

# Panel Presentations

## **A BRIEF REVIEW OF LITERATURE ON THE EFFECTIVENESS OF INTERNATIONAL CAPITAL CONTROLS**

Michael M. Hutchison

Methodologically, it is difficult to get actual “de jure” control index instruments. This implies that there could be significant measurement errors in the indices being used. It is also difficult to implement structural VAR analysis given data constraints and the number of parameters that need to be estimated. It may be worthwhile to consider conducting event studies in addition to VAR modeling for purposes of robustness and parsimony.

There are essentially three goals for which capital controls can be used:

- (i) to limit exchange market pressures and large currency fluctuations,
- (ii) to control volatile financial flows, and
- (iii) to restore monetary independence.

With regard to the effectiveness of capital controls in limiting exchange market pressure, the empirical literature in general points to ineffectiveness when controls are employed in the midst of a crisis. This may be due to the negative signaling effects of controls where perceptions of instability are reinforced (Bartolini and Drazen 1997) and because controlling outflows also leads to a decline in inflows. Dooley (1996) notes that capital controls induce yield differentials but cannot really prevent speculative attacks. As such, capital controls seem ineffective in controlling exchange rate fluctuations.

A survey of literature covering empirical tests of capital control effectiveness in controlling excessive capital flows points to the transitory impact on volumes. The permanent effects of capital controls lie more in the composition of the flows. In general, however, results of empirical analyses are not robust.

As regards the impact of capital controls on monetary independence, price data seem to support the proposition that they are effective in maintaining some degree of monetary independence. The gap between onshore local currency yields and the implied yields of non-deliverable forwards (NDFs) tend to widen with capital flow restrictions. Quantity data, however, do not seem to support the notion that capital controls are effective. Hutchison notes that data limitations are a caveat that must be considered when assessing the effectiveness of capital controls using econometric methods.

In summary, the empirical evidence on the effectiveness of capital controls in warding off sudden stops and currency crises is mixed. There is proof, however, that capital controls can alter the composition of cross-border flows toward longer maturity assets. The most robust evidence on effectiveness of capital controls is on its impact on monetary autonomy as reflected in the difference between onshore yields on local currency assets and the implied yields of NDFs.

### **Comments on Hutchison's Review**

Bautista affirms that there are indeed differences in the results arising from various empirical studies on the effectiveness of capital controls based on a parallel review of literature conducted by ADB staff and consultants. This reinforces the argument that the evidence from various econometric studies on the effectiveness of capital controls is mixed.

Two recent studies by Bautista, Jongwanich, and Lee (2010)<sup>1</sup> and by Bautista and Francisco (2011)<sup>2</sup> show that effectiveness of restrictions on cross-border flows are also affected by a country's domestic finance sector development and regional grouping.

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<sup>1</sup>Gochoco-Bautista, M. S., J. Jongwanich, and J. W. Lee. 2010. How Effective are Capital Controls in Asia? ADB Economics Working Paper Series No. 224, Economics and Research Department, Asian Development Bank, Manila

<sup>2</sup>Gochoco-Bautista, M. S., and R. Francisco. 2011. Effectiveness of Capital Restrictions: Do Regional and Income Differences Matter? ADB Economics Working Paper Series No. 261, Economics and Research Department, Asian Development Bank, Manila.

## THE THAI EXPERIENCE ON THE USE OF CAPITAL CONTROLS

Chalongphob Sussangkarn, TDRI

During my time as Thailand's Minister of Finance, between March 2007 to February 2008, the management of rapid capital inflows that Thailand was experiencing during that period was one of the most challenging policy issue. There were many discussions about the appropriate policy directions with no clear answer. First of all, when we have rapid inflows, how much exchange rate intervention is appropriate. The Bank of Thailand at the time felt that they had intervened a lot, but it was insufficient to keep the baht from a strengthening trend. This strengthening trend led to a one way bet for speculators, so even more inflows came in. Because of this, in December 2006, Thailand imposed capital controls in the form of a 30% Unremunerated Reserve Requirement (URR) and requiring inflows to stay in the country for at least one year. This led to a stock market crash and inflows into the stock market had to be exempted the next day. So, the capital controls could not prevent capital inflows from continuing.

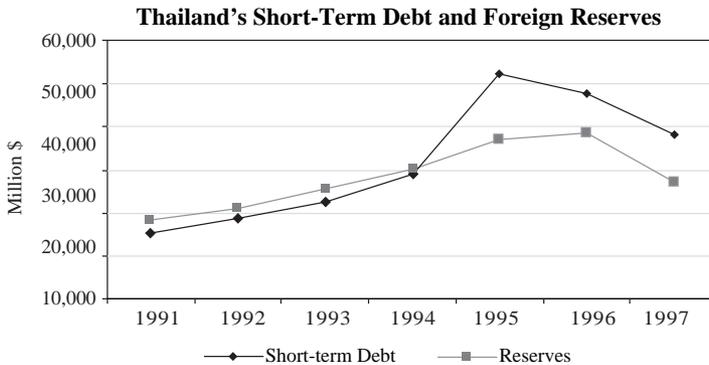
The intervention and the exchange rate appreciation led to large fiscal costs. There was a cost in sterilizing the exchange rate intervention and the appreciation of the baht also led to a valuation loss on the foreign reserves. After the 1997 crisis, the country incurred large costs in cleaning up the financial system. Bonds amounting to about \$40 billion were issued for this purpose. There was an agreement that the Bank of Thailand would take responsibility for the capital cost and the Ministry of Finance would fiscalize the interest payment. However, because the Bank of Thailand incurred large losses from exchange rate intervention under continued large capital inflows, the capital cost of the bonds could not be reduced, and interest cost on the bonds of about \$2 billion–\$3 billion had to be budgeted each year.

The situation was very frustrating because on the one hand you wanted to get rid of the capital controls, as they led to a lot of capital market distortions, but on the other hand you have to be concerned that if the baht suddenly appreciates by another 10%, then the situation will be very untenable. When I attended the Asian Development Bank's (ADB) Annual Meeting in Kyoto in May 2007, I complained in my governor's speech that organizations like the International Monetary Fund (IMF) did not do enough research on capital controls to provide guidance to countries on the appropriate capital control measures to use, and I thought that it would be very useful for the ADB to do such a study. ADB President Haruhiko Kuroda kindly took up this request and assigned the Asian Development Bank Institute to do it. The book on this study, *Managing Capital Flows: The Search for a Framework*, and such studies should be further encouraged.

My position on exchange rates is that they should be governed by fundamentals in the real economy. So, given recent large current account surpluses in East Asia, I believe that we should have let our currencies appreciate much more than what has happened. Of course, it is difficult for a single country like People's Republic of China or Thailand, to adjust our own exchange rate base on our own surplus alone. Countries in this region are competing with each other in third countries' markets, so appreciating your currency unilaterally, risks losing out to other East Asian countries. So you need a cooperative arrangement to deal with this issue, and this should be developed in East Asia.

I turn now to short term capital flows: These create short term foreign exchange liabilities in the sense that the flows may quickly reverse and they include short term foreign bank borrowing and also include foreign investment in stocks and bonds. These flows do have some benefits. For example, portfolio investment inflows increase investment and liquidity in the stock and bond markets. Also, for countries with saving deficits (current account deficits), foreign borrowing can help finance the deficits.

However, short term capital flows also create a great deal of risk. Certainly, Thailand learned the hard way from the 1997 crisis that if you do not have enough foreign reserves to back up the short term foreign liabilities, the country can easily become insolvent with very painful consequences. Prior to the 1997 crisis, foreign reserves were increasing rapidly for a number of years even though Thailand was experiencing large current account deficits. This was because of very large short-term foreign borrowing that more than filled the gap indicated by the current account deficits. By 1995–1996, short-term foreign debt became larger than total reserves. Speculators were betting on a baht depreciation and attacked the currency many times. The Bank of Thailand compounded the problem by using almost all of the reserves to defend the value of the baht. Thailand became essentially insolvent in not having enough useable foreign reserves to meet her foreign currency liabilities. The baht was floated on 2 July 1997 and Thailand had to seek IMF assistance.



Source: Thailand Development Research Institute.

The lesson for me is that you need to have sufficient coverage for your short term foreign currency liabilities. How do you have that coverage? When short term flows come in, the way to have that coverage is to buy up foreign currency inflows. The central bank needs to buy up the inflows, and this will prevent your currency from appreciating as well. This is easy to say, but in fact it is not easy to implement.

In a country like Thailand, we also have large current account surpluses, so the foreign inflows are not just from short term inflows, but also from the current account surplus as well as from foreign direct investment inflows. We can also have speculative inflows if there is a one way appreciation trend of the exchange rate. Foreigners bring in money to invest in the stock market, pushing up stock prices, and the currency also appreciates, so they gain double, and this leads to even more inflows. Thai people also join in the speculation and the situation becomes even worse.

So while in principle a country should make sure that it has enough reserves to back up its short term foreign currency liabilities, it is not that easy in implementation. The cost of sterilization can also be very high as was already mentioned. So I think that capital control measures should be part of the toolkit to manage capital flows, and they should be targeted at the short term flows. The IMF also agrees with this now, but it is still suggesting that capital controls should only be used as a last resort. I disagree with this. Sometimes you want to use capital controls to prevent your currency from appreciating to such an extent that you real sectors lose competitiveness. However, to do it properly I think there needs to be a common approach internationally, whether globally or regionally, say in East Asia or even in ASEAN. This is why if the IMF comes up with some concrete recommendations on appropriate capital control measures, it would be very useful.

For Thailand in 2006, the 30% URR was not the problem. The big problem was the requirement that the inflows must be kept in the country for at least one

year otherwise you lose 10% of your capital. Nowadays, money moves around quickly. To require that the money remains in the country for at least one year imposes very high costs. If one gets rid of this requirement and have some kind of URR, then this can be a capital control instrument where you can adjust the URR from 0% to a higher level as necessary (like a tax). However, before you can use that, you need to have the institutional infrastructure, such as special accounts for various kinds of inflows so the URR can easily be imposed and/or adjusted as needed. So if this is agreed to be an appropriate capital control instrument at the regional or global level, then even though the rate of URR is normally zero, countries can set up these accounts in case one day a non zero rate of URR is needed. Then the government or the central bank can easily announce and implement a non-zero URR rate at any time.

Other aspects of international cooperation are also very important. First, current provisioning requirement of the Basel Capital Accord, with less provision for short term loans compared to long term loans, encourages short term lending to emerging markets. It is true that for the lending bank short term lending has less risk. However, if every bank lend short, then the risk for the whole system is very high and this was a fundamental cause of the Asian financial crisis. This should be carefully re-examined.

Another issue is that unexpected capital flow reversal can lead to foreign exchange liquidity problems even though a country may have sufficient reserves to cover the short term foreign liabilities. This was the case for the Republic of Korea, for example, during the global financial crisis. It may be difficult to quickly liquidate your reserve holding, and may disrupt the US Treasury and other bond markets. This is why the Chiang Mai Initiative Multilateralization (CMIM) is so important. It should be able to provide short-term (say six months) liquidity support for temporary foreign exchange liquidity problems. Of course, the IMF can also provide this, but it still has a stigma problem in many East Asian countries from bad experiences during the Asian financial crisis. This also means that the linkage between CMIM and the IMF is still a major constraint for the effectiveness of CMIM.

Finally, cooperation on exchange rates is critical to rebalance the global economy. What has been the problem in the past is that there is no appropriate forum to talk about this. In Ministers of Finance meetings, focusing on exchange rate issues risks being accused interfering in the central bank as exchange rate policy is the responsibility of the central bank in many countries. However, in some countries, the central bank does not determine exchange rate, so central bank meetings cannot deal adequately with exchange rate issues either. However, from 2012, ASEAN plus 3 Finance Ministers Meeting will be joined by the ASEAN plus 3 Central Bank Governors. This should be the appropriate forum for the region to discuss exchange rate issues.

## MANAGING THE RISK FROM CAPITAL FLOWS

Eli Remolona, BIS

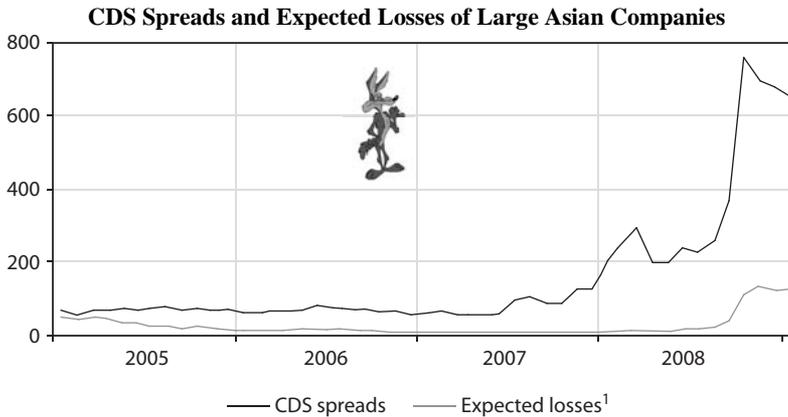
The risks emanating from the unfettered cross-border flow of capital has long been raised by well-known economists. To quote Jagdish Bhagwati, “Dollars are not widgets; free trade is not the same as free capital markets”. The existence of several puzzles like the Lucas paradox, the Feldstein-Horioka puzzle, and the home bias puzzle are indications that there are violations to propositions of neoclassical theory espousing full capital account liberalization.

The Lucas paradox essentially reveals that contrary to theory, capital does not move from rich to poor countries. The Feldstein-Horioka puzzle states that investment show relatively high correlations with savings in OECD economies despite the relatively free mobility of capital among them. The home bias puzzle shows that there is an empirical preference for local investments in the face of opportunities for risk diversification.

While the Lucas paradox may be resolved by enhancements in governance and through institutional development, there is no apparent way of resolving the Feldstein-Horioka and home bias puzzles. As such, consumption smoothing and global risk diversification are not likely to be delivered by free capital flows.

Capital flows are beset by sudden stops, capital flow reversals, and asset bubbles. The empirical evidence on the benefits of full capital mobility is mixed, whereas the tail risks associated with full capital mobility are real. The incidence of crises is correlated with the increasing liberalization of cross-border flows which began in the 1980 and accelerated in the 1990s. These risks are theoretically rooted on deviations from the behavioral axioms of neoclassical theory. Kahneman and Tversky (1979) show that standard expected utility theory does not hold survive experimental evidence. More precisely, the maximization of expected utility from consumption is not the relevant objective function of agents, and what matters for risk aversion are the gains and losses in income. This implies procyclicality of risk aversion and economic fundamentals, where agents take significant amounts of risk during booms and become extremely risk-averse during busts. Such behavior may be likened to that of the “Wily Coyote”, forever chasing the elusive “Roadrunner” until he eventually falls off a cliff. This pattern could be exemplified by the movement of CDS spreads in the run-up to and during the 2008 global financial crisis.

The cliff is the coyote’s Minsky moment, an information event that bursts the bubble and radically shifts agents’ behavior from low to extremely high risk aversion. The dynamics of the “Wily Coyote” effect, however, is not well understood.



<sup>1</sup>Average EDF multiplied by 0.5, which is the historical loss given default  
Sources: Markit; Moody's Investors' Services, author's calculations.

In principle, the risks associated with capital flows need to be mitigated. In doing so, the following may be considered:

- (i) Types of flows and contributions to risk or volatility;
- (ii) Alternative approaches to managing capital flows, e.g.,
  - “leaning” on banks (conduct preemptive action, and progressive or proactive intervention),
  - “clean” approach (allow the adjustment to occur and respond afterwards, take a passive approach);
- (iii) Nature of intervention (rules-based versus discretionary); and
- (iv) Frequency of intervention, e.g.,
  - “chicken feed” moves (small but frequent adjustments), or
  - discrete moves (large but infrequent moves).

It is argued that in most cases, a “lean” rather than “clean” approach to risk management as regards surges in capital flows is better, especially with the more volatile components. Some scope for discretion should also be allowed, in contrast to a strictly rules-based approach, given imperfect indicators of risk.

To minimize the risk of sudden stops from the liabilities side of the balance sheet, the following instruments may be used:

- (i) minimum holding period requirements,
- (ii) withholding taxes on nonresident flows, and
- (iii) macroprudential stability taxes.

On the asset side, the prevailing insurance instrument is reserve accumulation. It is, however, not clear how much reserves are needed, although the Guidotti-Greenspan rule states that the amount of reserves should be equivalent to the volume of short-term debt. It is likely that this is the rule being followed by the Chinese on their portfolio flows, which may actually be too much. Not being sure about the optimal size of reserves to hold as insurance against capital flow reversals is bad enough, but there are also costs to sterilization of inflows, and holding reserves as insurance against reversals could be costly due to the carrying costs of associated government bond issuance.

To manage the risk of asset price bubbles, the following are often adopted:

- (i) Basel III countercyclical buffers,
- (ii) aggressive use of loan-to-value ratios, and
- (iii) property cooling measures.

In cases where the impetus is strong, the above may not be sufficient. Surges in capital inflows result in excess liquidity, and this in turn fosters the emergence of price bubbles. There is evidently a role for monetary policy (through policy rate adjustments) under floating exchange rate regimes and increasing banks' reserve requirements in managed exchange rate regimes.

## **CAPITAL INFLOWS AND REGIONAL POLICY COOPERATION**

Masahiro Kawai, ADBI

### **Lessons from the Asian and Global Financial Crisis**

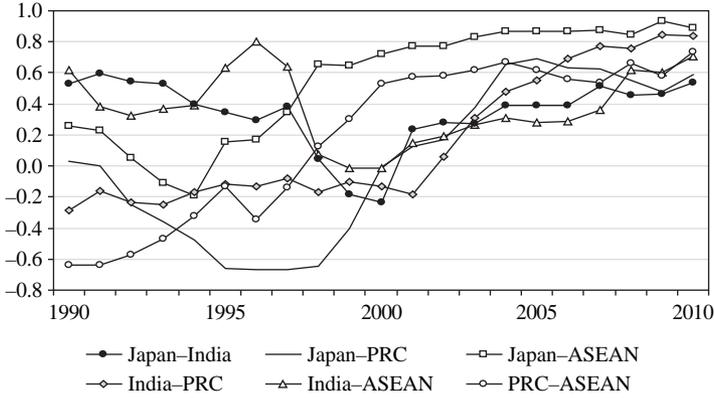
One important lesson from the 1997–1998 Asian financial crisis and the 2008–2009 global financial crisis is that policymakers in the region would benefit from closer policy coordination in managing macroeconomic-financial risk and crisis contagion from other economies. The reason is that we observe:

- (i) the high frequency of disruptive shocks from the global financial market, affecting all economies in the region;
- (ii) loose monetary policy in the US and Europe, affecting many economies in the region; and
- (iii) growing regional macroeconomic interdependence and the resulting spillover effects of macroeconomic and financial shocks and policies from other economies in the region.

Shocks from global financial markets have affected Asian economies in different ways. However, a coordinated approach to managing such shocks will be more effective than a unilateral approach and produce better results. For example, accommodative monetary policy—such as quantitative easing—in the US and Europe has similar effects on most economies in the region and therefore requires a coordinated response.

Growing regional trade and financial interdependence is magnifying the spillover effects of macroeconomic and financial shocks and policy actions. The increasing interdependence of economies in Asia is reflected in the rising correlation of the GDP growth rates of Japan, the People's Republic of China (PRC), India, and the ASEAN members.

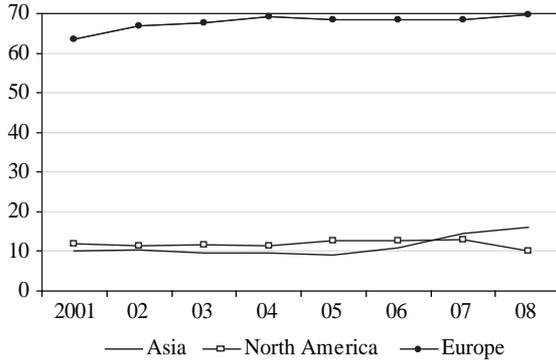
**Rising Correlation of the GDP Growth Rates of Japan, India, the PRC, and ASEAN  
(10-year moving windows)**



PRC = People’s Republic of China.  
Source: Author’s calculations.

The level of financial market integration in Asia is increasing, but is still in a long way behind Europe, as can be seen in the chart below. Nonetheless, the crisis contagion at the time of the Asian financial crisis signified the extent and speed with which one country’s financial crisis can spread to others in the region. As Asia’s financial systems develop and become more open, they will increasingly integrate with one another.

**Intraregional Portfolio Investment (%):  
Asia Rising but still lags behind Europe**



Source: International Monetary Fund, Coordinated Portfolio Survey.

## Capital Flow Management and Regional Policy Coordination

The volume of international capital inflows to Asia seems bound to increase as the growth prospects of the region's economies remain robust while the US and European economies remain weak. Asian policymakers have several policy options available to them to address the consequent risks of large and volatile capital inflows, including structural, macroeconomic, and macroprudential policy measures.

Structural policy measures include the development and deepening of domestic financial markets so they become resilient to volatile capital inflows and outflows, as well as the liberalization of goods and services imports and capital outflows to ease currency appreciation pressure. Macroeconomic policy responses of individual economies to large capital inflows include allowing currency appreciation, preventing currency appreciation through sterilized interventions and accumulation of foreign exchange reserves, tightening fiscal policy, and lowering policy interest rates. Macroprudential measures encompass tighter regulation and supervision of domestic banks to prevent a buildup of financial vulnerabilities such as asset price bubbles as well as to control the inflow of short-term capital.

Of the macroeconomic policy measures, there is a risk that currency appreciation will damage international price competitiveness and exports if carried out unilaterally. However, maintaining currency undervaluation through market interventions may have negative spillover effects on other economies. There are also limits to tighter fiscal policy and interest rate adjustment as the former takes time to implement and the latter requires low prevailing and expected inflation rates.

In managing capital flows, the typical prescription of policymakers and economists from advanced economies is to choose one of the three corner solutions of the "impossible trinity": liberalize cross-border capital flows, adopt a fully flexible exchange rate regime, and ensure monetary policy independence. This approach, while suitable for advanced economies, may not be desirable for all emerging economies, given their relatively underdeveloped financial—particularly banking—systems, shallow currency markets, and inadequate industrial diversification. These are important binding constraints that prevent emerging economies from benefiting fully from opening up their capital accounts and adopting fully flexible exchange rate regimes. For many of these economies, capital controls are still needed to mitigate the risks associated with large and volatile capital inflows and outflows.

The value of regional policy coordination in managing capital inflows is often ignored in such prescriptions. Capital flow management clearly has international implications, especially in the conduct of monetary and exchange rate policies and of macroprudential policies limiting short-term capital inflows.

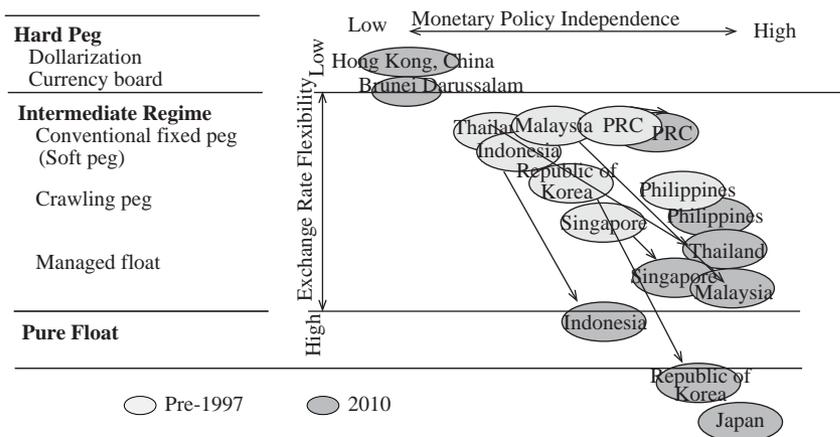
First, one country’s intervention in the foreign exchange market to prevent its currency from appreciating can affect the competitiveness of other countries. It may discourage them from allowing currency appreciation, for fear of loss of price competitiveness, even when they face the risks of inflation and asset price bubbles. Second, prudential and regulatory measures to limit short-term capital inflows can divert such flows to neighboring countries, which may not wish to receive them. Thus, coordinated responses would help to maintain macroeconomic and financial stability at the national and regional level.

Significant policy coordination will require intensive policy dialogue. Without it policymakers in individual economies may disregard the implications for neighboring economies of such policies as competitive currency depreciation or an asymmetric exchange rate policy that restrains appreciation pressures more than it does depreciation pressures. Intensive policy dialogue and coordination could prevent such beggar-thy-neighbor impacts and improve macroeconomic and financial sector performance.

### Exchange Rate Policy Coordination

Asia has a diverse range of exchange rate arrangements. Japan has a free-floating exchange rate regime, while the PRC maintains a very tightly managed exchange rate regime by intervening regularly and heavily in the market. All other economies have intermediate exchange rate regimes, including managed floats. With the notable exception of the PRC, most economies are gradually moving toward monetary policy independence and exchange rate flexibility.

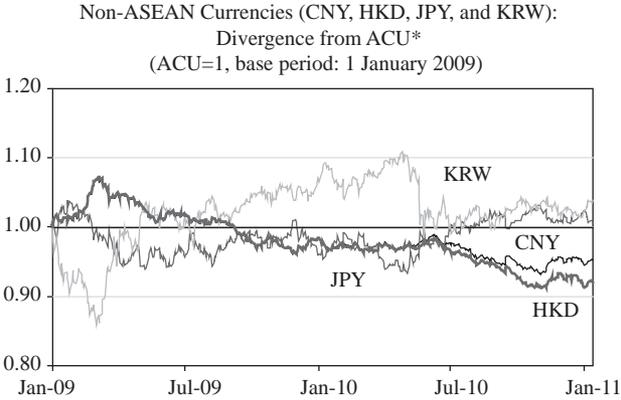
**Diversity of Exchange Rate Regimes in East Asia (pre-1997 and 2010)**



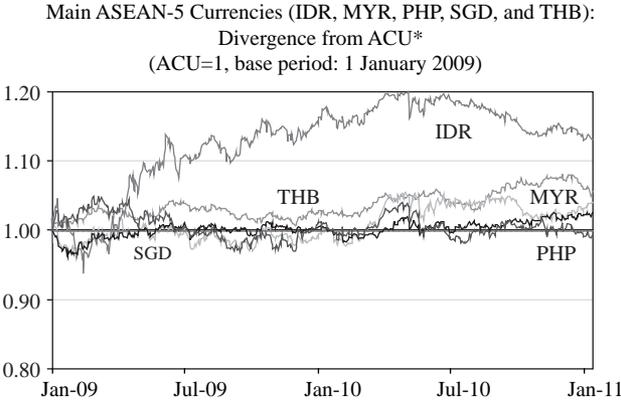
PRC = People’s Republic of China.  
 Source: Author’s diagram.

Asia’s nominal exchange rate movements reveal several interesting developments. Major ASEAN currencies, including the Malaysian ringgit, the Singapore dollar, the Thai baht and, to some extent, the Philippine peso, have tracked each other closely in recent years. The Indonesian rupiah has moved in a more volatile way, although over the past 2 years the rupiah has been moving in the same direction as other ASEAN currencies. In contrast, the Japanese yen and the Korean won have moved in a very volatile way, which could be problematic given the high and rising economic interdependence between the two countries.

**ACU Divergence Indicators**



\* An increase is an appreciation.



\* An increase is an appreciation.

Source: Asian Development Bank Institute.

Given the rising economic interdependence in Asia, intraregional exchange rate stability and extraregional rate flexibility are desirable. Ideally, Asian policymakers would adopt similar exchange rate arrangements that are

sufficiently flexible against external currencies and would also try to avoid significant intraregional exchange rate volatility. But the reality is that it is not easy to agree on exchange rate policy commitments in Asia, because of the region's structural diversity and preference for maintaining policy sovereignty.

Informal "soft" coordination may be sufficient to achieve intraregional rate stability (and extraregional rate flexibility) at this point. Market forces have driven some major ASEAN currencies to move in a similar direction, which should enable the authorities in these economies to maintain mutually relatively stable, not necessarily fixed, exchange rates. So if the PRC joins these ASEAN countries by allowing the renminbi to be more flexible and let its exchange rate behave like the major ASEAN currencies, emerging Asia should be able to achieve relatively stable intraregional exchange rates. The Japanese and Korean authorities also need to strengthen policy dialogue so they can prevent excessive fluctuations between the yen and the won. A conscious and long-term framework grounded on the principle of pragmatism in the ASEAN+3 countries (the ten ASEAN countries plus the PRC, Japan, and the Republic of Korea) would be a constructive way to move forward.

### **Regional Financial Cooperation**

Current regional financial cooperation initiatives involve monitoring and carrying out policy dialogue on capital flows, financial market conditions, and exchange market developments, among others. Cooperation also extends to the development and integration of ASEAN financial markets as well as to the development and deepening of local-currency bond markets through the Asian Bond Markets Initiative (ABMI) under the ASEAN+3 framework and the Asian Bond Fund projects under the Executives' Meeting of East Asia Pacific Central Banks (EMEAP). Lastly, the Chiang Mai Initiative Multilateralization (CMIM) provides a financial safety net to economies in the region should they encounter financial distress.

The next phase of efforts in fostering greater Asian financial cooperation shall focus on (i) strengthening the surveillance capability by providing sufficient resources to the ASEAN+3 Macroeconomic Research Office (AMRO), (ii) facilitating economic reviews and policy dialogue among the ASEAN+3 finance ministers and central bank governors, and (iii) further strengthening the CMIM process. The CMIM has been expanded to US\$240 billion in its fund size and has introduced precautionary instruments, similar to the IMF's precautionary and liquidity lines, in addition to its crisis-lending facility. Its IMF de-link portion has been raised to 30% and will need to be further raised over time to 100% by strengthening the surveillance process. The Asian bond market development programs need to continue by increasing the size of the Credit Guarantee Insurance Facility (CGIF) and by embarking on a third stage of the Asian Bond

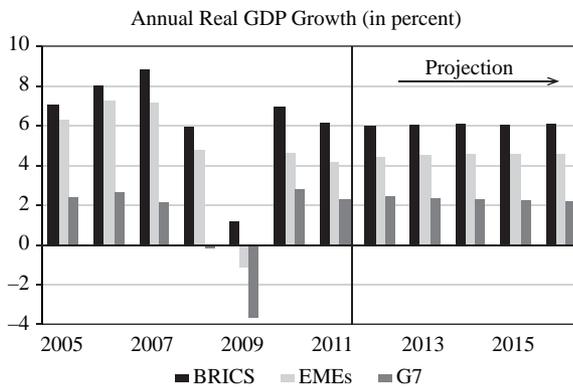
Fund (ABF3). An Asian Financial Stability Dialogue (AFSD) should be set up as a forum for coordinating regional efforts aimed at regional financial stability.

An increasingly integrated Asia needs more stable intraregional exchange rates. To maintain macroeconomic and financial stability, Asian economies need more flexible exchange rates vis-à-vis the US dollar. This will in turn require convergence of exchange rate regimes within Asia. In the case of major ASEAN currencies, market forces are leading to a trend toward such convergence. An intensive exchange rate policy dialogue is essential to start even informal and soft exchange rate policy coordination. Convincing the PRC to adopt a managed float akin to those that govern the ASEAN currencies would improve the alignment of exchange rate regimes in Asia.

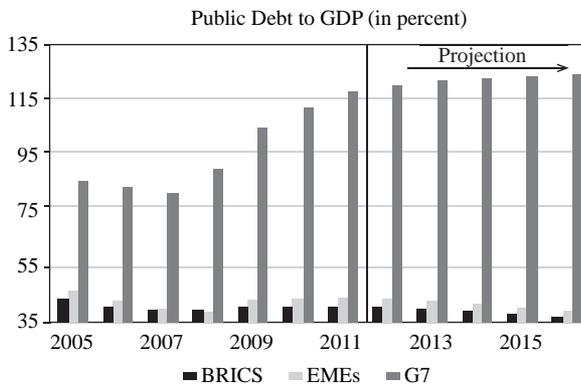
## MANAGING CAPITAL FLOWS: SOME RECENT EVIDENCE

Jonathan D. Ostry, IMF

The recent surge in capital flows to emerging markets is largely attributable to strong macroeconomic fundamentals, relatively high interest rate differentials, and attractive risk-return profiles on emerging market investments. Note below, for instance, the relatively buoyant growth projections for BRIC (Brazil, Russian Federation, India, and the PRC) and other emerging market economies, as well as projections of relatively low government debt ratios for these countries.

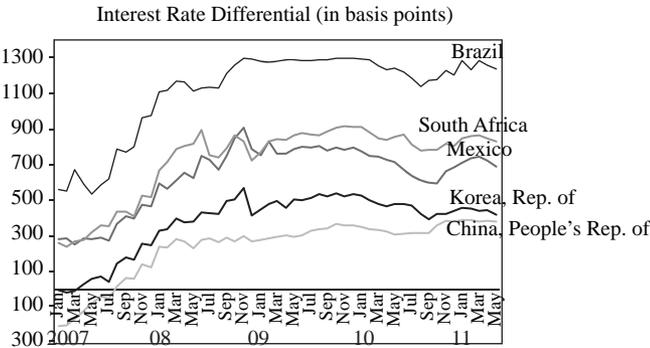


Note: Average year-on-year growth (in percent).  
Source: IMF's WEO database.

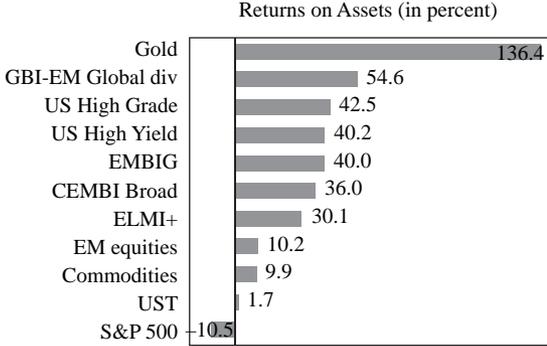


Note: Average gross general government debt to GDP ratio (in percent).  
Source: IMF's WEO database.

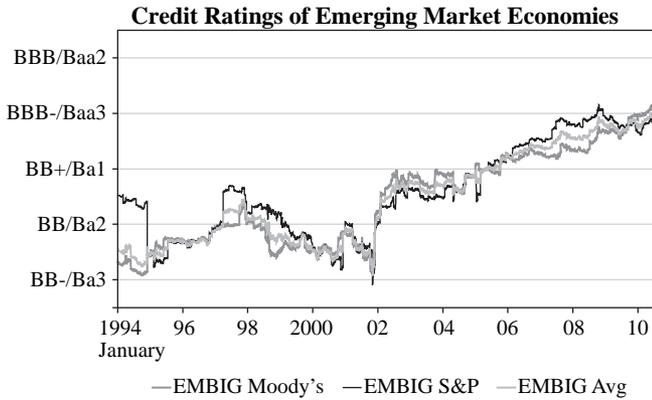
The relatively high interest rate differentials and favorable returns on emerging market investments, as well as improving credit ratings, likewise provide incentives for cross-border capital to flow to these countries.



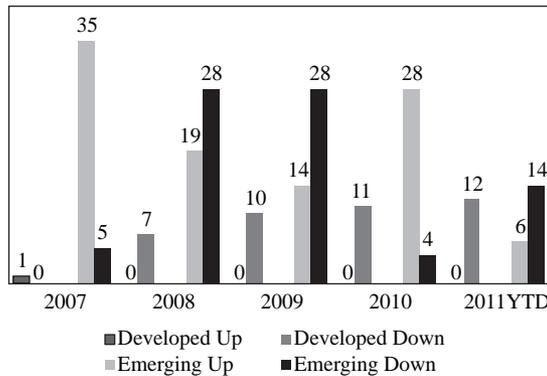
Note: 10-year government bond yield minus 3-month US T-bill rate in basis points.  
 Source: Bloomberg.



Note: Returns as of June 29, 2007 to May 31, 2011 (in percent).  
 Source: J.P. Morgan.



Note: EM fixed income indices are now investment grade. (> BBB-).  
 Source: Chang (2011).



Note: The total number of upgrades and downgrades includes both S&P and Moody's actions.  
 Last developed market sovereign rating upgrade occurred in 2007.  
 Source: Chang (2011).

Capital controls, foreign currency regulations, and domestic prudential regulations are all possible tools for managing financial-stability risks associated with a surge in capital flows. There is a large volume of literature on the use and effectiveness of capital controls, but little systematic treatment of the interplay of the three categories of instruments. To address this, an analysis of the joint effect of regulatory measures on the structure of external liabilities, foreign currency denominated lending, domestic credit booms, and resilience to crises was conducted.

Two capital control de jure indices were used in the study based on the IMF *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER): an economy-wide capital inflow controls index based on Schindler (2008), and a financial sector specific controls index, which is an average of binary variables with one reflecting restrictions on the financial sector's foreign

borrowing, differential treatment of non-residents accounts, and restrictions on foreign accounts. An index of foreign currency regulations based on the AREAER was created by taking the average of binary variables indicating limits on domestic lending in foreign currency, limits on purchases of locally-issued securities denominated in foreign currency, differential treatment of deposit accounts denominated in foreign currency, and limits on open foreign currency positions. IMF Desk Survey data was used to create an index of domestic prudential regulations, computed by taking the average of binary variables indicating the presence of loan-to-value ratios, the level of bank reserve requirements, and limits on sectoral credit concentration.

A cross-sectional analysis of 38 countries using 2007 data and pre-crisis regulatory measures suggests that economy-wide capital controls on inflows are significantly associated with lower debt while controlling for external vulnerability and institutional quality. The analysis also shows that foreign currency restrictions are significantly associated with lower debt, although the statistical significance disappears when economy-wide capital controls are included in the regression. Using the same data and replacing external debt with the ratio of foreign currency lending to total domestic credit, we find that economy-wide controls lead to a reduction in the proportion of foreign currency lending. Foreign currency restrictions had similar effects. The impact of capital controls and foreign currency credit restrictions jointly lower the proportion of foreign currency credit since the coefficients of the two classes of restrictions continue to remain significant.

Using a slightly smaller data set for 28 countries (because of data availability), a regression of the change in the credit ratio from 2003 to 2007 and pre-crisis regulatory measures was conducted to assess the incidence of credit booms in the presence of the aforementioned regulatory measures. Controlling for institutional quality, initial private credit to GDP, and credit bureaus, the analyses reveal that prudential regulations lead to smaller credit booms. The effect of prudential regulations also remains significant when capital controls and foreign exchange restrictions are added to the list of independent variables.

A panel data analysis of the same 38 countries was likewise done using data from 1995 to 2008. The results indicate that economy-wide and financial sector capital controls significantly reduce debt. The effect of economy-wide and capital controls and restrictions on domestic lending in foreign currency in the panel data analysis is similar to that obtained in the cross-section regressions, but, in addition, we also find a statistically significant effect of financial sector capital controls. Similarly, the results for the panel regressions of domestic credit booms and prudential regulations, capital controls, and foreign currency lending restrictions are consistent with the findings of the cross-section analysis.

If policy measures reduce vulnerability, then the downturn in the event of a crisis should be smaller. A cross-sectional analysis of the change in growth of 41

countries during the 2008 to 2009 global financial crisis and the average growth for 2003 to 2007 in relation to economy-wide and financial sector capital controls, domestic bank foreign currency lending restrictions, and prudential regulations, reveals that the use of regulatory measures tends to result in a smaller decline in economic growth. Specifically, both economy-wide capital controls and domestic prudential regulations retain statistical significance when included together as independent variables. Economy-wide capital controls, however, dominate when included with foreign currency lending restrictions. An analysis of past crisis resilience using 1995 to 2008 data shows that capital controls are associated with smaller declines in growth during incidence of crises.

The following were undertaken to ensure robust findings:

- (i) addition of regressors to capture political stability, financial market development, and type of political regime;
- (ii) use of alternative indices; and
- (iii) tests for endogeneity.

The key results of the analyses are either unaffected or strengthened after conducting the robustness tests. The findings of recent studies by the IMF suggest that capital control as well as prudential measures can reduce financial-stability risks, likely reflecting the impact in tilting external liability structures away from debt, especially short-term and FX-denominated debt. In addition, domestic prudential measures reduce risks from excessive domestic credit booms.