

Aizenman, Joshua

**Working Paper**

## Trilemma and financial stability configurations in Asia

ADB Working Paper, No. 317

**Provided in Cooperation with:**

Asian Development Bank Institute (ADBI), Tokyo

*Suggested Citation:* Aizenman, Joshua (2011) : Trilemma and financial stability configurations in Asia, ADB Working Paper, No. 317, Asian Development Bank Institute (ADBI), Tokyo

This Version is available at:

<https://hdl.handle.net/10419/53752>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



**ADB Working Paper Series**

**Trilemma and Financial Stability  
Configurations in Asia**

---

Joshua Aizenman

No. 317  
October 2011

**Asian Development Bank Institute**

Joshua Aizenman is professor at the University of California Santa Cruz and Research Associate at the National Bureau of Economic Research.

The views expressed in this paper are the views of the authors and do not necessarily reflect the views or policies of ADBI, the Asian Development Bank (ADB), its Board of Directors, or the governments they represent, or the views of the IDB or its member countries. ADBI does not guarantee the accuracy of the data included in this paper and accepts no responsibility for any consequences of their use. Terminology used may not necessarily be consistent with ADB official terms.

The Working Paper series is a continuation of the formerly named Discussion Paper series; the numbering of the papers continued without interruption or change. ADBI's working papers reflect initial ideas on a topic and are posted online for discussion. ADBI encourages readers to post their comments on the main page for each working paper (given in the citation below). Some working papers may develop into other forms of publication.

Suggested citation:

Aizenman, J. 2011. Trilemma and Financial Stability Configurations in Asia. ADBI Working Paper 317. Tokyo: Asian Development Bank Institute. Available:  
<http://www.adbi.org/working-paper/2011/11/01/4772.trilemma.financial.stability.asia/>

Please contact the author(s) for information about this paper.

Email: [jaizen@ucsc.edu](mailto:jaizen@ucsc.edu)

Asian Development Bank Institute  
Kasumigaseki Building 8F  
3-2-5 Kasumigaseki, Chiyoda-ku  
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500  
Fax: +81-3-3593-5571  
URL: [www.adbi.org](http://www.adbi.org)  
E-mail: [info@adbi.org](mailto:info@adbi.org)

© 2011 Asian Development Bank Institute

**Abstract**

This paper takes stock of recent research dealing with the degree to which the trilemma choices of Asian countries facilitated a smoother adjustment during the global crisis of 2008–2009, and the way the region has been coping with the adjustment to the postcrisis challenges. We point out that emerging Asia has converged to a middle ground of the trilemma configuration: limited financial integration, a degree of monetary independence, and controlled exchange rate buffered by sizable international reserves. This configuration, with the proper management of balance sheet exposure and public finances, facilitated a smoother adjustment of emerging Asia to the crisis, and was instrumental in inducing the rapid resumption of growth. The swings of financial flows, from large deleveraging of foreign positions in 2008 to the renewed inflows in 2010, validate the insight of the public finance approach to financial integration: the gains from deeper financial integration should be balanced against the costs of growing exposure to turbulences. A key lesson of the crisis is the need to apply a comprehensive cost/benefit approach to prudential policies, to the regulation of external borrowing and of domestic financial intermediation, and to the accumulation and use of international reserves. We illustrate these results in the context of the challenges facing emerging Asia's adjustment during the global financial crisis, and the postcrisis policy stance dealing with the renewed inflows of capital.

**JEL Classification:** F31, F32, F33, F36

# Contents

1.	Introduction and Overview .....	1
2.	The Policy Trilemma and Financial Stability .....	1
2.1	From the trilemma to the quadrilemma? .....	6
2.2	Trilemma configuration in Asia, the crisis of 2008–2009 and the postcrisis era .....	8
2.3	The trilemma choices and Asia’s adjustment during the crisis .....	9
3.	The Crisis of 2008–2009 .....	10
4.	Policy Lessons .....	13
4.1	Postcrisis challenges .....	18
5.	Concluding Remarks .....	19
	References and Further Readings .....	21

# 1. INTRODUCTION AND OVERVIEW

This paper provides an overview of the patterns of financial stability in Asia during the 2000s, and studies the possible lessons of the global crisis of 2008–2009. We start by portraying the varying patterns of emerging Asia in the extended trilemma framework, where countries choose the degree of financial openness, exchange rate stability, and monetary independence, buffered by the accumulation of international reserves. We show that the trend has been a convergence to the middle ground of the trilemma configuration, with a sizable accumulation of international reserves. This configuration, with the proper management of countries' balance sheet exposure and public finances, reduced the adjustment costs of emerging Asia to the global crisis of 2008–2009, and facilitated the remarkable resumption of Asian growth in 2010. We also review the challenges associated with the wide swings of financial flows to emerging countries during the 2000s: the sizeable net inflows before the crisis of 2008–2009, the large deleveraging of foreign positions during the crisis, and the resumption of large inflows in the aftermath of the crisis. We summarize the recent trends, and study the desirable future policy stance of emerging market countries.

The crisis of 2008–2009 validates the insight of the public finance approach to financial integration: gains from deeper financial integration should be balanced against the costs of a growing exposure to turbulences. Furthermore, policymakers should manage and balance possible misalignments between the financial and real sectors. A key lesson of the crisis is the need to apply a comprehensive cost-benefit approach to prudential policies, to the regulation of external borrowing and of domestic financial intermediation, and to the accumulation and use of international reserves. We illustrate these considerations by reviewing the use of international reserves and of exchange rate policies during the crisis; and the policy stance towards the renewed inflows of capital in the aftermath of the crisis. We argue that significant drivers of the flows of capital are yield chasing and carry trade, where the interests of the financial system may diverge from the interests of taxpayers, requiring proper prudential regulation to reduce the taxpayers' exposure to future crises.

# 2. THE POLICY TRILEMMA AND FINANCIAL STABILITY

The policy trilemma (the ability to accomplish only two out of three policy objectives—financial integration, exchange rate stability, and monetary autonomy) is a key implication of the Mundell-Fleming macroeconomic framework. A lingering challenge of taking the trilemma framework to the data is that, in practice, most countries rarely face the binary choices articulated by the trilemma. Instead, countries decide the degrees of financial integration, exchange rate flexibility, and monetary autonomy. Aizenman, Chinn, and Ito (2010, 2011) dealt with this issue by constructing three continuous indexes measuring the de facto trilemma dimensions of each country, normalizing each index between zero and one. The three trilemma indexes cover more than 170 economies for 1970 through 2009. The monetary independence index (MI) is based on the correlation of a country's interest rates with the base country's interest rate. The index for exchange rate stability depends negatively on exchange rate volatility, using the exchange rate between the home and base economies. The degree of financial integration is measured with the Chinn and Ito (2008) capital controls index (KAOPEN).<sup>1</sup>

---

<sup>1</sup> The index for monetary independence (MI) equals  $1 - 0.5[\text{corr}(i_t, i_j) - (-1)]$ , where  $i$  refers to home countries and  $j$  to the base country. By construction, higher values of the index mean higher monetary policy independence.

Exchange rate stability (ERS) equals  $0.01 / [0.01 + \text{stdev}(\Delta(\log(\text{exch\_rate})))]$ , where

Figure 1 shows the trajectories of the trilemma indexes for different income-country groups. For the industrialized economies, deepening financial openness accelerated after the beginning of the 1990s while the extent of monetary independence started a declining trend. After the end of the 1990s, exchange rate stability rose significantly, reflecting the introduction of the euro in 1999.<sup>2</sup>

---

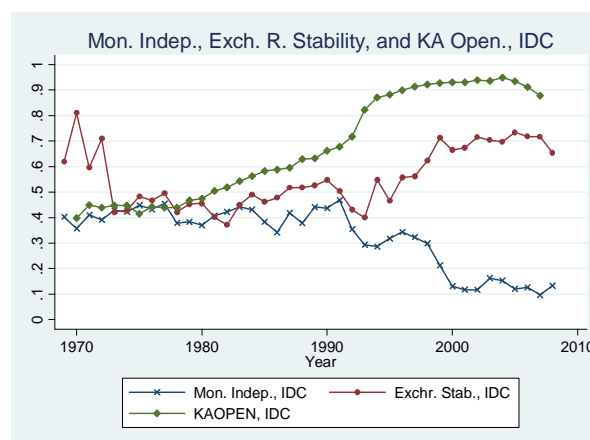
$stdev(\Delta(\log(exch\_rate)))$  is the annual standard deviations of monthly exchange rate series between the home country and the base country.

Financial openness (KAOPEN) equals the de jure index of capital account openness constructed by Chinn and Ito (2008), normalized between zero and one. Higher values of this index indicate that a country is more open to cross-border capital transactions.

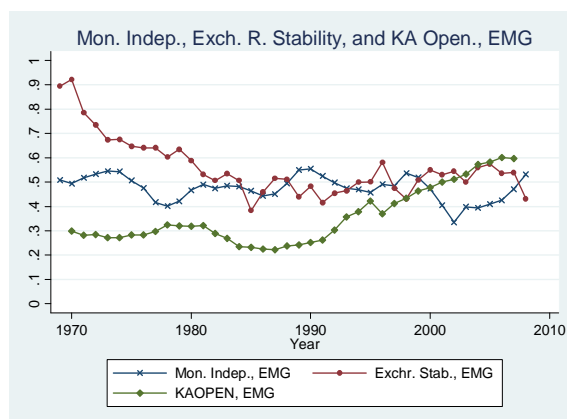
The indexes are available at [http://web.pdx.edu/~ito/trilemma\\_indexes.htm](http://web.pdx.edu/~ito/trilemma_indexes.htm).

<sup>2</sup> If the euro economies are removed from the sample, financial openness evolves similarly to the IDC group that includes the euro economies, but exchange rate stability hovers around the line for monetary independence, though at bit higher levels, after the early 1990s. The difference between exchange rate stability and monetary independence has been slightly diverging after the end of the 1990s.

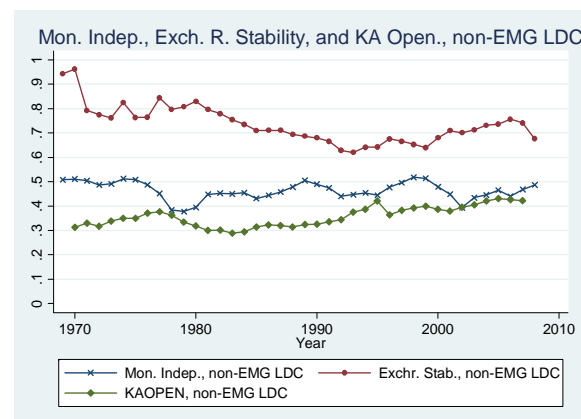
**Figure 1: Development of the Trilemma Configurations over Time<sup>3</sup>**  
 (a) Industrialized Countries



(b) Emerging Market Economies



(c) Non-Emerging Market Developing Countries



<sup>3</sup> Source: Aizenman, Chinn, and Ito 2011; Notes: Mon. Indep.=monetary independence; IDC=industrialized countries; Exch. R. Stability=exchange rate stability; KAOPEN=the Chinn-Ito Financial Openness Variable; EMG=emerging market economies; non-EMG LDC=non-emerging market developing countries



Developing economies on the other hand do not present such a distinct divergence of the indexes, and their experiences differ depending on whether they are emerging or non-emerging market economies.<sup>4</sup> For emerging market economies, exchange rate stability declined rapidly from the 1970s through the mid-1980s. After some retrenchment around early 1980s (in the wake of the debt crisis), financial openness started rising from 1990 onwards. For the other developing economies, exchange rate stability declined less rapidly, and financial openness trended upward more slowly. In both cases though, monetary independence remained more or less trendless.

Interestingly, for the emerging market economies, the indexes suggest a convergence toward the middle ground, even as talk of the disappearing middle has been doing the rounds. This pattern suggests that developing economies may have been trying to cling to moderate levels of both monetary independence and financial openness, while maintaining higher levels of exchange rate stability. In other words, they have been leaning against the trilemma over a period that coincides with the time when some of these economies began accumulating sizable international reserves (IR), potentially to buffer the trade-off arising from the trilemma.

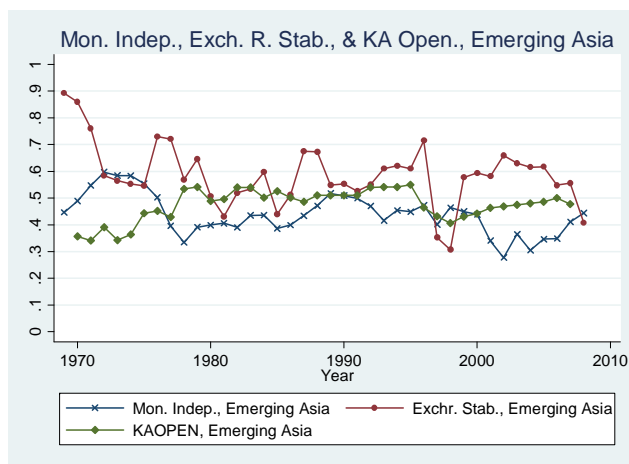
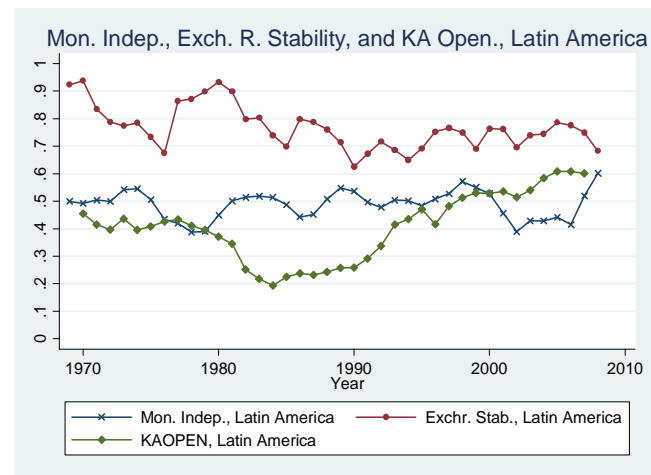
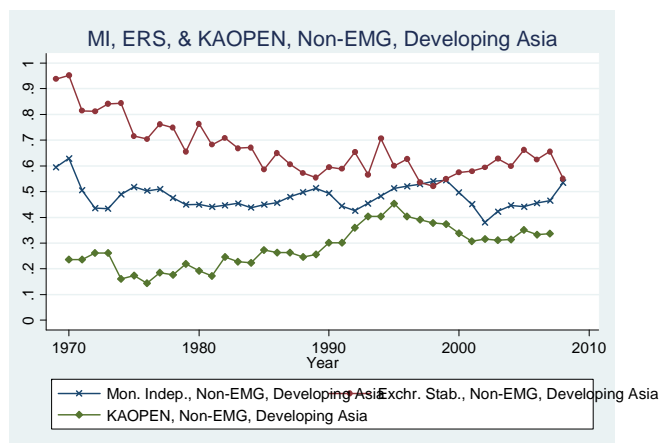
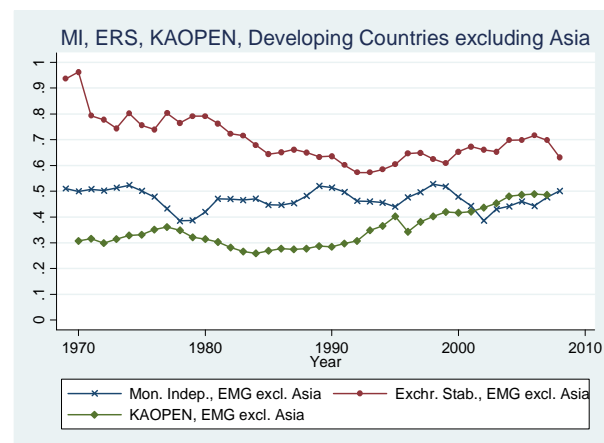
None of these observations is applicable to non-emerging developing market economies (Figure 1[c]). For this group of economies, exchange rate stability has been the most aggressively pursued policy throughout the period. In contrast to the experience of the emerging market economies, financial liberalization has not been proceeding rapidly for the non-emerging market developing economies. Asia, especially Asian emerging market countries, stands out from other geographical groups of economies.<sup>5</sup> Panel (a) in Figure 2<sup>6</sup> shows that for Asian emerging market economies, this sort of convergence is not a recent phenomenon. Since as early as the early 1980s, the three indexes have been clustered around the middle range. However, for most of the time, except for the Asian crisis years of 1997–1998, exchange rate stability seems to have been the most pervasive policy choice. In the postcrisis years in the 2000s, the indexes diverged, but seem to be converging again in the recent years. This characterization does not appear to be applicable to non-emerging market economies (non-EMG) in Asia (b) or Latin America (c). For non-emerging economies in Asia or non-Asian developing economies, convergence in the trilemma configurations seems to be the case in the last decade.

---

<sup>4</sup> The emerging market economies are defined as the economies classified as either “emerging” or “frontier” during 1980–97 by the International Financial Corporation. For those in Asia, emerging market economies are “Emerging East Asia-14” defined by Asian Development Bank plus India.

<sup>5</sup> The sample of “Asian Emerging Market Economies” includes Cambodia; the PRC; Hong Kong, China; India; Indonesia; the Republic of Korea; Malaysia; Philippines; Singapore; Thailand; and Viet Nam.

<sup>6</sup> Source: Aizenman, Chinn, and Ito 2011; Notes: Mon. Indep.=monetary independence; IDC=industrialized countries; Exch. R. Stability=exchange rate stability; KAOPEN=the Chinn-Ito Financial Openness Variable; EMG=emerging market economies; non-EMG LDC=non-emerging market developing countries

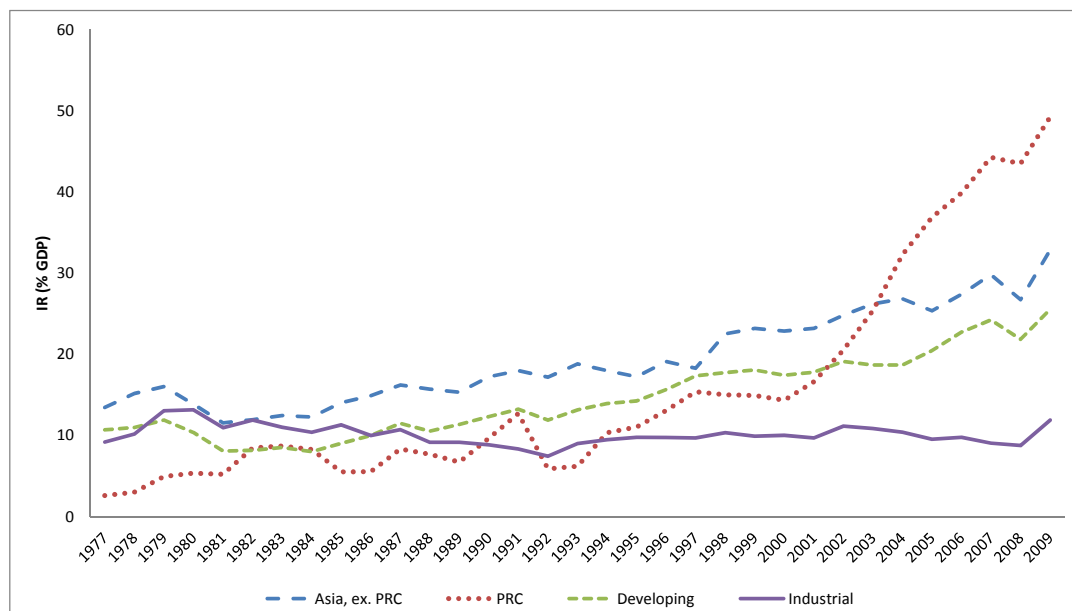
**Figure 2: Regional Comparison of the Development of the Trilemma Configurations****(a) Emerging Market Economies (EMG) in Asia****(c) Latin American Countries****(b) Non-EMG, Developing Asia****(d) Less Developed Countries (LDC) Excluding Asia**

## 2.1 From the trilemma to the quadrilemma?

An unintended consequence of the greater financial globalization adopted by most emerging markets during the 1990s has been their growing exposure to financial turbulences associated with sudden stops of inflows of capital, capital flights, and deleveraging crises. The significant output and social costs associated with financial crises, estimated on average above 10% of gross domestic product (GDP), added financial stability to the three policy goals framed by the original trilemma, probably changing the policy trilemma into the policy quadrilemma.

Pursuing financial integration while maintaining financial stability of emerging markets may explain intriguing developments in the three decades since the 1980s—despite the proliferation of greater exchange rate flexibility, international reserves/GDP ratios increased substantially. Most of the increase in reserve holding has taken place in developing countries, especially in emerging Asia (see Figure 3). The dramatic increase of international reserve hoarding has been lopsided. While the international reserves/GDP ratio of industrial countries was overall stable, hovering below 10%, the reserves/GDP ratio of developing countries increased dramatically, close to tripling in 25 years. By 2007, about two thirds of the global international reserves were held by developing countries. Most of this increase has been in Asia. The most dramatic changes occurred in the People's Republic of China (henceforth, PRC), increasing its reserve/GDP from below 5% in 1980, to about 50% in 2009. Econometric evaluations suggest several structural changes in the patterns of reserves hoarded by developing countries. A notable change occurred in the 1990s, a decade when the international reserves/GDP ratios shifted upwards. This trend intensified shortly after the East Asian crisis of 1997–1998, which had subsided by 2000. Another structural change took place in early 2000s, mostly driven by an unprecedented increase in the hoarding of international reserves in the PRC. The PRC's reserve/GDP ratio more than tripled during the 2000s.

**Figure 3: Hoarding International Reserves/GDP patterns, 1977–2009**



Note: The figure depicts total reserves minus gold to GDP ratio. Source: IFS–IMF

Source: Author's calculations.

A possible interpretation for the unprecedented hoarding of international reserves reported in Figure 3 deals with the unintended consequences of financial globalization. A remarkable takeoff in reserve hoarding by developing countries occurs from early 1990s, coinciding with the takeoff of financial integration of developing countries. The hoarding of international reserves/GDP by developing countries accelerated dramatically in the aftermath of the East Asian crisis. The evidence is consistent with the conjecture that financial integration of developing countries led to drastic changes in the demand for international reserves. Prior to the financial integration, the demand for reserves provided self-insurance against volatile trade flows. However, financial integration of developing countries also added the need to self-insure against volatile financial flows. By the nature of financial markets, the exposure to rapidly increasing demands for foreign currency triggered by financial volatility, exceeds by a wide margin the one triggered by trade volatility. The East Asian crisis was a watershed event, as it impacted high saving countries with overall balanced fiscal accounts. These countries were viewed as being less exposed to sudden stop events as compared with other developing countries prior to the crisis. With a lag, the affected countries reacted by massive increases in their stock of reserves (Aizenman and Marion 2003).

Recent studies validate the importance of “financial factors” as key determinants, in addition to the traditional trade factors, in accounting for increased international reserves/GDP ratios. Indeed, recent research has revealed that the role of financial factors has increased in tandem with growing financial integration. More financially open, financially deep countries, with greater exchange rate stability tend to hold more reserves. Within the emerging market sample, the fixed exchange rate effect is weaker, but financial depth (measured by M2/GDP) is highly significant and growing in importance over time (Cheung and Ito 2009, Obstfeld et al. 2010). Trade openness is the other robust determinant of reserve demand, though its importance seems to have diminished over time. The growing importance of financial factors helps in accounting for a greater share of the international reserves/GDP ratios (Aizenman and Lee 2007). These results are in line with a broader self-insurance view, where reserves provide a buffer, both against deleveraging initiated by foreign parties, as well as against the sudden wish of domestic residents to acquire new external assets, i.e., “sudden capital flight” (Calvo 1998, 2006; Aizenman and Lee 2007). The high positive co-movement of international reserves and M2 is consistent with the view that the greatest capital flight risks are posed by the most liquid assets, i.e., by the liquid liabilities of the banking system as measured by M2.

The views linking the large increase in hoarding reserves to growing exposure to sudden stops associated with financial integration face a well-known contender in a modern incarnation of mercantilism, also dubbed as the *Bretton Woods II* hypothesis (Dooley, Folkerts-Landau, and Garber 2003). According to this interpretation, reserves accumulation is a by-product of promoting exports, which is needed to create better jobs, thereby absorbing abundant labor in traditional sectors. Though intellectually intriguing, this interpretation remains debatable—the history of Japan and the Republic of Korea suggests the near absence of mercantilist hoarding of international reserves during the phase of fast growth, and the prevalence of export promotion by preferential financing in targeted sectors. Floundering economic growth led to the onset of large hoarding of reserves in Japan and the Republic of Korea, probably due to both mercantilist motives and self-insurance in order to deal with growing fragility of the banking system. These perspectives suggest that the massive hoarding of reserves by the PRC is a hybrid of the mercantilist and self insurance motives. Yet mercantilist hoarding by one country may induce competitive hoarding by other countries to preempt any competitive advantage gained by the first country, a reaction that would dissipate most competitiveness gains (Aizenman and Lee 2008). This view is supported by the interdependence of the demand for international reserves among East Asian countries (Cheung and Qian 2009).

The link between hoarding reserves and financial integration suggests a fourth dimension to the trilemma. In the short-run, countries came to expect that hoarding and managing

international reserves may increase their financial stability and capacity to run independent macroeconomic policies. This development seems to be important for emerging markets that are only partially integrated with the global financial system, and where sterilization is heavily used to manage the potential inflationary effects of hoarding reserves (the PRC and India being prime examples of these trends (Aizenman and Glick [2009])). In contrast, most of the industrial countries kept their international reserves/GDP ratios low. This could have reflected the easy access of industrial countries to bilateral swap lines in case of urgent needs for foreign currencies, as well as their ability to borrow externally in their currencies.

The experience of emerging markets suggests that the trilemma triangle, while useful, overlooks the possibility that with limited but growing financial integration, countries hoarding international reserves may loosen in the short-run some of the trilemma constraints. This possibility may be illustrated by contrasting the trilemma trends of Latin American and Asian emerging markets. Latin American emerging market economies had liberalized their financial markets rapidly since the 1990s, after some retrenchment during the 1980s, while reducing the extent of monetary independence and maintaining a lower level of exchange rate stability in recent years. Emerging Asian economies on the other hand, stand out by achieving comparable levels of exchange rate stability and growing financial openness while consistently displaying greater monetary independence. These two groups of economies are most differentiated from each other by their levels of international reserves holding, much higher in emerging Asia than in emerging Latin American countries. Without giving up its exchange rate stability and monetary independence, the PRC has increased its international reserves holding while slowly increasing financial openness. This evidence is consistent with the view that countries' efforts to "relax the trilemma" in the short-run can involve an increase in international reserves holding.

## **2.2 Trilemma configuration in Asia, the crisis of 2008–2009 and the postcrisis era**

The crisis of 2008–2009 may be viewed as the first serious test of the modern era of globalization. The financial turbulences in the 1990s started in emerging markets, with most of the contagion affecting other emerging markets. In contrast, the crisis of 2008–2009 originated in the United States, with repaid global transmission to most countries. The resultant transmission put most emerging markets at the receiving end of massive deleveraging, where the excess demand for the dollar induced liquidation pressure by Organisation for Economic Co-operation and Development (OECD) investors. The crisis validated the usefulness of the trilemma middle ground configuration in dealing with the challenges facing the developing countries. Emerging markets benefited by adopting controlled exchange rate flexibility and the active management of external balance sheet exposure by using reserves to cover short-term debt (see Eichengreen and Hausmann 1999 for analysis of balance sheet exposure). While decoupling of emerging markets countries from the recession impacting the OECD has been illusive, emerging Asia became the key contributor to the postcrisis global growth, led by the largest and most populous countries—the PRC and India. Overall, these countries adopted a heterodox approach, managing and controlling their financial integration. Arguably, these trends validate the public finance approach to financial integration: gains from deeper financial integration should be balanced against the costs of growing exposure to turbulences. Furthermore, policy makers should manage and balance possible misalignments of the interests of the financial and real sectors, elaborated below.

To put this discussion into the proper perspectives, note that the gains of financial integration for emerging markets are not self evident, as most of their growth was self-financed. "Self-financed growth" refers to an empirical literature which has emerged in the 2000s, which looks at the role played by national as opposed to foreign savings in promoting economic growth in developing countries. This includes papers by Aizenman, Pinto, and Radziwill

(2007), Prasad, Rajan, and Subramanian (2007), and others. Together with theoretical work by Gourinchas and Jeanne (2006), it complements earlier work which looked at the links between vulnerability and financial integration: the first asks whether financial integration has been good for growth; the second, whether it has been bad for vulnerability.

In a recent paper, Aizenman and Sushko (2011) examine the differential impact of three broad types of financial capital inflows—portfolio debt, portfolio equity, and foreign direct investment (FDI)—on manufacturing industry growth in a large sample of countries. They extended Rajan and Zingales' (1998) methodology, utilizing external finance dependence measure in a time-series context, in cross-sectional regressions of manufacturing industries' growth rates on a set of industry and country controls across 37 manufacturing industries, in up to 104 countries over 1991 through 2007. They found substantial differences between the effects of portfolio debt, portfolio equity, and FDI inflows on industrial growth. Overall, net portfolio debt and equity have mixed, frequently negative effects on industry's growth. FDI inflows provided more consistent gains.<sup>7</sup> It's noteworthy that these studies do not imply that financial autarky is optimal, as rapid trade integration forces growing financial integration supported by tacit capital mobility via trade misinvoicing. Instead, these works suggest the need for a balanced cost/benefit approach towards the optimal degree of financial integration, as there are no reasons to expect that full financial integration is optimal in the presence of distortions and externalities.

### 2.3 The trilemma choices and Asia's adjustment during the crisis

In Aizenman, Chinn, and Ito (2011) we examined econometrically how the various choices regarding the three policies affect final macro-policy goals, namely, high economic growth, output growth stability, low inflation, and inflation stability.<sup>8</sup> Overall, the study is consistent with the following conjectures:

- i. When policymakers put greater weight on real exchange rate stability, it is better to pursue more nominal exchange rate stability and greater financial openness (which implies lower levels of monetary independence). This configuration could have a volatility-increasing impact on investment and output, though the ultimate effect may depend on the level of international reserves and reserves accumulation policy.
- ii. Greater monetary independence increases real exchange rate volatility. If an emerging market country holds a level of IR/GDP above a threshold and pursues a higher

<sup>7</sup> The coefficients on net portfolio debt inflows are negative and significant in late 1990s, during the run-up to the Asian financial crisis, and to some degree in the 2000's. Surges in portfolio equity inflows also exhibit negative association with aggregate growth of the manufacturing sector. The economic magnitude of the impact of equity inflows are persistently negative and significant during 1999 through the 2005 period, with the actual inflows to various countries, including Chile, the PRC, the Republic of Korea, and Turkey, showing persistent negative impact on manufacturing sector growth. In contrast to debt inflows, equity inflows exhibited statistically and economically significant positive impact on the growth of financially constrained industries, unlike their negative impact on the average manufacturing growth rate. Finally, FDI inflows exhibit positive association with aggregate manufacturing growth during most of the sample period, and this positive economic impact is observed at the aggregate level and specifically for the industries in need of external financing.

<sup>8</sup> The data set is organized into 5-year panels, where all time-varying variables are included as 5-year averages. The estimation model used is given by:

$$y_{it} = \alpha_0 + \alpha_1 TLM_{it} + \alpha_2 IR_{it} + \alpha_3 (TLM_{it} \times IR_{it}) + X_{it}B + Z_i\Gamma + D_i\Phi + \varepsilon_{it};$$

$y_{it}$  is the measure of macro policy performance for country  $i$  in year  $t$ , i.e., output growth, output volatility, inflation volatility, and the medium-term level of inflation.  $TLM_{it}$  is a vector of any two of the three trilemma indexes, namely, *MI* (*monetary independence*), *ERS* (*exchange rate stability*), and *KAOPEN* (*financial openness*).  $IR_{it}$  is the level of international reserves holding (excluding gold) as a ratio to GDP, and  $(TLM_{it} \times IR_{it})$  is an interaction term between the trilemma indexes and the level of IR, that may allow us to observe whether IR complement or substitute for other policy stances.  $X_{it}$  is a vector of macroeconomic control variables.

level of exchange rate stability and a lower level monetary independence (i.e., a combination of greater exchange rate stability and greater financial openness), that country could achieve higher levels of real exchange rate stability and investment.

iii. This result may explain why many emerging market economies, especially those that are more open to international trade such as Asian emerging market economies, tend to prefer exchange rate stability and holding a massive amount of IR while also pursuing financial liberalization.

These findings have a significant relevance for Asian economies. The IR/GDP ratio for the Asian emerging market economies is the highest among the regional subgroups. Asian emerging market economies may have pursued international macroeconomic policies that help reduce the level of volatility in both investment and the real exchange rates, or at least the latter, if not both. Emerging Asia achieved lower levels of volatilities in both investment and the real exchange rate than any other group of developing economies (except for the 1990s because of the Asian crisis), and their levels are comparable to that of industrialized economies.

For the group of Asian emerging market economies, the trilemma policy combination contributes to lowering the volatilities of output and the real exchange rate, but possibly to raising the volatility of investment. However, given that these economies are quite open, the volatility-reducing impact of the trilemma policy combination on the real exchange rate volatility should outweigh the volatility-increasing impact on the investment volatility, thus contributing to lowering output volatility. For relatively closed economies which hold high levels of IR (higher than about 16% of GDP in the period we studied), policymakers may choose to pursue weaker monetary independence and greater exchange rate stability so that they can achieve higher stability in both investment and real exchange rates. However, in those economies which hold low levels of IR, policymakers may choose to pursue greater monetary independence and lower exchange rate stability although they could not minimize the volatility of the real exchange rate with greater monetary independence and lower exchange rate stability.

Overall, the trilemma policy configuration seems to be effective in reducing the volatility of the real exchange rate for the Asian economies. For this group of economies, it is the trade channel through which the trilemma policies seem to be affecting the volatility of output.

### 3. THE CRISIS OF 2008–2009

We analyze in this section the adjustment of emerging countries to the global crisis of 2008–2009. The earlier hopes for decoupling emerging Asia from the recessionary stance of the OECD during 2008 did not happen. Yet, after the intense deleveraging pressure associated with the dollar shortage in the second half of 2008, market sentiments switched, and large inflows of capital to emerging markets, and emerging Asia in particular, resumed in 2010. Higher international reserves/short-term external debt act as a buffer, reducing the odds and the severity of sudden stops and capital flight crises. The actual patterns of reserves during the 2008–2009 crisis revealed a mixed and complex adjustment. About half of the emerging markets managed the crisis without depleting reserves. The other half of the emerging markets depleted at the peak of the global crisis between 10% to one third of their international reserves.<sup>9</sup> Most of them bounced back to respectful growth paths, without the

---

<sup>9</sup> See Aizenman and Sun (2010) for further details. The absence of reserve depletion during the crisis does not necessarily imply that the emerging markets that refrained from using reserves were mistaken in accumulating the reserves in the first place. Crises come in various varieties, and these countries may benefit from using their reserves in the future. The absence of the use of reserves may also reflect the deterrent effect of higher international reserves, signaling a deeper pocket of liquidity of the central bank, deterring capital flight and

need for massive external help. Those emerging market and developing countries that relied on such help (using Federal Reserve [Fed]'s swap lines [the Republic of Korea and Mexico]; or International Monetary Fund [IMF] stabilization packages) were characterized by large balance sheet exposure, where too lax financial regulations prior to the crisis increased their vulnerabilities.

Looking at the patterns of using IR during the crisis, Aizenman and Sun (2010) explored the adjustment of 21 emerging markets countries (EMs) during the window of the crisis and found a mixed and complex picture. Regression analysis showed that EMs with large primary commodity exports, especially oil exports, experienced large IR losses during the 2008–2009 global crisis. Countries with a medium level of financial openness and a large short-term external debt to GDP ratio also on average lost more of their initial IR holdings. Aizenman and Sun (2010) also compared the pre-crisis demand for IR/GDP of countries that experienced sizable depletion of their IR, to that of countries that did not, and found differential patterns across the two groups. Trade related factors seem to be more significant in accounting for the pre-crisis IR/GDP levels for countries that experienced a sizable depletion of IR in the first phase of the crisis. While for other countries, financial factor are more important, and they achieved external adjustment through large currency depreciations rather than sizable IR depletion.

These findings are consistent with the view that countries that were intensively using reserves during the crisis had internalized their large exposure to trade shocks before the crisis, and used their IR as a buffer stock during the crisis. Further analysis shows that the IR losses of these countries followed an inverted logistical curve. After a rapid initial depletion of IR, they reached within seven months a markedly declining rate of IR depletion, and lost not more than one third of their pre crisis IR. Countries with larger external exposure tend to use more reserves in the first phase of the crisis. However with the increased stresses and not knowing the duration of the crisis, authorities started to rely more on currency depreciations rather than reserve depletion as a response to increasing market pressure. The patterns of using IR by the countries with sizable reserve depletion, and refraining from using IR by other countries, suggest that the adjustment of EMs during the ongoing global liquidity crisis was constrained more by their fear of reserves depletion than by their fear of floating (see Calvo and Reinhart [2002] for earlier analysis of the fear of floating).

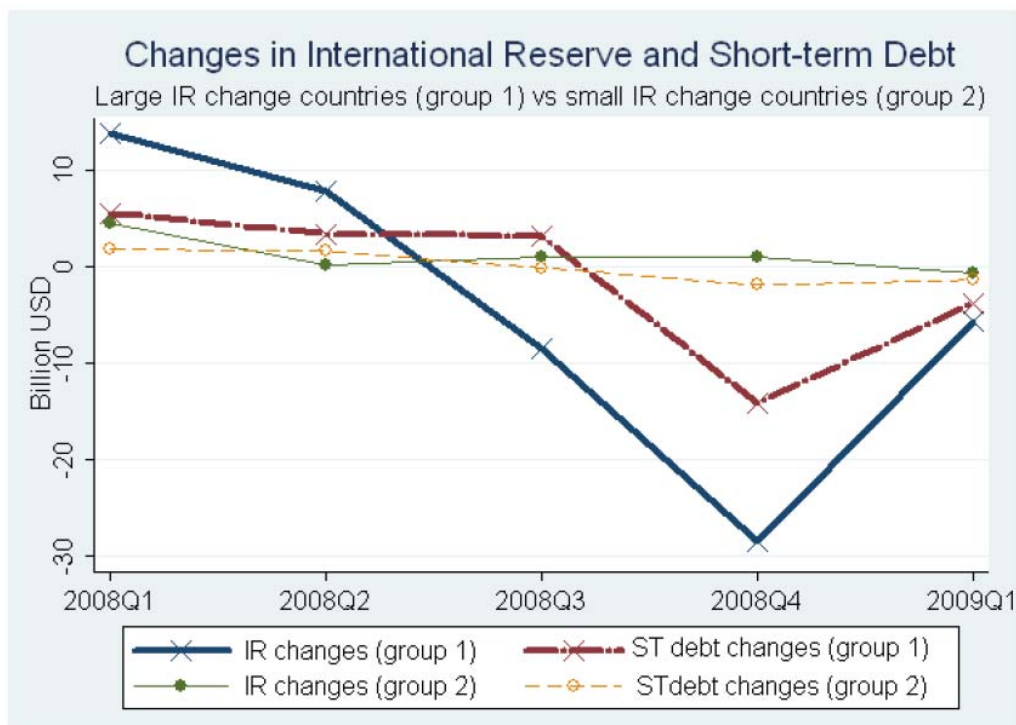
The experience of emerging markets suggests that at time of financial panic, international reserves function as a buffer funding the delivering of short-term debt. Figure 4 traces the average quarterly IR position and short-term external borrowing of emerging markets during 2008, and the first quarter of 2009. The countries are grouped into EMs that suffered significant IR losses (Group 1), and those that experience small IR losses, or gains (Group 2). Data constraints reduced the size of each group to 9 countries.<sup>10</sup> EMs that experienced sizable IR losses during the worst part of the crisis were exposed to a much larger deleveraging of short-term external debt than other EMs. During Q4 2008, the average IR losses were \$28 billion for EMs in the sizable IR losses group, half of it funded the deleveraging of short-term external debt (\$14 billion). In contrast, IR losses and the deleveraging of short-term debt were close to zero for countries experiencing small IR losses during Q4 2008 (IR increased on average by \$1 billion, short-term external debt declined by \$2 billion). This observation supports the notion that countries with high external debt exposure needed deeper use of reserves at the peak of the crisis, 2008 Q4, compared with those with low external debt exposure.

---

depreciation pressures. See De Gregorio (2011) for evidence on the role of international reserves in the determination of changes in Emerging Markets Bond Indexes spreads during the subprime crisis.

<sup>10</sup> Sizable IR loss group includes: Brazil, India, Indonesia, the Republic of Korea, Malaysia, Peru, Poland, Russia and Turkey. Non-sizable IR loss group include: Argentina, Chile, the Czech Republic, Columbia, Egypt, Israel, Mexico, Thailand, and South Africa (quarterly data is not available for the People's Republic of China; Peru; and Taipei, China). Due to the unavailability of monthly data we apply quarterly data.

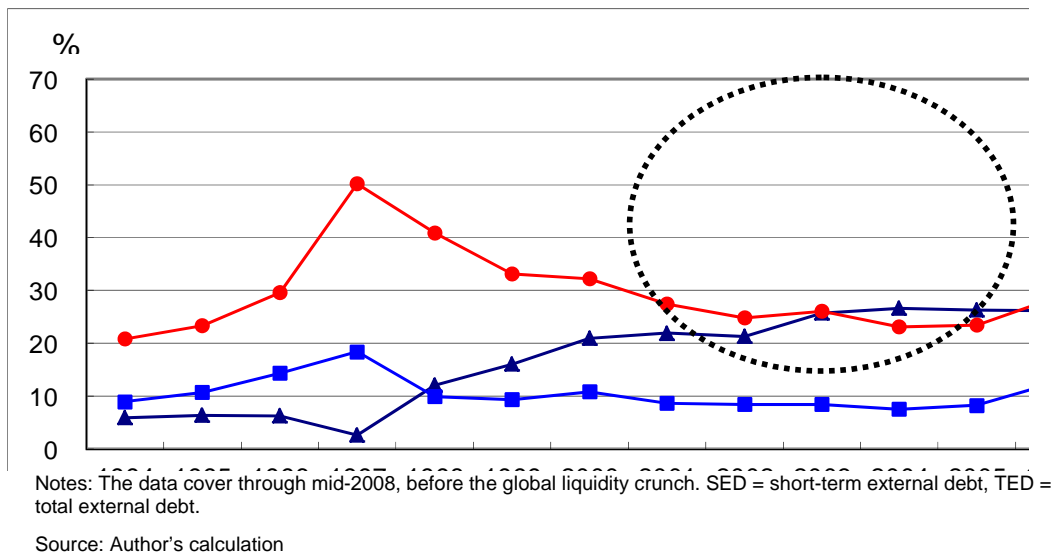


**Figure 4: IR Depletion and Deleveraging during the 2008–2009 Crisis.**

Source: Aizenman, Chinn, and Ito 2011

As during the 1997–1998 crisis, the Republic of Korea continued to be a bellwether country. The Republic of Korea's financial history in the 2000s illustrates the challenges associated with open capital markets. During the mid 2000s, the Korean regulator's "hands-off" attitude contributed to the buildup of balance sheet vulnerabilities prior to the crisis. The deleveraging pressure during the global crisis led to massive depreciation, and despite the sizable IR position prior to the crisis, the Republic of Korea faced the prospect of another financial meltdown.

Figure 5 summarizes the evaluation of international reserves, short- and long-term borrowing of the Republic of Korea in recent decades. The experience of the financial melt down during 1997–1998 led to the sharp increase of IR/GDP after the Asian crisis. By 2000, the Republic of Korea's reserves were about twice as large as its short-term debt, and by 2003 reserves exceeded its total external debt. Less than ten years after the 1997–1998 East Asian crisis, the Republic of Korea's IR/GDP seemed to be more than adequate using conventional yardsticks—exceeding the exposure to short-term debt, and allowing financing several quarters of imports. Yet, this blissful configuration held only for three years. While the Republic of Korea's IR/GDP remained stable during 2005–2008, the overall external debt/GDP doubled, with the level of short-term external debt approaching the level of international reserves.

**Figure 5: Republic of Korea's IR/GDP and External Debt/GDP, 1994–2008**

The global liquidity crisis of 2008–2009 and the ensued deleveraging illustrated vividly the fragility of the Republic of Korea's balance sheet. During the first stage of the crisis (3<sup>rd</sup> and 4<sup>th</sup> quarters of 2008), the Republic of Korea's reserves dropped by about \$60 billion in half a year, a decline of about 25%. Indeed, reserves were key to the bailout package that the government unveiled in the second half of 2008. The centerpiece of the package was a \$100 billion three-year government guarantee for banks' foreign debt. This sum was more than sufficient to cover Korean banks' foreign debt maturing by June 2009, estimated by the Ministry of Strategy and Finance to be about \$80 billion.

Yet, despite the large hoarding of international reserves used to finance the bailout package, market concerns were not abated. The Republic of Korea experienced a massive confidence crisis in the second half of 2008, which was abated only following the introduction of an unprecedented \$30 billion US Fed's swap line to the Republic of Korea, to be followed later by swaps lines from the Bank of Japan and the Bank of China. While the Fed's swap line was modest relative to the Republic of Korea's International reserves (IR), the signaling effect associated with the Fed's willingness to support the Republic of Korea probably prevented switching to a panic equilibrium, and within a quarter the confidence crisis abated. Indeed, within less than a year from the crisis, another U-turn happened, and large inflows of capital from the US and other OECD countries resumed. These developments are also reflected in the exchange rate. The deleveraging crisis induced massive depreciation of won within less than a year, from 900 W/US\$ to about 1500, while the resumption of financial inflows induced rapid appreciation towards 1100 W/US\$.

## 4. POLICY LESSONS

We analyze in this section possible policy lessons associated with emerging Asia's experience during the crisis of 2008–2009. We conclude that prudential supervision, tightening the link between short-term external borrowing, and hoarding IR would mitigate the excessive exposure to deleveraging risks induced by short-term external borrowing. A key lesson from the recent history of the Republic of Korea and other emerging markets is the downside risk of financial openness and under-regulation of financial flows. Financial flows are volatile and fickle, and may be subject to herding and contagion. These flows are impacted by changing perceptions about the attractiveness of the emerging market country relative to that of the OECD countries, and to other emerging markets. Sizable flows may be induced by arbitrage that may expose the emerging market economy to adverse welfare

effects. To illustrate, private banks in the Republic of Korea (domestic and foreign banks operating in the Republic of Korea) may opt to borrow externally to fund carry trade. This in turn increases the exposure of the Bank of Korea to the possibility of deeper bailout needed at times of deleveraging. Hoarding international reserves by the Bank of Korea may not be enough to protect the interest of the Republic of Korea's taxpayers. The bailout option may inadvertently subsidize the carry trade, as the private bank borrowing the funds does not have the incentive to internalize the greater taxpayers' exposure to the future bailout.<sup>11</sup> The same logic applies to other activities funded by private banks' external borrowing.

This example illustrates the need to apply the public finance approach to international reserves and prudential policies in emerging markets. Prior to the crisis, IR/GDP was viewed as a key indicator of soundness of policies. Yet, the experience of countries during the crisis suggests that accumulation of IR is only one dimension of prudential policies. With hazards impacted by agents' behavior, optimality calls for a mixture of partial insurance and preventive methods reducing the frequency and intensity of the calamity (installing a fire alarm and external lights in a house, driving a car at a lower speed, equipping a car with air bags, etc.). This logic applies equally well to the emerging markets' exposure to sudden stops and deleveraging shocks—a country may supplement hoarding international reserves with policies that would reduce its exposure to capital flight. Such policies may include proactive steps to reduce exposure to external debt (Rodrik 2006). Regulations reducing external borrowing may trim the demand for IR, increasing the overall welfare of the economy.

The public finance approach to regulation is reflected in Hyun Song Shin's view (stated while serving as a chief advisor to President Lee Myung-bak),

"...it should tax the wholesale liabilities of the country's banks. Whenever a Korean bank wants to expand its loan book faster than its retail deposits, it relies on foreign borrowing to fill the gap. So a levy on these extra liabilities would serve to limit banks' borrowing abroad." *The Economist*, 11 November 2010.

Taxing surges in external borrowing of domestic banks is a discretionary tool supporting prudential supervision (Aizenman 2011). This policy tool is akin to an international version of the Federal Deposit Insurance Corporation's (FDIC) policies in the US. A deposit in a bank covered by the FDIC allows the bank to expand its balance sheet, increasing the expected liabilities of the FDIC (i.e., the tax payer) at a rate proportionate to the riskiness of bank's portfolio. The insurance offered by the FDIC implies that the saver lacks the incentive to monitor the bank. This distortion should be dealt with by imposing a risk premium on the bank, at a rate reflecting its riskiness. The main difference between FDIC's risk premium applied to domestic deposits and external borrowing by banks in emerging markets is that the FDIC covers deposits in US dollar, and is indirectly backed by US ability to cover these liabilities by fiat money and/or domestic taxes. In contrast, external borrowing by EMs' banks increases the balance sheet exposure of the country to foreign currency debt. This exposure should be dealt with by the accumulation of IR and by the proper risk premium, inducing banks to internalize the impact of external borrowing on the tax payers' exposure to future bailouts. Ironically, economists that oppose external borrowing tax, viewing it as an impediment to free mobility of capital, rarely support the abolishment of deposit insurance.

---

<sup>11</sup> An interesting observation made by Dominguez, Hashimoto, and Ito (2011): "Countries with large stocks of international reserves and a high domestic interest rate may inadvertently be counter-parties to the carry trade. While carry-traders borrow in low interest currencies and invest in high interest currencies, most reserve building countries invest in low interest foreign currencies and borrow at the (relatively higher) domestic interest rate." This observation is consistent with the view that the optimal accumulation of reserves should be addressed as part of a comprehensive prudential regulation that would recognize possible externalities associated with carry trade exposures.

Taking this public finance perspective, open capital markets should be supervised with prudential regulations aimed at limiting the adverse balance sheet exposure. This can be done by taxing external borrowing at a rate reflecting the risk exposure, and using the tax revenue to co-fund precautionary accumulation of reserves. These steps may include discretionary, time varying taxes and reserve ratios, adjusted to reflect the inflow pressure, and the balance sheet exposure of the banking system.<sup>12</sup> The resumption of growth of the emerging markets in 2010, at times when in most OECD countries growth remains anemic and subject to expansionary monetary policy, increased substantially the interest rates in emerging countries relative to that in the OECD. This in turn led to large surge in inflows of capital to EMs, inducing EMs to invoke prudential policies and regulations. Table 1 summarizes some of these policies in Asia, showing the proliferation and deepening of these policies in the Republic of Korea and other emerging Asian countries. Similar trends apply to emerging Latin American countries and other regions (see Pasricha [2011] for analysis of the recent regulation trends in EMs).

---

<sup>12</sup> See also Bianchi (2010) and Korinek (2010), who studied the way capital flow volatility can trigger feedback cycles that work through the depreciation of the real exchange rate.

**Table 1: Recent Macro-prudential Measures and Capital Controls in Emerging Asia in 2010**

Country	I/ O	T/ E	Type	Nature	Summary
PRC	I	E	CC	Foreign investors' access	Some overseas FIs allowed to invest their foreign yuan holdings in domestic interbank market bonds.
India	I	T	CC	Interest Rate Caps on ECB	Interest rate cap on eligible external commercial borrowing re-instated.
Indonesia		T	OM	Minimum holding periods on central bank bills	Minimum holding period introduced on central bank debt instruments, for both residents and non-residents.
Indonesia	I	T	CM	Reserve Ratios	Foreign-currency deposit RR increased from 1% to 5% in March.
Indonesia	I	T	CM	Reserve Ratios	Foreign-currency deposit RR increased from 5% to 8% in June
Indonesia	I	T	CC	Reserve Ratios	30% RR on vostro accounts (rupiah-denominated transaction accounts held by non-residents), beginning end-January 2011 with 3-month transition.
Indonesia	I	T	CC	Ceilings on foreign investment/ external borrowings	Limit (30%) on daily balance of banks' short-term external debt re-instated.
Rep. of Korea	I	E	CC	Withholding Tax	Removed withholding tax of 0–15% (depending on tax treaty) on interest, capital gains tax and transaction tax for non-residents.
Rep. of Korea		T	CC	Limits to FX exposure/ currency mismatches	Tightened limit on FX derivatives contracts of domestic banks and foreign bank branches with domestic residents (100% of value of exports from 125%)
Rep. of Korea	I	T	CC	Limits to FX exposure/ currency mismatches	New limits set on FX derivatives contracts of domestic banks (50% of previous month's capital) and branches of foreign banks (250%).
Rep. of Korea	I	T	CM	Exchange controls	Bank loans in foreign currency to be restricted to overseas uses only. Small and medium sized manufacturers exempted.
Rep. of Korea	I	T	CC/C M	Limits to FX exposure/ currency mismatches	Tighten existing regulations on foreign currency liquidity of domestic banks.
Rep. of Korea	I	T	CC	Tax on Inflows	14% withholding tax on interest income on bonds bought by foreign investors as well as a 20% capital gains tax re-imposed.
Rep. of Korea	I	T	CM	Tax on Inflows	Announced plans to legislate a macro-prudential stability levy on non-deposit foreign currency liabilities. The levy will fund provision of FX liquidity when necessary.
Philippines	O	E	CC	Exchange controls	Allow prepayment of BSP-registered foreign/foreign currency loans of the private sector to be funded with FX from AABs/AAB-FX corps without prior BSP approval.

Country	I/ O	T/ E	Type	Nature	Summary
Philippines	O	E	CC	Exchange controls	Banks allowed to process remittance requests by foreign investors without prior approval.
Philippines	O	E	CC	Exchange controls	Increase in FX purchase limit for outward investment by residents.
Philippines	O	E	CC	Disclosure Requirements	Registration requirements for outward investments by residents in excess of US\$ 60 million lifted and replaced by reporting requirements.
Taipei,China	I	T	CM		The rate on reserve requirements for currency deposits will be increased to 0.193% from 0.178%, while the rate for Taipei,China dollar time deposits was lifted to 0.934% from 0.855%.
Taipei,China	I	T	CC	Foreign investors' access	Offshore funds restricted to investing no more than 30% of their portfolios into local government debt and money-market products.
Taipei,China	I	T	CC	Exchange controls	Trading in NDFs capped at one fifth of a bank's total FX trading.
Taipei,China	I	T	CC	URR	Monetary authority won't pay lenders interest from Jan. 1 on reserves held for deposits from foreigners. It currently pays interest on 55% of the reserves.
Thailand	O	E	CC	Ceilings on foreign investment/ external borrowings	Raised limits on foreign asset accumulation by residents, including outward FDI.
Thailand	O	E	CC	Ceilings on foreign investment/ external borrowings	Removed limit on direct overseas investment, relaxed restrictions on lending by Thai firms to non-resident borrowers, and raised cap on offshore property purchase.
Thailand	O	E	CC	Ceilings on foreign investment/ external borrowings	Permitted Thai companies to invest abroad in the form of direct investment or lend to affiliated companies up to US\$ 50 million per year.
Thailand	O	E	CC	Ceilings on foreign investment/ external borrowings	Relaxed other regulations for Thai residents which include: raising outstanding balance limits on foreign currency deposit accounts deposited with funds exchanged from commercial banks; increasing amount limit for purchase of immovable properties abroad; relaxing regulations on repatriation by raising the threshold amount above which foreign currency proceeds are required to be brought into Thailand, as well as relaxing the related reporting requirement.
Thailand	I	T	CC	Tax on Inflows	Withholding tax of 15% to be imposed on interest income and capital gains receivable by non-resident corporate and individual investors on bonds issued by the government, state enterprises and the Bank of Thailand.

Notes: ECB=external commercial borrowing; BSP=Bangko Sentral ng Pilipinas; RR=reserve ratios; NDF=non-deliverable forward; FX=foreign exchange; I/O=Inflow/outflow; T/E=Tightening/easing; CC=capital control; CM=Currency based measure; OM=other measure.

Source: IMF AREAER 2002–2009, Reinhart and Reinhart 2008, national sources and news articles.

Remarkably, the IMF acknowledged the potential usefulness of these steps as practical response to varying circumstances:<sup>13</sup>

“From a macroprudential perspective, the relevant concern is the contribution of capital inflows to the buildup of systemic vulnerabilities, by facilitating the buildup of imbalances in the financial and non-financial sector, unsustainable asset price booms, and financial sector distress as flows stop or reverse direction.”

“Macroeconomic policies can be used to address the risks from large inflows. If these policies are not sufficient, prudential tools and in some circumstances, also capital controls can be used. Some prudential tools can reduce potential systemic risks associated with capital inflows without targeting inflows per se. These tools differ from capital controls in that they do not discriminate between residents and non-residents. One example is a countercyclical capital buffer linked to the buildup of credit, which could be triggered by a broad indicator of credit growth that captures both domestic and foreign provision of loans. A second example is caps on LTV and debt-to-income ratios, which would discourage an erosion of lending standards. In addition, a levy or charges on short-term wholesale funding could also potentially discourage overreliance on vulnerable wholesale funding, irrespective of whether that funding is sourced domestically or from abroad.

Macroprudential tools can also be used to reduce indirectly systemic risks in the non-financial sector associated with capital inflows. Republic of Korea’s leverage cap on banks’ off-balance-sheet foreign exchange positions introduced in June 2010 aims to achieve this objective. Capital controls are motivated by various considerations, both macroeconomic and financial. As such, they are not macroprudential instruments, although they could be if they specifically targeted systemic risk and were underpinned by strict governance arrangements that ensured no slippage in their use.”

## 4.1 Postcrisis challenges

Earlier research suggests that EMs that increased their financial integration during the 1990s and mid 2000s, accumulated IRs due to several reasons, including the precautionary motive to obtain self insurance against sudden stops and deleveraging crises.<sup>14</sup> Yet, the 2008–2009 global crisis suggests that the levels of IR required in order for this self-insurance to work may be comparable to that of a country’s gross external financial exposure (see Park 2009). The financial turbulences confronting Asia are illustrated by the patterns of net private capital flows, in percent of GDP, in emerging Asia (see *World Economic and Financial Surveys Regional Economic Outlook: Asia and Pacific*, IMF, April 2011). Emerging Asia excluding the PRC confronted a drop in private capital flows of 7% during the crisis (from about plus 3% to above minus 4%), bouncing back to inflow of about 4% within a year from the crisis, to the pre crisis level. The most volatile component in emerging Asia excluding the PRC was bank and other private flows, moving from 4.1% in 2008 Q1, to -1.4% in 2009 Q1, bouncing back to 3.4% in 2010 Q1. This is another illustration of the nature of financial openness: private financial flows are volatile, and subject to quick reversal. FDI seems to exhibit lower overall volatility, while banks and debt flow are highly volatile. Note that the overall swing of the flows was smaller than the one registered in the 1997–1998 crisis, but nevertheless large, and potentially destabilizing. While in the 1997–1998 crisis the volatility was mostly induced by factors specific to East Asia, the 2008–2009 crisis was propagated from the US, dominated initially by the deleveraging of foreign positions due to liquidity shortage induced by the financial panic in the US, as well as by the fear of the coming global recession. This time, however, the overall superior balance sheet position of emerging markets, especially of emerging Asia relative to that of the US and Europe, provided the impetus for the resumption of large inflows of capital. The solid resumption of growth of emerging Asia, in contrast to the anemic recovery of the US and Europe, and the instability of the eurozone propagated by

<sup>13</sup> See BIS, FSB, and IMF (2011), which also states “These issues are currently being examined in detail by the IMF, with a view to further developing guiding principles for the use of policies to manage capital flows, both from the perspective of individual countries and taking into account the multilateral dimension. Macroeconomic policies can be used to address the risks from large inflows.”

<sup>14</sup> See Calvo (1998) for a model of sudden stops, and Rajan, Siregar, and Bird (2005) for an application for Asia.

the shaky debt positions of its periphery countries, induced massive inflows of funds, possible chasing yields.

The resumption of the inflows of capital to emerging Asia comes at times when monetary expansions and easy credit induced by the crisis, and the fast growth recovery set in motion real estate and asset appreciations. The inflow of foreign capital may provide further impetus for these trends. Reserve accumulations to deal with external borrowing have limited capacity to deal with these challenges. It comes with the need to sterilize in order to mitigate the inflationary bias, yet sterilization is not costless, and may lead to secondary rounds of inflows, possibly leading to inflationary pressures down the road (see Aizenman and Glick 2009). Furthermore, emerging markets may participate today in another round of global carry trade, where the lower interest rates in the US and the OECD countries fund the purchase of higher yielding bonds in emerging countries. This situation exposes the global financial system to the potential instability associated with unwinding of carry trade positions. While such carry trade may provide private rents to savvy players, it exposes the taxpayers in emerging countries to greater future liabilities. As our previous discussion suggested, prudential regulations are needed to mitigate these forces. These regulations should supplement tighter monetary and fiscal stance, as there is no way to deal with the inflow pressure by prudential policy alone.

## 5. CONCLUDING REMARKS

The crisis of 2008–2009 is a tectonic shift that hastened the dismantling of the Bretton Woods II system, moving from a US centric towards a multi polar world. This paper focused on the crisis from the perspective of emerging market countries, with a special focus on emerging Asia. Overall, the crisis validated the gains from the middle ground position in the trilemma configuration, buffered by a sizeable chest of international reserves. Yet, the crisis also illustrated the need to take a broader public finance approach towards prudential regulations. Our analysis looked at the perspective of the emerging markets, and did not deal with the degree to which there is greater room for an overhaul of the global financial system. Emerging countries have asserted their willingness to use proactive measures managing their financial integration.

The recent statements from the International Financial Institutions (IFIs) may reflect a paradigm shift in the assessment of prudential regulation, propagated by the global crisis and the willingness of emerging market countries to experiment with new policies. Yet, it is premature to know the degree of the effectiveness of these steps, and the ultimate impact of the crisis on the IFIs' and the OECD's de facto and de jure positions regarding financial integration and prudential regulation. Nevertheless, the logic of the public finance approach suggests the following:

- i. **Evidence suggests that capital mobility is a mixed blessing.** Starting with autarky, FDI and greater financial integration seem to support economic growth. Yet, excessive inflow of hot money increases the vulnerability of a country to crises.
- ii. **The 2008–2009 crisis illustrated the risk of low and uneven standards of prudential regulations.** Chances are that the OECD countries overshot the optimal financial deregulation in the decade before the crisis, and the global financial globalization went too far.
- iii. **There is a probable rivalry between the interests of the financial sector and the non-financial economy.** Regulations should be set at a level that probably would make financial intermediation less profitable, so that the social marginal cost of financial intermediation equals the social marginal social benefit.
- iv. **Chances are that the financial system may resist changes, as it will cut its rents—**"Where you stand depends on where you sit." (Nelson Mandela). There is a built-in



bias against financial regulations: All the crises that were avoided by tighter financial regulations are imperceptible and not credited to the policymaker. Yet, the cost of financial regulation is transparent and debited to the policymaker. This asymmetry suggests that higher regulator effort, while helping to avoid a crisis, tends to erode over time the support for future regulation (Aizenman 2010).

## REFERENCES AND FURTHER READINGS

- Aizenman, J. 2011. Hoarding International Reserves Versus a Pigovian Tax-Cum-Subsidy Scheme: Reflections on the Deleveraging Crisis of 2008-9, *Journal of Economic Dynamics and Control* (35) 9: 1502–1513.
- Aizenman, J. 2009. Financial Crisis and the Paradox of Under- and Over-Regulation, NBER Working Paper # 15018, presented at the World Bank Annual Bank Conference on Development Economics (ABCDE), Seoul, June 2009. Appeared at *Lessons from East Asia and the Global Financial Crisis* (ABCDE), J. Y. Lin and B. Pleskovic (eds.). World Bank World Bank Publications, 2011: 213–234.
- Aizenman, J. and J. Lee. 2007. International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence. *Open Economies Review* (18) 2: 191–214.
- Aizenman, J. and J. Lee. 2008. Financial versus Monetary Mercantilism—Long-run View of Large International Reserves Hoarding. *The World Economy* (31) 5: 593–611.
- Aizenman, J., M.D. Chinn, and H. Ito. 2010. The Emerging Global Financial Architecture: Tracing and Evaluating the New Patterns of the Trilemma's Configurations, *Journal of International Money and Finance* (29) 4: 615–641.
- Aizenman, J., M.D. Chinn, and H. Ito. 2011. "Surfing the Waves of Globalization: Asia and Financial Globalization in the Context of the Trilemma." *Journal of the Japanese and International Economy* (25) 3: 290–320.
- Aizenman, J. and R. Glick. 2009. "Sterilization, Monetary Policy, and Global Financial Integration," *Review of International Economics* (17): 4: 777–801.
- Aizenman, J. and Y. Sun. 2010. The financial crisis and sizable international reserves depletion: From 'fear of floating' to the 'fear of losing international reserves'?" NBER Working Paper No. 15308.
- Aizenman, J. B. Pinto and R. Radziwill. 2007. Sources for financing domestic capital – is foreign saving a viable option for developing countries? *Journal of International Money and Finance* (26) 5: 682–702.
- Aizenman, J. and V. Sushko. 2011. Capital Flow Types, External Financing Needs, and Industrial Growth: 99 countries, 1991–2007, NBER Working paper No. 17228.
- Bianchi, J. 2010. Overborrowing and Systemic Externalities in the Business Cycle. Manuscript.
- BIS, FSB and IMF. 2011. Macro prudential policy tools and frameworks: Update to the G20 Finance Ministers and Governors. Manuscript.
- Calvo, G. 1998. Capital Flows and Capital-market Crises: The Simple Economics of Sudden Stops. *Journal of Applied Economics* 1: 35–54.
- Calvo, G. and Reinhart, C. M. 2002. Fear of Floating, *Quarterly Journal of Economics* 117: 379–408.
- Calvo, G. 2006. Monetary Policy Challenges in Emerging Markets: Sudden Stop, Liability Dollarization, and Lender of Last Resort. Working Paper 12788, National Bureau of Economic Research.
- Cheung, Y. W, and X. W. Qian. 2009. Hoarding of International Reserves: Mrs. Machlup's Wardrobe and the Joneses. *Review of International Economics*. 17(4): 824–843.
- Cheung, Y. W, and H. Ito. 2009. Cross-sectional analysis on the determinants of international reserves accumulation. *International Economic Journal* (23) 4: 447–481.

- Chinn, M. D., and H. Ito. 2008. A New Measure of Financial Openness. *Journal of Comparative Policy Analysis* (10) 3: 309–322.
- De Gregorio, J. 2011. International Reserve Hoarding in Emerging Markets Economies, Center Bank of Chile report No. 40.
- Dominguez, K, Y. Hashimoto, and T. Ito. 2011. International Reserves and the Global Financial Crisis. Manuscript, the NBER.
- Dooley, P. M., D. Folkerts-Landau, and P. Garber. 2003. An Essay on the Revived Bretton Woods System. NBER Working Paper No. 9971. Cambridge, MA: National Bureau of Economic Research.
- Eichengreen, B., and R. Hausmann. 1999. Exchange Rates and Financial Fragility, NBER Working Papers No. 7418.
- Gourinchas P. O., and O. Jeanne. 2006. The Elusive Gains from International Financial Integration, *Review of Economic Studies* (73) 3: 715–741.
- Korinek, A. 2010. Excessive Dollar Borrowing in Emerging Markets: Balance Sheet Effects and Macroeconomic Externalities, manuscript.
- Obstfeld, M., Shambaugh, J. C. and Taylor, A. M. 2010. Financial Stability, the Trilemma, and International Reserves. *American Economic Journal: Macroeconomics* (2): 57–94.
- Park, Y. C. 2009. Reform of the Global Regulatory System: Perspectives of East Asia's Emerging Economies, presented at the *World Bank Annual Bank Conference on Development Economics (ABCDE)*, Seoul, June 2009. Appeared at *Lessons from East Asia and the Global Financial Crisis (ABCDE)*, J. Y. Lin and B. Pleskovic (eds.). World Bank World Bank Publications.
- Pasricha, K. G. 2011. When are capital controls macro prudential tools? Manuscript, Bank of Canada.
- Rajan R. S., R. Siregar and G. Bird. 2005. The Precautionary Demand for Reserve Holdings in Asia: Examining the Case for a Regional Reserve Pool, *Asia Pacific Journal of Economics and Business* (5)12: 21–39.
- Rajan, R., and L. Zingales. 1998. Financial Dependence and Growth. *American Economic Review* 88: 559–86.
- Rodrik, D. 2006. The Social Cost of Foreign Exchange Reserves, *International Economic Journal* (20) 3: 253–266. [talog/world-development-indicators](http://www.talog/world-development-indicators).