

Measures to Manage Capital Flows in Emerging Economies: Recent Experiences*

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[Preliminary Draft –Please do not cite]

23 June 2011

Abstract

After a brief reversal during the recent financial crisis, private capital inflows to EMEs are once again surging. The IMF has revised its long-standing opposition to capital controls to come out with indicators of the need to impose capital controls. In this context, this paper assesses the extent to which emerging economies had a macroeconomic ‘need to impose CFMs’ using the IMF criteria, both for the period immediately preceding the Great Recession and the period since. We find that in the majority of country-year pairs in which there was an inflow surge in our sample, the IMF criteria for the need to impose capital controls were not satisfied. Yet, the 22 countries in our sample took around 500 capital flow measures (both easings, tightenings and institutional changes) during this period (2004-2010). Most of these measures were pure capital controls rather than prudential-type measures. Most measures were also undertaken by country-year pairs that did not satisfy IMF criteria for their need. Moreover, the crisis marked a large drop in the measures liberalizing both inflows and outflows — a trend that has gone largely unnoticed hitherto.

*I would like to thank Kristina Hess for outstanding research assistance, including painstakingly collecting data on all the capital flow measures. My thanks to Rose Chen who also provided excellent research assistance and to Robert Lavigne for comments and encouragement. I would also like to acknowledge collaboration with Kun Mo on related work. The views in the paper are those of the author. No responsibility for them should be attributed to the Bank of Canada.

After a brief reversal during the recent financial crisis, private capital inflows to EMEs are once again surging. Since capital inflow surges to developing economies are often followed by sudden stops, and many of these countries are still unable to borrow abroad in their own currencies (leading to currency mismatches and foreign currency liquidity risk), such inflow waves can give rise to macro and financial stability concerns. Brazil became the first emerging economy since the crisis to tighten inflow controls and the IMF has revised its long-standing opposition to capital controls, suggesting now that they may be used as a last resort once primary macroeconomic responses have been exhausted. These events have given rise to a sense that the net capital inflow reducing measures have increased in frequency since the crisis.

The objective of this paper is to review the recent trends in capital flow management measures (CFMs) in EMEs. In particular, this paper aims to:

1. Assess the extent to which emerging countries had a macroeconomic ‘need to impose CFMs’ using the IMF criteria, both for the period immediately preceding the Great Recession and the period since.
2. Summarize and analyze the actual measures related to capital account taken by emerging economies in these periods and relate them to the need to impose CFMs.

I. Macroeconomic framework for determining “need to impose CFMs”

Allowing for the moment the broader definition of macroprudential policy, in this section, we ask how often the imposition of CFMs would have been consistent with macroprudential policy in recent years, using the IMF criteria.¹ The IMF’s proposal of this framework represents a major policy shift and therefore the criteria merit greater scrutiny. We first describe the criteria and then evaluate the EMEs in our sample against it. Our sample consists of the 21 emerging markets that are in the MSCI Emerging Markets Index, and Argentina and we evaluate their macroeconomic situations against the criteria for the years 2004 to 2010.²

¹ IMF (2011a).

² However, we do not have data on capital flows for Taiwan. Therefore this section contains analysis of only 21 countries, although in the section on capital controls, we include Taiwan.

II.1. Criteria for determining “need to impose CFMs”

The IMF recommends the use of capital inflow measures in the face of an inflow surge if the following three conditions are satisfied:

- a) The exchange rate is not undervalued;
- b) International reserves are adequate or sterilization costs are too high; and
- c) The economy is overheating and there is no scope to tighten fiscal policy.

The IMF proposes establishing numerical thresholds, as well as judgement based criteria, to evaluate whether each of these conditions have been met. The numerical thresholds used by IMF do not take into account sterilization costs or the scope for tightening fiscal policy. We use numerical thresholds for each of the above criteria and follow closely the IMF’s work. Exchange rate undervaluations are based on Rodrick (2008) which classifies a currency as undervalued if its PPP real exchange rate is higher than 1 after taking into account the Balassa-Samuelson effect; reserves are judged to be adequate if they are adequate to cover short term external debt and current account deficit and economy is judged to be overheating if either the inflation rate is moderate or increasing or if the bank credit growth is high. We consider a country to be facing an inflow surge if the net capital inflows as a ratio of GDP are higher than recent trends or large in absolute value. The criteria are described in more detail in the Appendix A.1. In the next section, we describe which countries passed all three of the criteria.

II.2. Macroeconomic policy options for EMEs since 2004.

Given the framework described above, in this section, we evaluate the EMEs’ macroeconomic policy options for each year since 2004. The countries that satisfied the IMF criteria for “need to impose CFMs” are listed in Table 1. There are only 13 country-year observations that satisfy the IMF criteria, out of a total of 103 “surge” country-year pairs. The proportion of countries that were out of other macroeconomic options and needed to impose CFMs has been low in all years, peaking at 29 percent in 2008 and staying below 15 percent in other years.

Table 1: Countries with “need to impose capital flow measures”

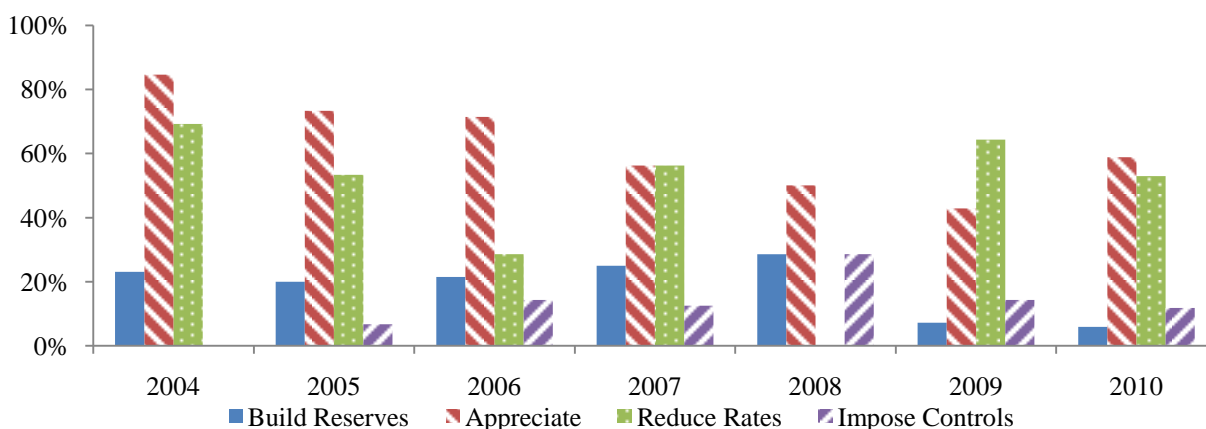
IMF criteria						
2004	2005	2006	2007	2008	2009	2010
	South Africa	Brazil	Brazil	Brazil	Turkey	Brazil
		Korea	Mexico	Chile	South Africa	Hungary
				Czech Rep.		
				Morocco		

Each of the three conditions for the “need to impose CFMs” (or its violation) represents a primary response option to an inflow surge. When the exchange rate is undervalued, the primary response option would be to allow it to appreciate; when the international reserves are inadequate, authorities may accumulate reserves; and when the economy is not overheating, the authorities may lower interest rates to reduce the return to inflows.

Figure 2 depicts for each year, the number of countries that were facing a surge and had each of the 3 primary response macroeconomic options available to them and the number that satisfied the “need to impose CFMs”. The total number of countries with a surge varied between 13 and 17 in these years. The broad majority of countries facing a surge (85 percent) had room to allow their exchange rates to appreciate in 2004, but this number has fallen to a simple majority (59 percent) in 2010. The number of countries that could reduce rates has fallen from 69 percent in 2004 to 53 percent in 2010. Most countries have adequate reserves – only Turkey had the option to build reserves in 2010.

To summarize, most emerging markets have had one or more primary response macroeconomic policy option available in the years when they were facing inflow surges and overheating. This holds both for the pre-crisis surge periods and post-crisis period. The next section looks at the actual CFMs that countries took in these years.

Figure 2: Number of countries that had each macroeconomic option available when facing an inflow surge



II. Recent measures on the capital account in EMEs and their relationship to “need to impose CFMs”

Against the background set in the previous section on the need to impose CFMs, this section looks at the actual policy measures on the capital account that EMEs took since 2004. Our main source of data is IMF’s Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).³ The AREAER provides information on member countries’ exchange arrangements, exchange and trade restrictions and capital transactions which includes regulations applicable to the financial sector that are relevant for capital transactions. We use information contained in the capital transactions section. We supplement this information with information from central banks’ websites, news sources and other research papers.

Most measures are small changes in controls. Major policy announcements are broken up into categories of transactions that they affect and each is counted separately. The IMF’s AREAER which breaks down the broad category, capital transactions as follows:

1. Controls on capital and money market instruments:
 - a. Controls on capital market securities: further classified into ‘controls on shares or other securities of a participating nature’ and ‘banks or other debt securities’
 - b. Controls on money market instruments
 - c. Controls on collective investment schemes

³ See data appendix for more information on the measures.

2. Controls on derivatives and other instruments
3. Controls on Credit Operations:
 - a. Commercial Credits
 - b. Financial Credits
 - c. Guarantees, sureties and financial backup facilities
4. Controls on direct investment
5. Controls on liquidation of direct investment
6. Controls on real estate transactions
7. Controls on personal capital transactions
8. Provisions specific to the financial sector:
 - a. Provisions specific to commercial banks and other credit institutions, which includes open foreign exchange position limits and other provisions
 - b. Provisions specific to institutional investors

If a major policy announcement takes place and includes measures related to several categories above, each measure is classified separately in the category it belongs and is counted separately. Therefore, we think the number of measures provides useful information. This approach is related to but different from the existing literature on de-jure financial openness indices (Chinn and Ito, 2007; Glick and Hutchison, 2001; Grilli and Milesi-Ferretti, 1995; Quinn, 1997; Edwards, 2004 among many others). Most indices use information in the summary table in AREAER, which provides information only on the existence or lack of existence of controls in each category –they differ on the number of categories used. The exceptions are Quinn (1997) and Edwards (2004) which provide 4 scales of the restrictiveness of regulation in each category. We use information on changes under each category, so provide information on how actively the capital account policy was being changed and in what direction.

III.1. Classification of measures on the capital account

In order to understand the direction of policy better, we group the measures into whether the measures would encourage or discourage Net Capital Inflows (NKI), i.e. the difference between capital inflows and outflows. This gives us the following categories:

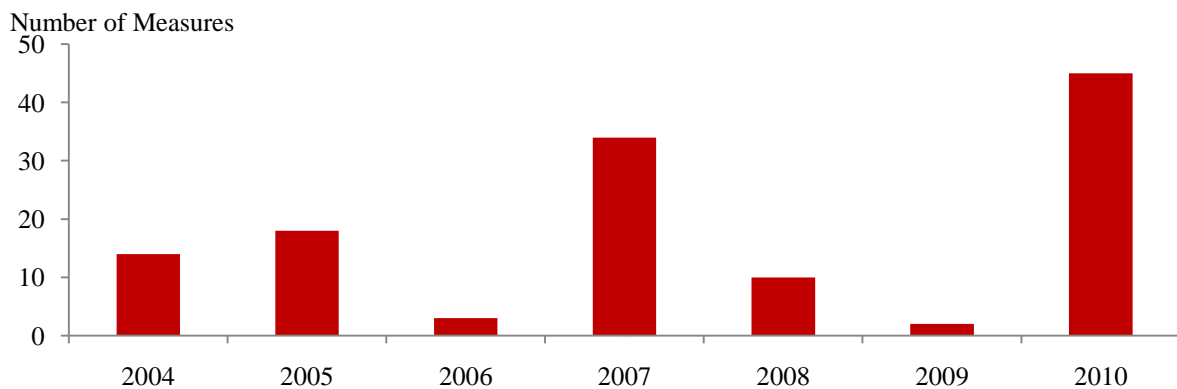
1. **NKI Reducing Measures:** These are measures that represent tightening of inflows or easing of outflows.

2. **NKI Increasing Measures:** These are measures that represent easing of inflows or tightening of outflows.
3. **Net NKI Reducing Measures** = NKI Reducing Measures - NKI Increasing Measures

III.2. Trends in measures on the capital account since 2004

The 22 EMEs in our sample introduced a total of 518 measures on the capital account between 1 January 2004 and 28 Feb 2011. The number of Net NKI reducing measures in EMEs as a group has indeed seen a rise in the post-Great Recession period (Figure 3), so that the general sense that the policy in EMEs is tending towards reducing NKI seems correct.⁴

Figure 3: Net NKI Reducing Measures in EMEs have spiked in 2010.



However, the reason that this has happened is not because of an increase in the rate of new inflow tightening measures. Figures 4-6 explore the reasons behind the spike in Net NKI Reducing measures. These show:

1. **In the total number of measures, there was no surge in 2010.** Figure 4 provides a breakdown of the measures by year. 2007 and 2008 were the peak years for capital account measures, with the total number of measures close to 120 in each of the years. 2009 saw the fewest changes and while the number of measures increased in 2010, they were comparable to 2004 and 2006 levels and much smaller than the peaks. Therefore, in terms of the level of activity in capital accounts, the situation in 2010 was a bit calmer than the period immediately preceding the capital flow reversals due to the financial

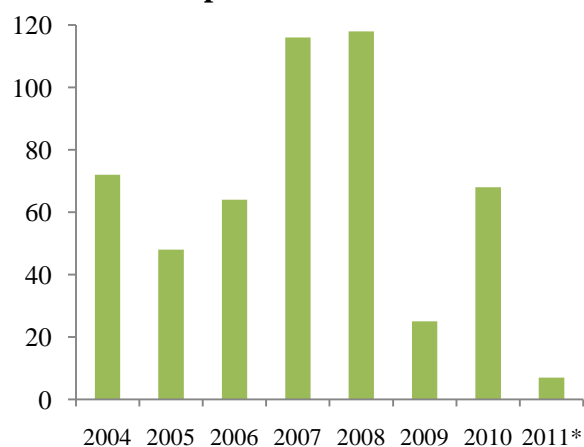
⁴ The figure may be masking trends within different EMEs. The low values in 2008 and 2009, for example could just reflect the fact that different EMEs were moving in different directions in terms of reducing or increasing NKI.

crisis. The peak in net NKI reducing measures in 2010 then must reflect a change in composition of total measure towards net NKI reducing measures.

2. **A surge in both NKI reducing measures and NKI increasing started pre-crisis and was briefly interrupted in 2009** (Figure 5). However, 2010 saw a resumption of NKI reducing measures not matched by resumption of NKI increasing measures, leading to a large shift in policy toward NKI reducing measures.

3. **Further, although the number of new inflow reducing measures has increased in 2010, the main forces behind the shift toward net NKI reducing measures have been the decline in both inflow and outflow liberalizations.** (Figure 6). Figure 6a shows that inflow easing measures were at their peak during 2007-08 but have dropped sharply in 2009-11, leading to the sharp decline in NKI increasing measures seen in Figure 5. While the inflow easing measures in 2008 exceeded the number of measures in 2007 (38 compared to 25), 2009 and 2010 together saw only 8 measures to ease inflows. On the other hand, outflow tightening measures have not been popular in EMEs since 2004 and did not increase much during the reversals of 2008Q4 and 2009Q1. As far as NKI reducing measures are concerned, Figure 6b shows an increase in inflow tightening in 2010, but a much sharper fall in outflow liberalizations, compared to the pre-crisis years 2007 and 2008, which saw overheating in many emerging economies along with peak net capital inflows. Why the liberalizations of inflows and outflows have stopped is a question that needs to be asked.

Figure 4: 2007 and 2008 were peak years for measures on capital account



*through February 2011

Figure 5: NKI reducing measures peaked in 2007 and continue to remain high.

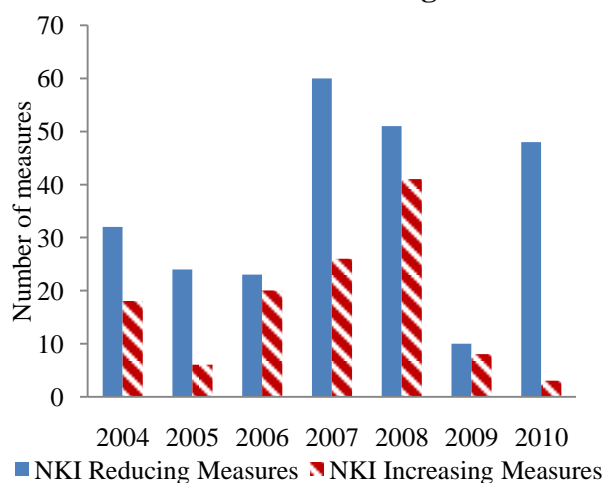


Figure 6a: Pre-crisis, most Net Capital Inflows Increasing
Measures involved easing of inflows. EMEs have largely put such measures on hold since.

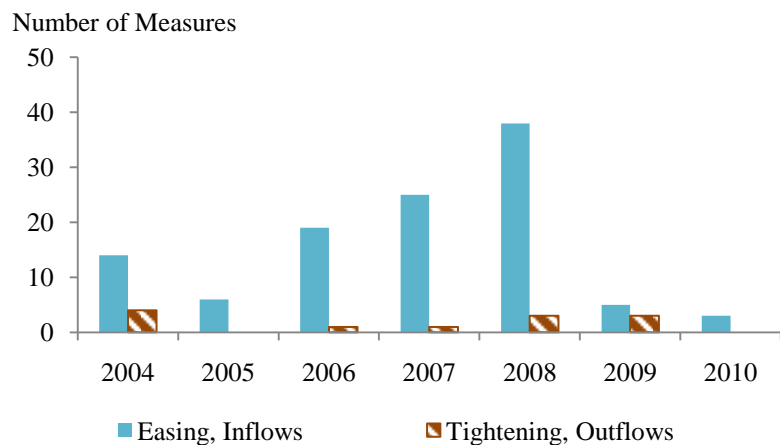


Figure 6b: Pre-Crisis, Net Capital Inflows Reducing
Measures predominantly involved easing of outflows. Not anymore.

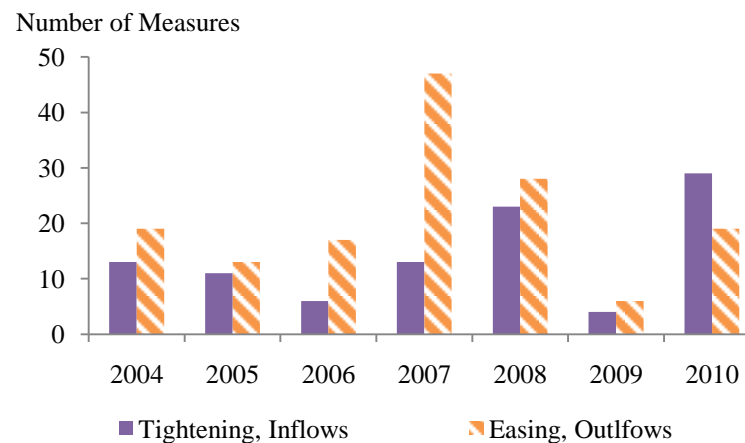


Figure 7a: Latin America
EMEs have stopped introducing measures that would increase net capital inflows.

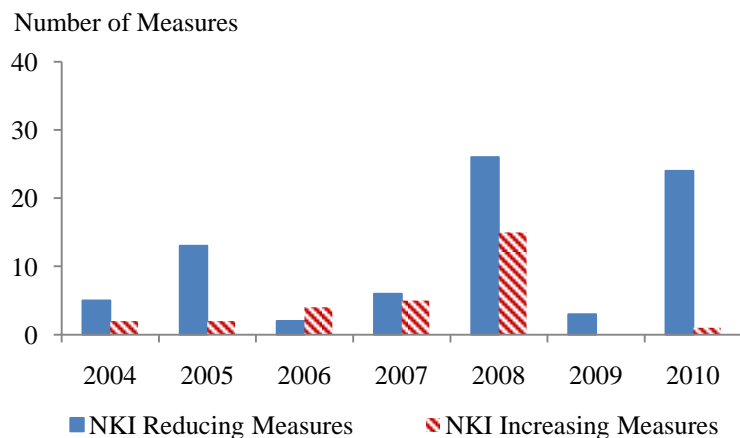
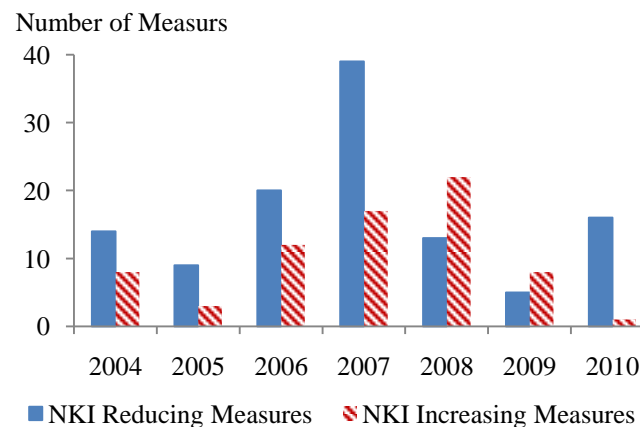


Figure 7b: Asia
EMEs are doing less on the capital account since the crisis.



There are other noteworthy trends in the measures on capital account. These include:

1. **The regional trends parallel the overall trends.** In Latin America, the number of net capital inflow reducing measures in 2010 recovered to their peak in 2008, but the net capital inflow increasing measures fell to almost zero (Figure 7a). In Asia, the NKI measures in 2010 were not close to their 2007 peak, but the number of NKI increasing measures also fell to close to zero (Figure 7b).
2. **Most measures are taken by economies with a “floating” exchange rate**, i.e. by economies with a largely market determined exchange rate, but which has seen some intervention during the last 6 months (Table 1).⁵ Moreover, most measures were taken by countries with an inflation target or other monetary policy arrangement, rather than an exchange rate arrangement or monetary base target (Table 2).

Table 1: Measures on capital account, by exchange rate arrangement of countries

Year	Floating	Free Floating	Other	Soft Peg	Total
2004	49	11	0	12	72
2005	28	12	0	8	48
2006	29	22	0	13	64
2007	74	21	0	20	115
2008	94	14	1	10	118
2009	19	5	0	0	23
2010	53	10	0	1	64
2011	6	1	0	0	7
Total	352	96	1	63	512

3. Notes: Classifications are from IMF AREAER, April 2009.

Table 2: Measures on capital account, by monetary arrangement.

Year	Inflation-Targeting Framework	Momentary Aggregate Target	Other	Exchange Rate Anchor	Total
2004	18	2	40	12	72
2005	21	15	4	8	48
2006	39	0	12	13	64
2007	40	0	55	20	115
2008	67	4	37	10	118
2009	14	0	10	0	23
2010	62	0	1	1	64
2011	5	0	2	0	7
Total	266	21	161	64	512

Notes: Classifications are from IMF AREAER, April 2009.

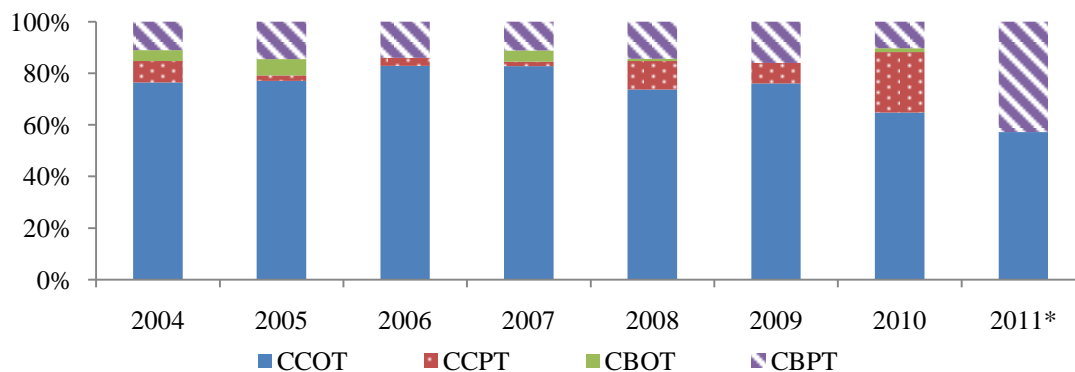
⁵ See Appendix Table 1 for descriptions of exchange rate and monetary policy classifications.

Additionally, we classify the measures on capital account into currency based or capital controls, as follows:⁶

- a. **Currency Based Measures:** These are measures that discriminate based on currency, for example, between transactions denominated in domestic vs. foreign currency. These are further classified into:
 - i. *Currency Based, Prudential Type (CBPT)*
 - ii. *Currency Based, Other Type (CBOT)*
- b. **Capital Controls:** these are measures that discriminate based on residency of the transactor. These are further classified into:
 - i. *Capital Controls, Prudential Type (CCPT)*
 - ii. *Capital Controls, Other Type (CCOT)*

We find that the share of prudential type measures has increased in recent years - but not by much (Figure 8). Most measures introduced since 2004 have been capital controls rather than currency based measures and the majority have been of the non-prudential type. However, the share of prudential type measures –both capital controls and currency based – has increased since the recent financial crisis. This may reflect the heightened focus on macroprudential management since the crisis. This is a positive trend, but could go further.

Figure 8: Most measures were capital controls rather than currency based measures



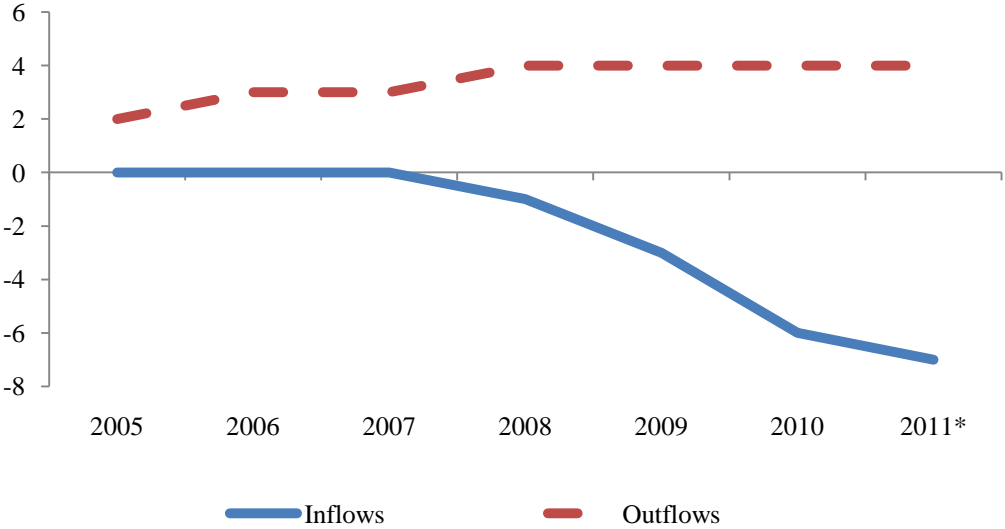
Notes: The number of measures introduced through February 2011 was small, totalling 7. Abbreviations used are: CCPT – capital control prudential type; CCOT – capital control, other; CBPT – currency-based prudential type; CBOT – currency-based other

⁶ Further details on each of the categories are in the appendix.

Further, since the aggregate analysis could be masking opposing country-level trends, and since the measures are not weighted by the importance of the country in the global economy in the aggregate analysis, we gauged the evolution of policy individually for the BRICs and Korea. We added for each country and each year, the easing and tightening measures for inflows and outflows. A single easing measure is assigned a numeric value 1 and a single tightening measure a numeric value -1. The sum of the number of easing and tightening of inflows in a given year provides a sense of whether the policy on the whole leaned towards liberalizing inflows during that year or towards tightening restrictions on inflows. Adding these over time (taking the cumulative sum over years) provides a sense of direction over the entire period.

Figures 9 present the cumulative change in inflows and outflows for each of the five countries. In China, India as well as Korea, there were several outflow liberalization measures in the pre-crisis period, a trend that was interrupted by the crisis. In Brazil and Korea, the two countries most in the news for capital controls since the crisis, the inflow restrictions have increased steadily since 2007. These figures show that the trends at the country level broadly follow the trends in EMEs as a group.

Figure 9a: Brazil, overall policy direction: new inflow and outflow measures



*through February 2011

Figure 9b: China, overall policy direction: new inflow and outflow measures

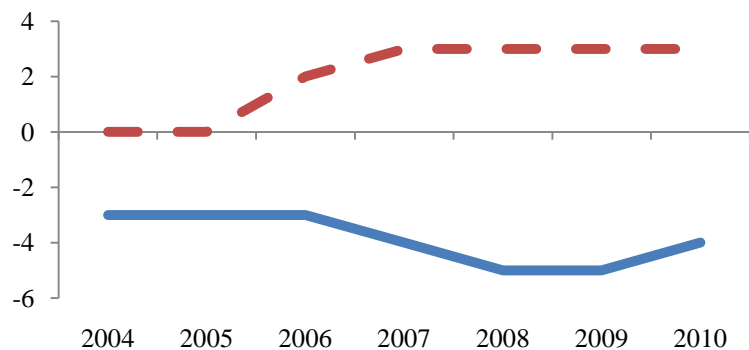


Figure 9c: India, overall policy direction: new inflow and outflow measures

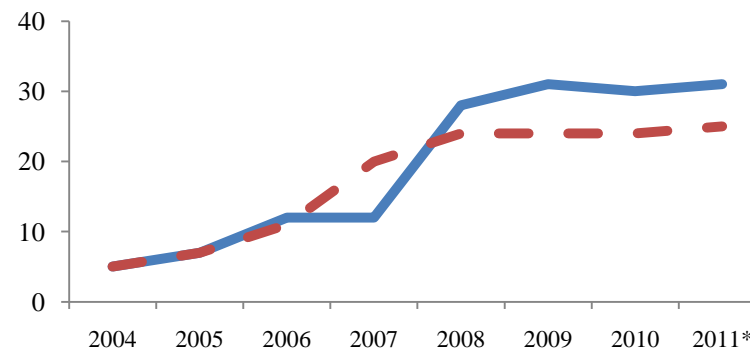


Figure 9d: Russia, overall policy direction: new inflow and outflow measures

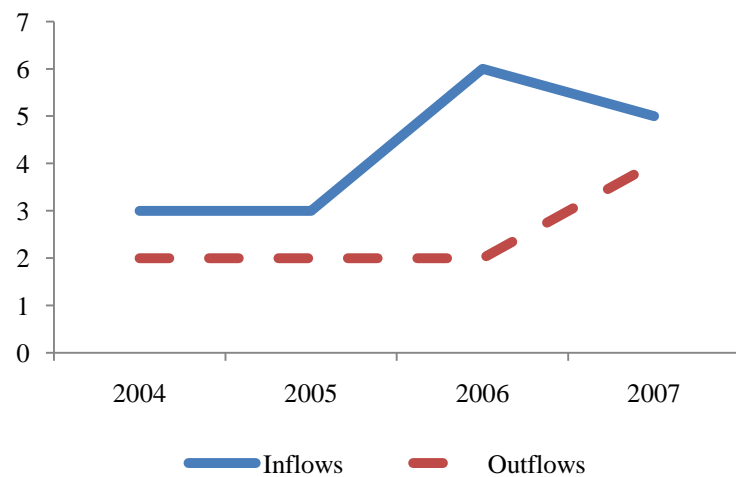
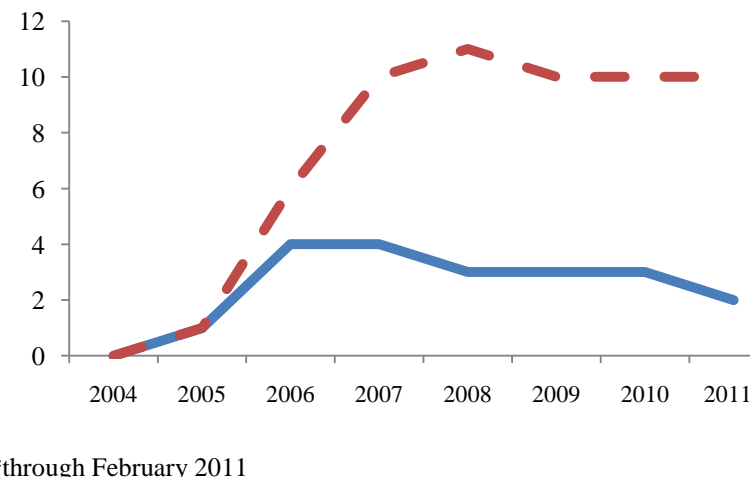


Figure 9e: Korea, overall policy direction: new inflow and outflow measures

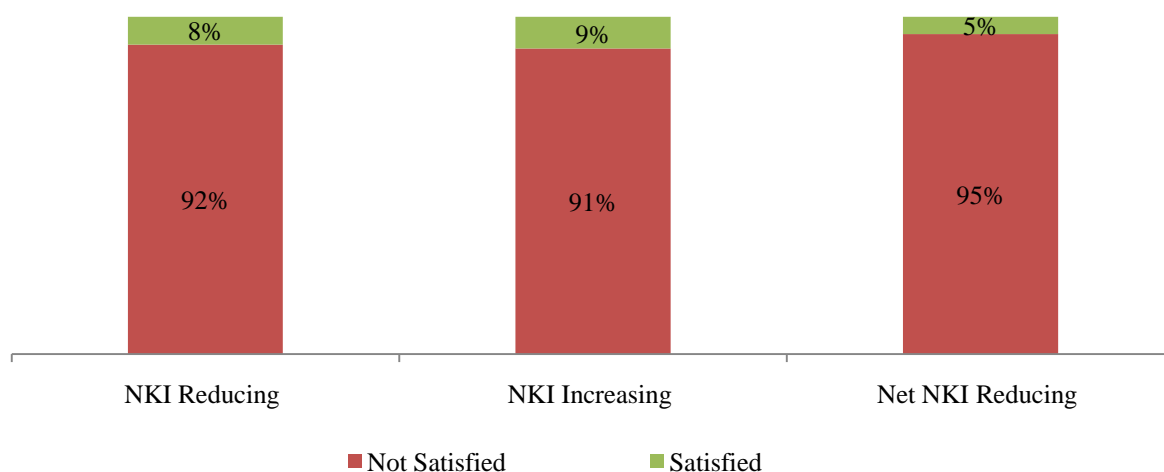


*through February 2011

III.3. Relationship with “need to impose CFMs”

Having looked at both the number of countries that satisfied the IMF criteria for need to impose capital controls and the actual capital account measures since 2004, this section puts the two together and asks whether most of the controls were being imposed when there was a need to impose these. Figure 10 provides the percentage of measures introduced in countries in years when the IMF criteria for need to impose capital controls were/were not satisfied. The figure shows that only 5% of the net NKI reducing measures were introduced when the IMF criteria were met. Looking at NKI reducing measures only, almost 92% of measures were introduced in country-years that did not satisfy the IMF criteria for need to impose CFMs. Measures on capital account are therefore not being used as measures of the last resort.

Figure 9: The number of capital account measures introduced when the IMF criteria for “need to impose CFMs” is *not* satisfied far exceeds those imposed when these criteria were satisfied.



III. Summary and Conclusions

This paper examined the macroeconomic management options of emerging markets using IMF criteria and found that in recent years, most EMEs have had at least one alternative macroeconomic option open to them even as they imposed CFMs. The measures are not being used as a last resort.

Additionally, most measures being imposed were pure capital controls measures, rather than prudential type measures. However, the recent financial crisis did mark some changes in the trend. There has been a small shift from non-prudential type measures to prudential type measures.

A surge in both NKI reducing measures and NKI increasing started pre-crisis and was briefly interrupted in 2009. 2010 saw a resumption of NKI reducing measures not matched by resumption of NKI increasing measures, leading to a large shift in policy toward NKI reducing measures. Further, although the number of new inflow reducing measures has increased in 2010, two important forces behind the increase in net NKI reducing measures have been the decline in both inflow and outflow liberalizations – a trend that has gone largely unnoticed hitherto.

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Appendix

A.1. Numerical criteria for the framework

We consider an economy as having faced an inflow surge during a given year if net capital inflows as a percentage of GDP during that year were:

- a. higher than the average of the previous 5 years; or
- b. were higher than 1.5 percent of GDP⁷

For the year 2010, there is no data on net capital inflows for 4 countries – Egypt, India, Malaysia, Morocco. We assume these had a surge in this year.

The numerical targets used for the criteria for “need to impose CFMs” are as in IMF (2011a):

1. The economy is considered to be *not* overheating when *both* these criteria are met in a given year:
 - a. the year-on-year CPI inflation rate averaged less than 3 percent over the last two years, or less than 10 percent and declined from the average level of the preceding year
 - b. bank credit did not rise by more than 5 percent of GDP.
2. Reserves are judged to be adequate if the ratio of foreign exchange reserves (less gold) to the sum of short-term debt and the current account deficit (excluded if surplus) is above 100%. If the current account was in surplus, the ratio is computed only as reserves/short term debt.
3. Since the CGER assessments used by IMF are not publicly available, we use Rodrick (2008) currency undervaluation which classifies a currency as undervalued if its PPP real exchange rate is higher than 1 after taking into account the Balassa-Samuelson effect.

⁷ Net capital inflows are measured by the sum of the capital and financial account balance, i.e. the net autonomous inflows. IMF (2011a) uses quarterly data on gross private capital inflows to identify inflow surges and classifies a quarter as seeing a surge if the gross inflows in that quarter significantly exceed their long run average (since 1990Q1) by one standard deviation or exceed 1.5 percent of annual GDP. However, the IMF does not apply the “need to impose CFMs” criteria only to countries facing a surge. There are 26 surge episodes using IMF definition of a surge in 2010, but the numerical criteria for “need to impose CFMs” is applied to 39 countries.

The PPP exchange rates are only available through 2009 – we use the 2009 assessment of undervaluation for 2010.

A.2. Classification of measures on the capital account

We classify the measures into the following categories:

1. Whether the measure (or change) impacts capital inflows (I) or outflows (O) or cannot be clearly identified as affecting only one of these categories (other)⁸
2. Whether the change represents an easing (E) or tightening (T) of policy or a neutral/institutional change

In order to understand the direction of policy better, we group the measures into whether the measures would encourage or discourage Net Capital Inflows (NKI), i.e. the difference between inflows and outflows. This gives us the following categories:

3. **NKI Reducing Measures:** These are measures that represent tightening of inflows, easing of outflows or other tightening.
4. **NKI Increasing Measures:** These are measures that represent easing of inflows, tightening of outflows or other easing.
5. **Net NKI Reducing Measures** = NKI Reducing Measures - NKI Increasing Measures

We also classify each of the measures on the following lines:

6. **Currency based or capital controls**
 - c. **Currency Based Measures:** These are measures that discriminate based on currency, for example, between transactions denominated in domestic vs. foreign currency.
 - i. *Currency Based, Prudential Type (CBPT):* These are prudential regulations specific to the financial sector measures that differentiate based on currency. They include limits on open foreign exchange (FX)

⁸ Examples of the other measures that could not be classified as inflow or outflow measures include limits on net open foreign exchange positions of financial institutions, ban on use of foreign currency in special economic zones, restrictions on transactions that would constitute at once an inflow and outflow, for example use of external borrowing to invest abroad, etc.

positions, limits on banks' investments in FX assets, differential reserve requirements on liabilities in local currencies and FX.⁹

- ii. *Currency Based, Other Type (CBOT)*: These are currency based measures that apply to the non-financial sector and do not discriminate between residents and non-residents.¹⁰ For example, on 1 April 2007, residents and non-residents were allowed to issue foreign currency bonds in Malaysia.

d. **Capital Controls**: these are measures that discriminate based on residency of the transactor.

- i. *Capital Controls, Prudential Type (CCPT)*: These measures are applied to the financial sector only and are often similar to CBPT in design or impact. These include differential reserve requirements on non-resident deposits (which could have the same impact as a differential reserve requirement on foreign currency deposits if most foreign currency deposits are held by non-residents). Another example of this type of measures is the provisioning requirement of 2% that was imposed on Rouble and foreign currency obligations of credit institutions to non-resident banks, in Russia effective 1 August 2004.
- ii. *Capital Controls, Other Type (CCOT)*: This is the residual category of all measures on international transactions, payments and transfers related to capital account that discriminate based on residency of transactor.

7. The exchange rate regime of the countries adopting the policy changes. The information on exchange rate regimes is from the IMF's AREAER. Appendix Table 1 provides descriptions of the IMF classifications.

8. The monetary policy frameworks of the countries adopting the policy changes. The information on monetary policy frameworks is from the IMF's AREAER. Appendix Table 1 provides descriptions of the IMF classifications.

⁹ Basel Committee accepts limits on net open position of banks as prudential; however, many EMEs have imposed limits on long or short positions in FX or in one or more foreign currency. While these asymmetric open position limits can in principle be considered a capital control, we follow Ostry et. al. (2011) in classifying them as CBPT.

¹⁰ However, these measures are often close to capital controls as while they do not discriminate between residents or non-residents on one side of the transaction, they often only apply to residents on the other side of the transaction. An example of this kind of regulation is in Malaysia on April 1, 2007, the limit on foreign currency borrowing by resident companies from licensed onshore banks and non-residents as well as through issuance of onshore foreign currency bonds was increased to 100 million Malaysian Ringgit or its equivalent in aggregate, and on a corporate group basis from the previous 50 million Ringgit. The proceeds were allowed to be used for domestic purposes or offshore investment.

9. Geographical regions.

A.3. Data Appendix

This appendix consists of two tables. Appendix Table 1 provides descriptions of the IMF classifications. Appendix Table 2 provides the data sources.

Appendix Table 1: Description of IMF Classifications

IMF Classification (Abbreviation)	Brief Description
Exchange Rate Regimes	
Free Floating (FF)	A largely market-determined exchange rate if there has been no intervention over the preceding six months, with the exception of limited intervention to address disorderly market conditions.
Floating (F)	A largely market-determined exchange rate that is not classified as free floating.
Soft Peg (SP)	Includes conventional pegged arrangements, pegged exchange rates within horizontal bands, crawling pegs, stabilized arrangements, and crawl-like arrangement.
Other (O)	Any arrangement that does not fall into one of the categories described above or hard pegs.
Monetary Arrangements	
Inflation-Targeting Framework (IT)	This involves the public announcement of numerical targets for inflation, with an institutional commitment by the monetary authorities to achieve these targets, typically over a medium-term horizon. Additional key features normally include increased communication with the public and the markets about the plans and objectives of monetary policymakers and increased accountability of the central bank for achieving its inflation objectives. Monetary policy decisions are often guided by the deviation of forecasts of future inflation from the announced inflation target, with the inflation forecast acting (implicitly or explicitly) as the intermediate target of monetary policy.
Monetary Aggregate Target (MT)	The monetary authority uses its instruments to achieve a target growth rate for a monetary aggregate, such as reserve money, M1, or M2, and the targeted aggregate becomes the nominal anchor or intermediate target of monetary policy.
Exchange Rate Anchor (XA)	The monetary authority buys or sells foreign exchange to maintain the exchange rate at its predetermined level or within a range. The

Other (O)	<p>exchange rate thus serves as the nominal anchor or intermediate target of monetary policy. These frameworks are associated with exchange rate arrangements with no separate legal tender, currency board arrangements, pegs (or stabilized arrangements) with or without bands, crawling pegs (or crawl-like arrangements), and other managed arrangements.</p> <p>The country has no explicitly stated nominal anchor, but instead monitors various indicators in conducting monetary policy. This category is also used when no relevant information on the country is available.</p>
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Source: IMF AREAER 2009.

Notes for Monetary Arrangements: When a country classified as having both XA and IT, it was classified in this paper as XA. When a country was classified as having one of the listed categories and an IMF-supported program, it was classified in this paper as having the listed category.

Appendix Table 2: Data Sources

Variable	Source	Description
Bank Credit	<i>IFS, WDI</i>	Domestic credit provided by the banking sector, expressed as a percentage of GDP. For Argentina, China, India and Korea, 2010 values are calculated by applying the growth rates of the Claims on Private Sector series under Deposit Money Bank/Other Depository Corporations sections from IMF's International Financial Statistics (IFS) database to Bank Credit for 2009. For these countries, 2010 bank credit is calculated as $\text{BankCredit as\% of GDP}_{2009} * (\text{Claims}_{2010} / \text{Claims}_{2009})$. All other data are obtained from the World Development Indicators (WDI) database.
Capital Account Balance	<i>IFS, China Statistics Information & Service Centre</i>	Capital account, n.i.e.; negative values indicate deficits. For Brazil, Czech Republic, Hungary, Peru and Philippines, annual estimates for 2010 are calculated from available quarterly data. With two quarters of data available, annual estimates are calculated as $(Q1+Q2)*2$. With three quarters of data available, annual estimates are calculated as $(Q1+Q2+Q3)*4/3$. 2010 data for China is obtained from the China Statistics Information & Service Centre. All other series are obtained from IFS.
Chinn-Ito Index		A de-jure measure of financial openness. The index is currently updated to 2009 and can be obtained from Menzie Chinn or Hiro Ito's homepages.
Current Account Balance	<i>IFS, WEO</i>	Current account balance, n.i.e.; negatives values indicate deficits. 2011 forecast values for all countries are obtained from the April 2011 WEO. For Argentina, Brazil, Colombia, Czech Republic and Morocco, 2010 values are also obtained from the WEO. All other data are obtained from IFS.
Financial Account Balance	<i>IFS, China Statistics Information & Service Centre</i>	Financial account, n.i.e.; negative values indicate deficits. For Brazil, Czech Republic, Hungary, Peru and Philippines, annual estimates for 2010 are calculated from available quarterly data. With two quarters of data available, annual estimates as calculated as $(Q1+Q2)*2$. With three quarters of data available, annual estimates are calculated as $(Q1+Q2+Q3)*4/3$. 2010 data for China is obtained from the China Statistics Information & Service Centre. All other series are obtained from IFS.
Reserves	<i>IFS</i>	Foreign exchange reserves less gold.

Variable	Source	Description
GDP	<i>WDI</i>	Gross domestic product in current US dollars.
Inflation	<i>IFS, WEO & Author's calculations</i>	Calculated from annual consumer price index series (CPI) using 2005 as base year. CPI data for China, Taiwan, Chile and 2011 forecasts are obtained from the April 2011 World Economic Outlook (WEO) database. All other CPI data are obtained from IFS.
Measures on the Capital Account	<i>IMF AREAER, news sources and research papers</i>	Our main data source on these measures is the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which provides on an annual basis, information on capital account measures, i.e. regulations or restrictions concerning capital transactions between residents and non-residents or between two residents involving a foreign capital asset or between two non-residents involving a domestic capital asset, and payments and transfers related to these transactions. They also include foreign exchange related measures, i.e. regulations specific to the financial sector that differentiate between currencies for certain transactions. Note that countries can take other measures (not directly pertaining to capital account transactions) to stem inflows - these are not included in the analysis here. An example of such measures is the imposition of a minimum holding period for central bank bills, by Indonesia, as these bills were popular among FIIs. The reason is that we cannot be sure about the exhaustiveness of the list. Our information on capital account measures is from IMF's AREAER and other sources like central banks websites and news reports and is therefore expected to be quite exhaustive. For other measures, seemingly unrelated measures can have an impact and it is not possible to compile an exhaustive list without a deep institutional knowledge of the country.
Net Capital Inflows	<i>IFS, China Statistics Information & Service Centre & Author's</i>	The net capital inflows series is calculated as the sum of capital account balance and financial account balance. When capital account balance is absent, for example in the case of India, net capital inflows is equal to financial account balance.

Variable	Source	Description
Short Term External Debt	<i>calculations</i> <i>WDI, IIF</i>	External debt stocks, short term. Data for Czech Republic, Hungary, Korea and Poland are obtained from the Institute of International Finance (IIF). For all other countries, 2010 values are calculated using the year on year growth rate from 2009 to 2010 of the Short Term Debt, External Debt and Assets series (D203) from IIF as $ShorTermExternalDebt_{2009} * (D203_{2010} / D203_{2009})$. All other series are obtained from the World Bank's World Development Indicators database.
Under-valuation using PPP measures	<i>Penn World Table 7.0 & Author's calculations</i>	Two series were used to compute this series. PPP real exchange rate is the Purchasing Power Parity over GDP in national currency units per US dollar. GDP per capita is PPP converted GDP per capita at 2005 constant prices (International dollar per person). Both series are obtained from Penn World Table 7.0.