paper, different de jure and de facto measures were used, to mitigate the limitations of each type of index.

78. **The de jure measures are generally based on the IMF's AREAER.** These indices convert qualitative information on restrictions reported by member countries into a quantitative database. Three measures are employed in this paper.

- One of these measures is the Chinn-Ito index, which is based on principal component analysis of binary indicators in the AREAER. These are (i) "multiple exchange rates," (ii) "current account," (iii) "surrender of export proceeds," and (iv) five-year average of restrictions on capital account. By construction, the index has a mean of zero and a higher index value denotes a country more open to cross-border capital flows. This index is available for a large number of countries over 1970 to 2009.
- Another de jure index used in this paper, created by staff, is an average of binary indicators of restrictiveness in 62 categories of capital transactions. The categories include capital transactions, foreign exchange and domestic currency accounts of residents and nonresidents, regulatory measures related to the financial sector and repatriation and surrender requirements. The index distinguishes between inflows (nonresidents' investments in the country) and outflows (residents' investments abroad). This broad restrictiveness index can have a value between zero and 1 and higher values represent more restricted crossborder capital flows. Due to its more extensive coverage, it can measure liberalization or reversal of liberalization better than narrower indicators.
- As a robustness check, another index of the same type, the narrow staff restrictiveness index of capital flows was also used, which is similar to the Schindler index

⁶⁰ Prepared by Simon Townsend (MCM).

⁶¹ For a recent review of various indices used to measure the liberalization of capital flows see Quinn and others, 2011.

(Schindler 2009). The narrow restrictiveness index is also based on the AREAER, but comprises fewer categories of restrictions (21) and includes restrictions on equity, bond, money market and collective investment instruments, financial credit, and direct investment by direction. The difference between the Schindler index and staff's narrow restrictiveness index is that the former includes a limited qualitative assessment of controls. For example, if a measure requires only notification of the transaction, the control covers only a few sectors of the economy or they are maintained for anti-money laundering or security reasons, the index considers the transaction as not controlled. Since the Schindler index is available only up to 2005, staff's narrow restrictiveness index was used in this paper instead. For the period of the availability of the Schindler index, the correlation between the two indices is more than 92 percent.

79. **The second type of indicator of the liberalization of capital flows is a de facto openness measure based on gross stocks of foreign assets and liabilities as a ratio to GDP.** This includes FDI, equity, investment, external debt, and official reserves. The higher this measure for a country, the more open the capital account, as the country is experiencing significant private flows to and from the rest of the world.⁶² The stock data up to 2007 were developed and described by Lane and Milesi-Ferretti, 2007. Data for 2008–10 are staff updates using flows from the IMF Balance of Payments, not controlled for valuation.

80. **In some of the analysis, another de facto openness indicator based on BIS data on bank-intermediated financial inflows and outflows was also used.** While the Milesi-Ferretti index encompasses all capital flows, this indicator tracks capital flows through the banking system reported as BIS foreign claims (stocks and changes) and net bank inflows (flows and changes in flows).

⁶² Other de facto indices in the literature are based on the price difference of equities or forward exchange rates in onshore and offshore markets .

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