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Why Was Asia Resilient? Lessons from the Past and for the Future

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Why Was Asia Resilient? Lessons from the Past and for the Future

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Abstract

Asia proved to be remarkably resilient in the face of the global financial crisis, but why was its output performance stronger than that of other regions? The paper shows that better initial conditions—in the form of lower external and financial vulnerabilities—contributed significantly to Asia's resilience. Key pre-crisis factors included moderate credit expansion, reliance on deposit funding, enhanced bank asset quality, reduced external financing, and improved current accounts. These improvements reflected the lessons from the Asian financial crisis in the late 1990s, which helped reshape both public policies and private sector behavior. For example, several countries stepped up their use of macroprudential policies, well before they were recognized as an essential component of the financial stability toolkit. They also overhauled financial regulations and strengthened oversight of financial institutions, which helped reduce risk-taking by households and firms before the global financial crisis. Looking ahead, Asia is in the process of adjusting to more volatile external conditions and higher risk premiums. By drawing the right lessons from its pre-crisis experiences, Asia's economies will be better equipped to address new risks associated with increased cross-border capital flows and greater integration with the rest of the world.

JEL Classification Numbers: G01, E44, F32, N25

Keywords: Global financial crisis, resilience, financial and external vulnerabilities

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"Those who cannot remember the past are condemned to repeat it."

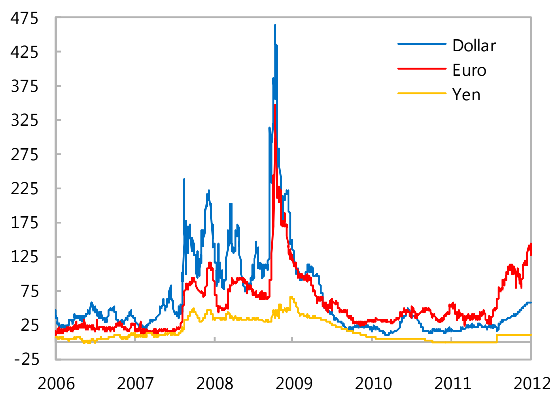
George Santayana

WHY WAS ASIA RESILIENT? LESSONS FROM THE PAST AND FOR THE FUTURE

I. INTRODUCTION

The widespread default of U.S. subprime loans in 2007 erupted into a major financial crisis that spilled over to Asia and the rest of the world. With liquidity conditions rapidly deteriorating toward the end of October 2008 (Figure 1), banks and other financial institutions at the core of the global financial system pared back their positions overseas, forcing asset fire-sales and the withdrawal of credit lines around the world. Trade financing dried up and worldwide demand plunged. The economies of the major advanced countries ground to a halt in the fourth quarter of 2008 and Asia, along with the rest of the world, suffered a sharp decline in output in the ensuing global credit crunch (Figure 12).

Figure 1. Interbank Spreads, 2006-2011[1/]
(Basis points)



Sources: Bloomberg; and IMF staff calculations.
1/ Based on the difference between 3-month LIBOR and 3-month treasury bill rate.

The initial impact of the global financial crisis (GFC) recalled the trauma that engulfed Asia only a decade ago. The scale of capital outflows and the collapse in real activity in late 2008 were as large as that experienced during the height of the Asian financial crisis (AFC). The AFC culminated in a full blown financial crisis in Korea, Indonesia, Malaysia, the Philippines and Thailand, with sharp corporate and bank deleveraging, which led to significant output contractions, along with business failures, unemployment, and poverty.[1]

[1] See IMF (2000 and 2007) and Lane and others (1999) for a comprehensive discussion of the AFC and its aftermath.

Yet, this time the outcome for Asia was different from ten years ago and from other similar economies. There was no full-blown financial crisis or sharp destructive external adjustments. Asia was relatively resilient and able to preserve systemic stability, while the euro area encountered its worst economic and financial crisis in history and other major advanced economies struggled to regain their footing. A number of economies such as Australia, China, and Indonesia continued growing throughout the GFC while the economies that saw an initial steep decline in output, such as Korea, Malaysia and Singapore, posted swift and robust recoveries.

Why was Asia more resilient and will it continue to be resilient? This paper provides an analysis of the factors underpinning Asia's resilience during the GFC. It attempts to determine whether better initial conditions in Asia helped contribute to its resilience relative to the rest of the world during the GFC. The marginal impact of each factor is estimated using OLS regressions.[2] An analysis of what went *right* offers important lessons for the future as the international community strives to complete the ambitious agenda on financial sector reform. Indeed, the need for Asia to reduce macro-financial vulnerabilities and to speed up regulatory reform have once again become prominent as investors pulled out of the region in reaction to news that the Fed will be ending quantitative easing.

II. The Global Financial Crisis

The GFC hit Asia hard in two ways:[3]

- Capital fled the region (Figure 2). BIS-reporting banks' cross-border claims on Asia declined by about 15 percent between the third quarter of 2008 and the first quarter of 2009. This was roughly twice the reduction experienced in other regions and surpassed the decline seen during the worst of the AFC (Appendix Table 2). The deleveraging was mostly carried out by European banks (both inside and outside the euro area), reducing their consolidated claims in virtually all Asian countries (Figure 13).[4]

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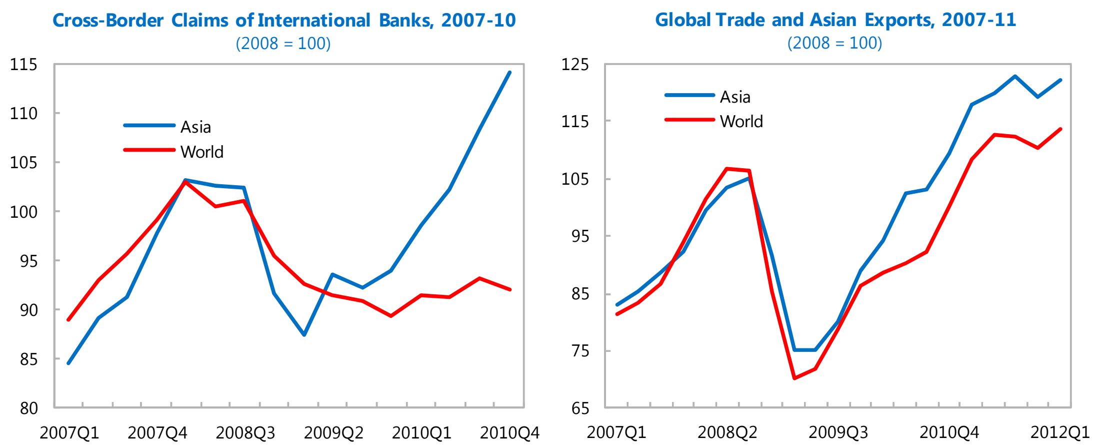
[2] The analysis in this paper is restricted to larger advanced and emerging economies in Asia with a significant financial sector as defined in Appendix Table 1. Given Asia's heterogeneity, this would help avoid over-generalizing and ensure greater comparability.

[3] See IMF (2008a, 2008b, 2009a, 2009b, and 2009c).

[4] More broadly, total net capital outflows, including portfolio and foreign direct investment, from Asia were significant and, excluding China, amounted to 3½ percent of GDP on an annualized basis.

- Exports fell. Between September 2008 and February 2009, exports plummeted by 30 percent. This was comparable to the decline seen in other regions, and three times more severe than during the AFC. Industrial production for highly export dependent economies such as Hong Kong SAR, Malaysia, Singapore, and Thailand, was sharply lower. Even the larger economies that were not as export dependent, such as Australia, China, India and Indonesia, experienced a small decline.[5]

Figure 2. Asia: Financial and Trade Shocks during the Global Financial Crisis



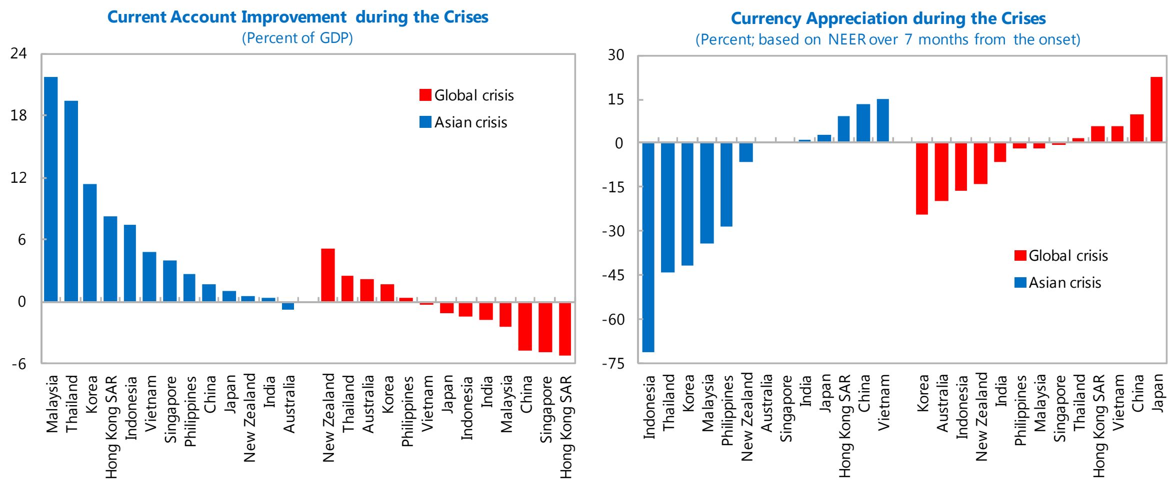
Sources: BIS, Locational Banking Statistics; IMF, Direction of Trade Statistics, International Financial Statistics, and IMF staff calculations.

As a result, output shrank for Asia as a whole for two consecutive quarters (Figure 14). Real GDP in Asia, excluding China and India, fell by 11 percent in the fourth quarter of 2008 and a further 8 percent in the first quarter of 2009, on an annualized basis. The initial drop in output was more acute than that in other regions, including those countries that were at the core of the crisis.

The external shocks were also followed by significant exchange rate depreciation in several countries. In particular, countries running current account deficits and accumulating foreign liabilities in their banking systems, or with relatively open capital markets (notably, Australia, Korea, India, Indonesia, and New Zealand) were most affected by the initial shockwave and in many cases saw their nominal effective exchange rates depreciate significantly. The depreciations were nevertheless smaller and smoother than during the AFC, as were the current account adjustments (Figure 3). The relatively modest adjustment in the exchange rate and current account reflected external imbalances that were not as large as during the AFC.

[5] Industrial production for the export dependent economies fell by a record 16 percent and about 1 percent for the four larger economies, reflecting a smaller shock to exports.

Figure 3. Asia: Current Account Adjustments and Exchange Rate Movements



Sources: IMF, Information Notice System and World Economic Outlook databases; and IMF staff calculations.

To mitigate the effects of the GFC shock, Asia quickly adopted monetary and fiscal stimulus. Low inflation and government debt, credible monetary policies, and fiscal surpluses meant that many countries in Asia were able to mount a decisive and comprehensive countercyclical policy response. Aggressive monetary easing through cuts in policy rates or reserve requirements, large fiscal stimulus packages amounting to 3-5 percentage points on a cyclically adjusted basis (Table 1), and unprecedented actions by central banks to ensure that financial systems had adequate liquidity and support,[6] all served to mitigate the effects of the crisis.

Table 1. Regions: Change in Fiscal Balance, 2007-2009 (Percentage points)

	Actual 1/	Cyclically adjusted 2/
Advanced economies	-7.8	-3.9
Advanced Asia	-6.9	-5.1
Emerging economies	-4.8	-2.8
Emerging Asia	-3.9	-3.2
China	-3.9	-3.5
India	-5.2	-4.2

Sources: IMF, Fiscal Monitor October 2012; and IMF staff calculations.
1/ In percent of GDP
2/ In percent of potential GDP

[6] Measures taken to support domestic financial markets included: providing easy access to central bank facilities, remunerating required reserves, and introducing a host of measures including, blanket guarantees on deposits, swaps to companies and banks needing foreign currency, guarantees on external bond issuance for banks, and expansions of guarantees to ensure that small and medium-sized enterprises could retain access to credit.

Starting in March 2009, Asia's exports and economy began to revive. Strong competitive positions, in some cases aided by exchange rate depreciation, and robust import demand within the region, in particular from China, helped propel Asian exports to above the pre-crisis level by the second quarter of 2010, three quarters ahead of the full recovery of global trade (Figure 15). By end 2010 and through 2011, Asia was driving the global recovery, the first time that Asia's contribution to a global recovery had outstripped that of other regions. At the same time, unemployment rates were contained and only in New Zealand did rates increase significantly, by about 2½ percentage points.[7]

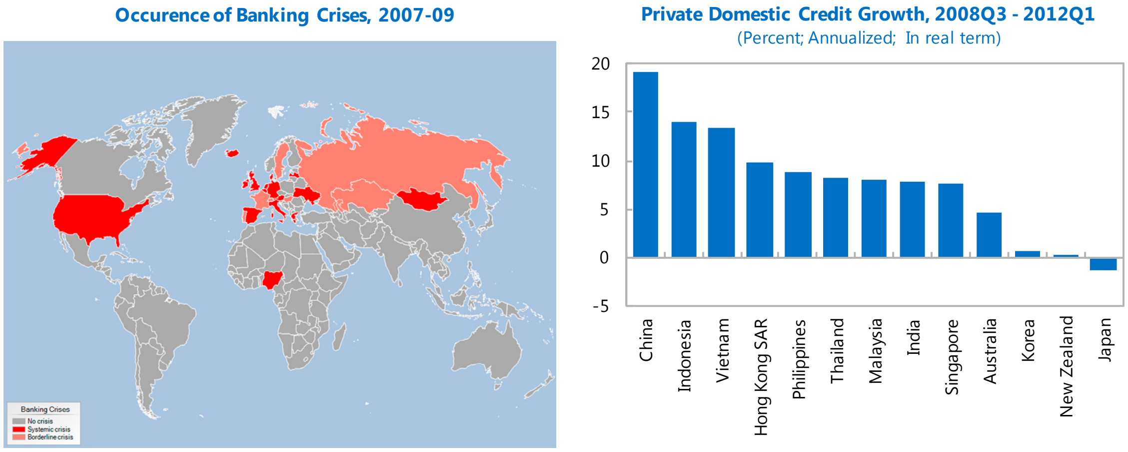
Capital inflows also quickly resumed. Within just 6 quarters, BIS-reporting banks' cross-border claims on Asia rose from a trough in early 2009 to a new high in late 2010, much shorter than the decade it took to recover from the AFC. By end-2011, worldwide cross-border claims of international banks on Asia had reached another new high even though claims on other parts of the world were still 10 percent lower than the pre-crisis level. Korea was the only country with claims remaining about 20 percent below its pre-crisis level, but this reflected the reduced reliance of banks on foreign wholesale funding following macroprudential measures implemented to rein in foreign currency risk.

Asia's financial sector remained stable through the crisis. There were no full blown banking or balance of payment crises, or very sharp current account adjustments, as there were during the AFC (Figure 4).[8] Most countries did not see a significant deterioration in financial soundness indicators and Asian currencies strengthened relative to their pre-crisis levels in a short span of time. As the banking systems in Asia remained stable, private domestic credit generally held up and resident deposits continued to gradually expand in response to concerted efforts by banks to change their funding composition away from wholesale to retail. In countries such as Australia, Korea and New Zealand that relied more on wholesale funding, domestic credit growth dropped quite substantially, in part because of a significant decline in credit demand by households and businesses. In Japan, the stagnant credit growth was emblematic of a decade long structural trend.

[7] The recovery in economic activity in New Zealand and Japan were interrupted by devastating earthquakes in 2010 and 2011, respectively.

[8] Laeven and Valcencia (2012) provide a database on banking crises, and in contrast to the AFC, during the GFC, no Asian country had a banking crisis.

Figure 4. Banking Crises and Credit Growth



Sources: IMF, International Financial Statistics; Laeven and Valencia (2012); and IMF staff calculations.

III. Factors Underpinning Asia's Resilience

Macroeconomic policies in Asia were sound going into the GFC but this was also true for many of the countries at the epicenter of the crisis. Asia and many of the advanced economies shared common attributes: low inflation, fiscal surpluses or small deficits except for Greece, and public debt that was largely below 60 percent of GDP (Figure 16). These indicators were not exceptionally more favorable in Asia compared with the rest of the world. Thus, while credible and consistent macroeconomic policies were necessary to support a stable economy, they alone were not sufficient to explain cross country differences in resilience during the GFC.

Asia was more resilient than other regions because of relatively low financial and external vulnerabilities, the result of a decade of financial and structural reform following the AFC. The AFC had illustrated how financial imbalances in banks and corporations can become a threat to overall macroeconomic stability, thus raising the awareness of their close interdependence, and the need for financial sector reform to reduce key vulnerabilities (Box 1). As a result, policymakers in Asia adopted a more proactive and intensive approach to banking supervision to ensure that idiosyncratic risks were closely monitored and addressed, while making use of macroprudential instruments to respond to emerging systemic risks in the financial sector. Indeed, Asia was ahead of many other countries in deploying instruments, such as restrictions on loan-to-value, debt-to-income and credit growth, limits on currency and maturity mismatches, and adjustments in reserve requirements and risk weights to contain excessive financial imbalances.[9] Equally important,

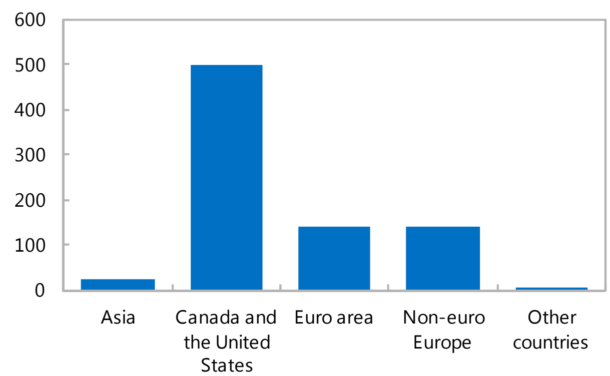
[9] For an analysis of macroprudential tools and usage, see Lim and others (2011) who also provide a comprehensive overview of global country experiences, including Asian countries. Lim and others (2013) analyze macroprudential arrangements in Asia.

the move to a more flexible exchange rate policy in the region also acted as an effective shock absorber (Appendix Table 3).

In particular, Asia's financial sector was not highly leveraged or dependent on wholesale funding for expansion, and perceived to be well regulated.

- Private sector credit growth in the five years preceding the GFC was modest compared to the advanced countries, and in some cases the expansion was slower than the rate of growth in GDP (Figure 17). In the countries most affected by the AFC, there was a long period of post-crisis deleveraging when private credit fell by some 40-50 percent of GDP.[10]
- Most Asian countries had credit to deposit ratios of around or below 100 percent before the GFC in stark contrast to many advanced countries and emerging European economies.
- The banking system was well capitalized with high quality (common equity tier-1) capital. Nonperforming loans were a small share of total loans and, given tight regulatory restrictions, exposure to subprime loans or structured credit products, such as collateralized debt obligations was minimal (Figure 5).

Figure 5. Subprime Market Losses and Writedowns (US$ billions)



Sources: Bloomberg; and IMF staff calculations.

- Banks' predominantly held a net foreign asset position and were less vulnerable to external shocks during the GFC. They did not face a sustained debilitating funding squeeze, and were also able to easily absorb losses on their overseas securities portfolios, including Japanese banks, which had the highest leverage and exposure to Lehman Brothers (US$4.2 billion).[11] Significant steps were taken to strengthen

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[10] Only four jurisdictions—Australia, New Zealand, Taiwan Province of China, and Vietnam—witnessed an increase in private domestic credit to GDP by more than 3 percentage points per year during 2002-07.

[11] See IMF (2008b).

prudential regulation and supervision, particularly among the ASEAN-5 countries following the AFC (Appendix 2).

In addition, Asian economies were not highly exposed to short-term external liabilities, and rollover risk was low, thus enabling the falling exchange rate to absorb the initial shock.

- Most countries were running current account surpluses, ranging from 2 percent of GDP to more than 25 percent, limiting the need for net foreign financing.[12]
- In 2007, net external debt was about 25 percent of GDP or less except for Australia and New Zealand.
- The ratio of short-term external debt to foreign reserves was below 100 percent in the nine Asian countries for which data is published; only Hong Kong SAR had a ratio above 100 percent, albeit it had a strong overall net foreign asset position.[13]
- The stock of foreign reserves had been built up significantly after the AFC for countries with floating as well as managed or pegged arrangements, and speculative attacks were largely avoided.

Within Asia, the economies most affected by contagion from the GFC were precisely those with faster credit growth and larger current account deficits, funded by foreign currency borrowing. Australia, Korea, and New Zealand fell into this group (Figure 17). However, in these economies, the worst effects were avoided owing to effective policy responses, including central bank liquidity support. The exchange rates were allowed to depreciate vis-à-vis the U.S. dollar—by about 30 percent in Korea, which helped turn its current account from a deficit in the third quarter of 2008 to a surplus in early 2009, and by about 25 percent in Australia.[14] Furthermore, Australia, Korea, and New Zealand established U.S. dollar swap lines with the Federal Reserve, which in the case of Korea was in addition to its already large pool of foreign reserves, to further bolster market confidence. New Zealand banks received funding support from their Australian parents, which were perceived to be sound. Eventually, markets participants were able to distinguish the strong macroeconomic fundamentals in these countries and their economies recovered quickly soon after.

Another important, albeit idiosyncratic, factor contributing to Asia's resilience was its regional dynamism and China's strong economic performance. In the years before the GFC,

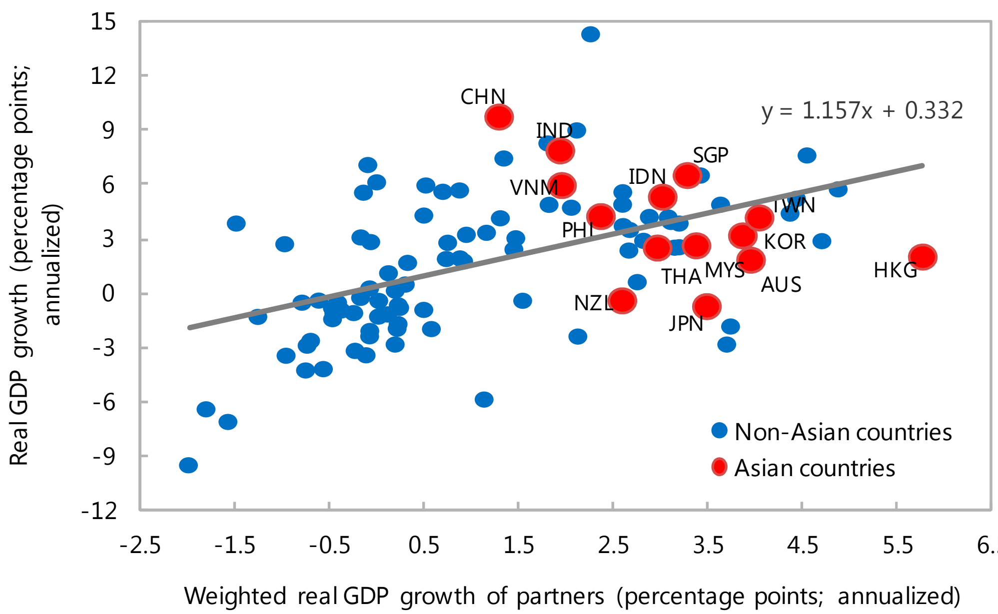
[12] The exceptions are Australia, New Zealand and Vietnam, which ran relatively large current account deficits of more than 5 percent of GDP.

[13] Hong Kong SAR has a high level of foreign reserves when compared to the monetary base (372 percent), months of retained imports (19½), and GDP (73½ percent).

[14] As noted in the 2012 Australia FSAP, although banks' net foreign currency liabilities amounted to 24 percent of GDP, almost all foreign currency positions are hedged. The authorities also had considerable policy space to respond to negative shocks given low public debt, a flexible exchange rate, some scope for monetary easing and a well capitalized banking system.

Asia was one of the most dynamic and fast growing regions in the world. As recovery took hold, individual economies helped each other sustain the growth momentum. In particular China's robust growth supported demand for Asian countries' export, including through higher commodity prices that benefitted countries such as Australia, Indonesia, and New Zealand. Moreover, in India and Indonesia, domestic demand held up fairly well and supported growth. In a scatter plot showing the relationship between real GDP growth and the GDP growth of trading partners during 2009-10, Asia gained from having partners that were strong, especially China, with growth 1.2 percentage points higher for each additional percentage point increase in the growth of its partners (Figure 6).

Figure 6. Real GDP Growth and Partners' Economic Performance, 2009-2010



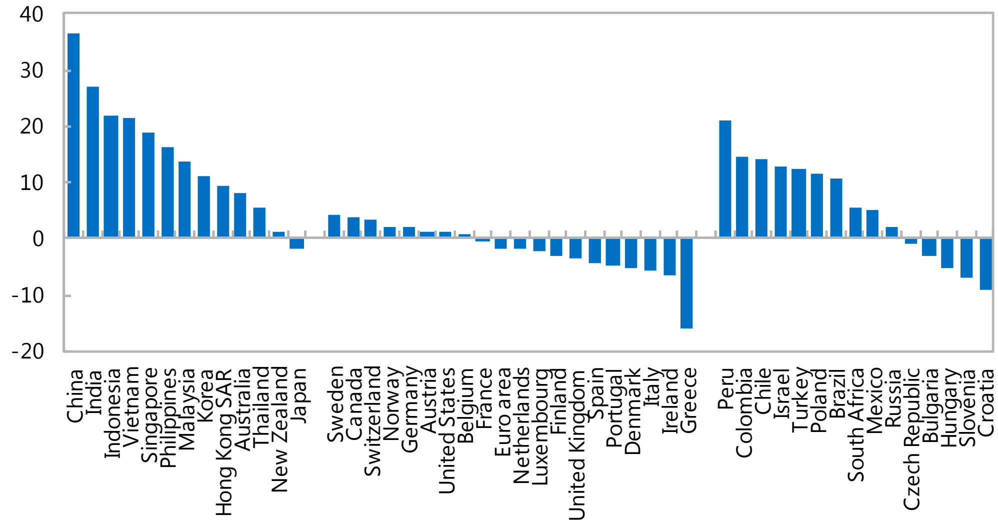
Sources: IMF, World Economic Outlook database; and IMF staff calculations.

IV. Estimating Asia's Resilience during the GFC

A. How Resilient Was Asia?

By mid 2012, output in most Asian countries was significantly higher than their pre-crisis levels, a sharp contrast to some other parts of the world (Figure 7). In this section, we estimate the "magnitude" of Asia's resiliency and the relative importance of financial and external strength, as noted in the section above, in underpinning the recovery from the GFC.

Figure 7. Real GDP, 2012H1
(Percentage points, relative to pre-crisis peak)

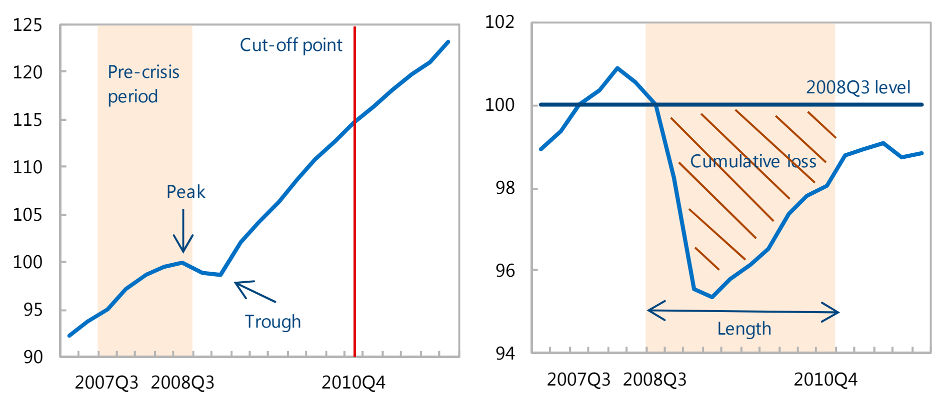


Sources: IMF, World Economic Outlook database; and IMF staff calculations.

To assess economic resilience, a measure of output performance is derived based on the depth and length of output decline to give a cumulative output loss/gain for each country:

- Depth: The extent of the decline in real GDP from the pre-crisis peak to the trough (Figure 8). The pre-crisis peak is the highest output level that occurs between 2007Q3–and 2010Q4. The distance from peak to trough captures the immediate impact of the GFC shocks on output. In cases of no output contraction, the depth is set to zero.

Figure 8. Measuring Output Performance



- Length: The time it takes for output to recover to the 2008Q3 level with a cut-off point at 2010Q4, to focus directly on the effects of the GFC. Thus, the longest recovery period is restricted to 9 quarters.

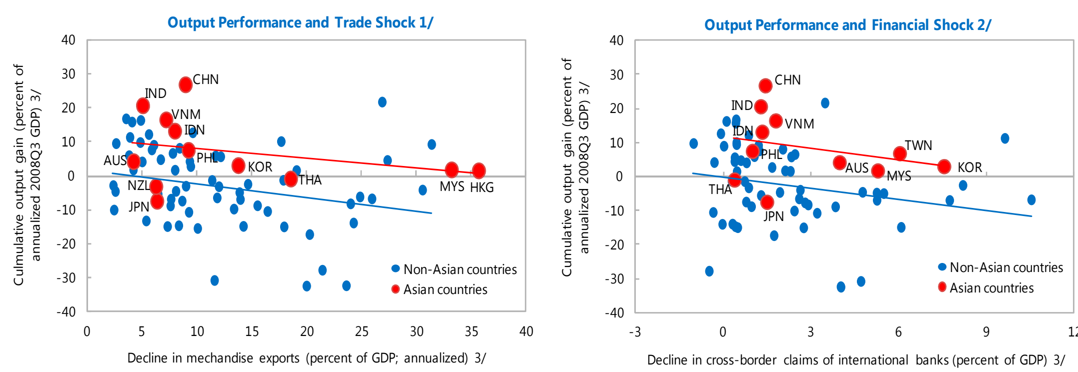
- Loss: The cumulative loss of output relative to the 2008Q3 level. In cases where the economy expanded rapidly after an initial drop, or did not contract at all, there would be a positive cumulative output gain (which is a negative output loss).
- Economic resilience minimizes the output loss for each country.

Using the measure of output performance and accounting for the size of the trade and financial shocks, Asia is shown to be resilient in a sample of 82 countries.[15] The result is obtained using a cross-country regression of output performance (y) on financial shock (fs) defined as the change in the cross border claims of international banks, and trade shock (ts) defined as the change in merchandise exports between 2008Q4 to 2009Q1,[16] and a dummy variable (A_D) to represent Asian countries:

$$y_i = \alpha + \beta_i \mathrm{fs}_i + \beta_i \mathrm{ts}_i + A_D \varepsilon_i.$$

On average, the positive "Asia effect" meant that countries in the region had a shallower decline in output, a faster recovery, and a smaller cumulative output loss compared to other regions (Figure 9).[17] Specifically, comparing Asia to the rest of the world, the depth of the output decline was smaller by 2.8 percentage points, the recovery to the 2008Q3 output levels was more than 3 quarters quicker, and the cumulative output loss was lower by 11 percent of annualized 2008Q3 GDP. This is in contrast to the results for Europe, where the trade and financial shocks caused significant output losses and some countries have yet to emerge from recession five years after the onset of the GFC.

Figure 9. Output Performance and Shocks during the Global Financial Crisis



Sources: Haver Analytics; IMF, International Financial Statistics and World Economic Outlook database; and IMF staff calculations.
1/ Excluding Singapore due to its significant decline in mechandise exports (65 percent of GDP).
2/ Excluding countries experienced extremely large change in cross-border claims of international banks.
3/ Output performance is based on the period 2008Q3-2010Q4. Trade and financial shocks cover the period 2008Q4-2009Q1.

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15 The sample covers all 82 countries whose quarterly GDP data are available and reliable.

16 The reason for restricting the shocks to these two quarters is to isolate the GFC shocks from other developments, and thus ensuring that they can be treated as exogenous and the relationship between the shocks and output performance can be estimated by using ordinary least square.

17 The results are qualitatively similar for all three measures of output performance.

B. Testing Asia's Financial and External Strength

The next step is to evaluate how much financial and external strength contributed to Asia's resilience and explained cross-country differences in output performance during the GFC.[18] To examine this relationship, a series of bivariate regressions were estimated:

$$y_i = \alpha + \beta x_i + \varepsilon_i,$$

where y_i is output performance in country i (i.e. depth, length or loss), and x_i is an indicator capturing the degree of financial or external vulnerabilities in country i prior to the GFC (Appendix 3). Five indicators were used to capture financial vulnerabilities: (i) credit growth with respect to GDP; (ii) the change in the ratio of non-performing loans to total loans to measure asset quality; (iii) the ratio of private credit to total deposits as a proxy for the economy's reliance on wholesale funding; (iv) the change in total capital to assets as a measure of banking system leverage; and (v) the net foreign assets of the banking system to measure its exposure to foreign funding risk.[19] The indicators used to capture external vulnerabilities measure the country's reliance on external financing in one form or another: (i) gross external debt; (ii) net external debt; (iii) the ratio of foreign reserves to short-term external debt; (iv) the current account deficit; (v) net non-direct investment inflows. Of course, financial and external vulnerabilities are also interconnected: for example, current account deficits generate external borrowing, which is typically denominated in foreign currency and intermediated through the banking system. Table 2 and Appendix Table 7 show the pre-GFC initial conditions of these vulnerability indicators. On this basis, Asia was in a much stronger position than Europe and Western Hemisphere, including Latin America.

[18] A closely related work by Park, Ramayandi, and Shin (2013) analyze factors explaining output performance in countries that experience a currency crisis. They find that basic macroeconomic conditions such as inflation and GDP growth before a crisis can explain output performance differences among crisis countries. However, their focus is on comparing the experiences during the AFC and the GFC of the five Asian economies that were the hardest hit during the AFC, and not on what "went right" for Asia in terms of financial and external vulnerabilities compared to other countries and regions.

[19] An indicator to measure exposure to subprime loans was not included because of the lack of consistent data for the countries in the sample.

Table 2. Initial Conditions

	Initial Conditions 1/			
	Asia	Europe	Western Hemisphere	Rest of the World
Financial vulnerabilities				
Change in credit to GDP	-1.3	5.1	1.9	2.0
Increase in bank NPLs to total loans	-7.1	-2.8	-0.8	-6.2
Credit to deposit ratio	88.1	133.3	112.3	92.7
Banking system's net foreign assets	7.6	10.9	0.7	2.9
Increase in bank capital to total assets	1.1	-0.6	0.9	1.7
External vulnerabilities				
Gross external debt	18.0	80.6	60.5	20.2
Net external debt	-7.0	12.2	28.9	12.2
Foreign reserves to short-term debt	450.4	121.8	157.9	545.4
Current account deficit	-5.6	0.2	3.3	-7.1
Cumulative net non-direct investment inflow	0.1	1.2	3.3	-2.9

Source: IMF staff estimates.
1/ Based on initial conditions of all countries in each region.

The empirical evidence suggests that countries with less *prior* financial and external vulnerabilities had more favorable output performance during the GFC.[20]

- Most of the estimated coefficients are statistically significant and have the expected sign, including financial soundness indicators such as capital and non-performing loans. Countries with a slower pace of expansion in credit to GDP and less accumulation of external debt, particularly of the non-direct investment kind, also fare better in output performance (Table 3).[21]
- On a weighted average basis, the drop in output in Asia was 3.8 and 1.4 percentage points lower compared to Europe and Western Hemisphere, respectively; the recovery period was shorter by about 5.4 and 5 quarters; and the cumulative output loss was lower by 21 and 16 percent of annualized 2008Q3 GDP.
- With respect to financial vulnerabilities, credit growth appears as the most important factor in terms of explaining the difference in output performance across countries. The modest pre-GFC credit expansion in Asia can account for about 40 percent of the difference in the cumulative output loss vis-à-vis non-Asian economies (Figure 10

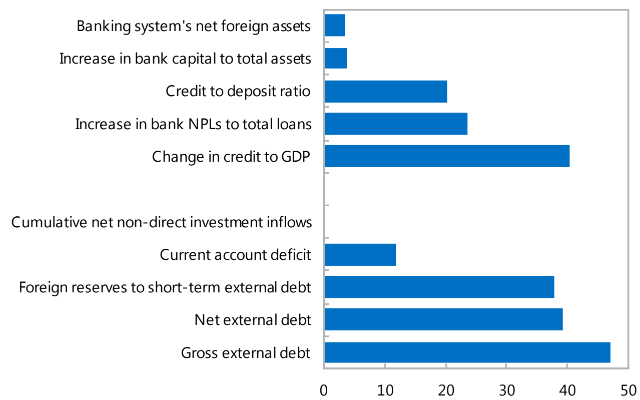
[20] As always the econometric evidence must be interpreted with caution. Strictly speaking, the analysis does not establish causality (which is generally difficult to establish) and the results should be seen as correlations between output performance during the GFC and financial and external vulnerabilities pre-GFC. Still, the explanatory variables have been chosen and constructed such that they represent conditions *prior* to the GFC, and should not be affected by output performance in the years following the GFC.

[21] Macroeconomic variables such as inflation, public debt to GDP and the fiscal balance to GDP were also included as explanatory variables in the regression but they were not statistically significant. This is because Asia was not unique in enjoying fiscal strength *prior* to the crisis—some advanced and emerging economies in other regions also entered the crisis from a position of fiscal strength. This suggests that sound macroeconomic management is necessary but not sufficient to explain regional differences in output performance, or resilience to shocks.

and Table 4), and 37 and 24 percent vis-à-vis Europe and Western Hemisphere, respectively.

Figure 10. The Relative Importance of Financial and External Vulnerabilities in Explaining Differences in Output Performance between Asia and Other Regions

Share of Cumualtive Output Loss Explained by Initial Conditions 1/



Source: IMF estiamtes.
1/ For each region, the share of cumulative output loss (relative to Asia) explained by a particular initial condition is calculated as its estimated output loss (relative to Asia) divided by its actual output loss (relative to Asia). Then, the shares of individual regions are aggregated and weighted by regional GDP. The estimated output loss is based on the bivariate regression analysis.

- With respect to external vulnerabilities, the level of external debt and foreign reserves matter the most, individually able to explain about 40-45 percent of the difference in the cumulative output loss between Asia and non-Asian economies.
- The combined contribution of financial and external vulnerabilities to output performance can be estimated using a multivariate regression analysis. Based on preferred specifications,[22] lower financial and external vulnerabilities in Asia account for about 60-84 percent of the difference in the cumulative output loss vis-à-vis Europe, and 49-65 percent vis-à-vis Western Hemisphere.

The economic importance of these initial conditions is larger for emerging markets and developing economies.

[22] The preferred specifications are chosen based on the ability of the variables to explain cross-country output performance. In particular, the change in credit to GDP, the increase in NPLs to total loans, and the credit to deposit ratio are always included, along with one external vulnerability indicator: gross external debt, net external debt, or foreign reserves to short-term external debt. The results are not reported here, but available upon request. Note, however, that interpretation of individual coefficients is difficult as many of the explanatory variables are highly correlated. In general, credit growth and dependence on wholesale funding, as well as external indebtedness and adequacy of foreign reserves remain statistically significant.

Table 3. Output Performance and Initial Conditions Based on Financial and External Vulnerabilities

Estimated Bivariate Regression Coeffcients

	All Countries				Only Emerging Markets			
	Depth	Length	Gain	Sample Size	Depth	Length	Gain	Sample Size
Financial vulnerabilities								
Change in credit to GDP	0.33 ***	0.30 ***	-1.18 ***	81	0.64 ***	0.35 ***	-1.74 ***	56
R-square	0.11	0.19	0.23		0.21	0.18	0.27	
Increase in bank NPLs to total loans	0.17 *	0.24 ***	-0.80 ***	71	0.20 *	0.15 **	-0.71 **	49
R-square	0.05	0.17	0.08		0.04	0.04	0.08	
Credit to deposit ratio	0.04 **	0.03 ***	-0.12 ***	80	0.06 **	0.02 **	-0.15 ***	56
R-square	0.12	0.12	0.20		0.22	0.09	0.22	
Increase in bank capital to total assets	-0.42 *	-0.48 ***	1.80 ***	71	-0.42	-0.47 ***	1.85 **	47
R-square	0.05	0.10	0.16		0.10	0.19	0.19	
Banking system's net foreign assets	-0.08	-0.01	0.16	75	-0.36 ***	-0.14 ***	0.80 ***	54
R-square	0.08	0.00	0.05		0.49	0.21	0.42	
External vulnerabilities								
Gross external debt	1.89 ***	1.94 ***	-6.83 ***	67	2.63 **	2.23 ***	-9.59 ***	56
R-square	0.13	0.32	0.23		0.13	0.25	0.29	
Net external debt	0.07 **	0.04 **	-0.18 ***	65	-0.01	0.06 **	-0.36 ***	45
R-square	0.10	0.09	0.13		0.02	0.13	0.24	
Foreign reserves to short-term external debt	...	...	...	...	-2.67 ***	-1.77 ***	7.75 ***	47
R-square	...	...	...		0.25	0.32	0.37	
Current account deficit	0.10	0.06 *	-0.38 **	82	0.00	0.11 **	-0.53 **	56
R-square	0.04	0.03	0.09		0.00	0.09	0.13	
Cumulative net non-direct investment inflows	0.30 *	0.19 **	-0.76 **	78	0.51 **	0.30 ***	-1.27 ***	56
R-square	0.09	0.07	0.09		0.16	0.15	0.17	

Source: IMF staff estimates.
Note: ***, ** and * indicate 1, 5 and 10 percent statistical significance, respectively.

Table 4. Estimated Impact of Initial Conditions on Output Performance

	Estimated Impact on Output Performance Relative to Asia 1/								
	Depth (percentage points)			Length (quarters)			Gain (percentage points; annualized)		
	Europe	Western Hemisphere	Rest of the World	Europe	Western Hemisphere	Rest of the World	Europe	Western Hemisphere	Rest of the World
Financial vulnerabilities									
Change in credit to GDP	2.1	1.1	1.1	1.9	1.0	1.0	-7.6	-3.8	-3.9
Increase in bank NPLs to total loans	0.7	1.1	0.1	1.0	1.5	0.2	-3.4	-5.0	-0.7
Credit to deposit ratio	1.6	0.9	0.2	1.1	0.6	0.1	-5.0	-2.9	-0.6
Increase in bank capital to total assets	0.7	0.1	-0.2	0.8	0.1	-0.3	-3.1	-0.4	1.0
Banking system's net foreign assets	-0.6	0.6	0.4	-0.1	0.1	0.1	1.1	-1.1	-0.7
External vulnerabilities									
Gross external debt	2.8	2.3	0.2	2.9	2.4	0.2	-10.3	-8.3	-0.8
Net external debt	1.4	2.4	1.3	0.9	1.5	0.8	-3.8	-6.6	-3.5
Foreign reserves to short-term external debt	3.5	2.8	-0.5	2.3	1.9	-0.3	-10.1	-8.1	1.5
Current account deficit	0.6	0.9	-0.1	0.4	0.5	-0.1	-2.2	-3.3	0.6
Cumulative net non-direct investment inflows	0.3	1.0	-0.9	0.2	0.6	-0.6	-0.8	-2.4	2.3
Preferred multivariate specifications 2/									
Gross external debt	5.2	3.2	1.2	5.2	3.0	1.0	-16.0	-10.5	-3.7
Net external debt	3.4	2.1	1.3	3.4	2.2	0.9	-12.4	-8.0	-4.1
Foreign reserves to short-term external debt	6.4	3.3	1.9	6.4	2.1	0.7	-17.3	-9.3	-4.3
Actual output performance relative to Asia 3/	3.8	1.4	-1.5	5.4	5.0	-0.6	-20.7	-16.3	-3.4

Source: IMF staff estimates.
1/ Based on initial conditions of all countries in each region.
2/ Multivariate regressions are based on change in credit to GDP, increase in bank NPLs to total loans, credit to deposit ratio, and one of the following external vulnerability indicators: gross external debt, net external debt, and foreign reserves t short-term external debt.
3/ Based on all 82 countries included in the regression analysis.

However, had the initial conditions for external and financial vulnerabilities been similar to those leading up to the AFC, Asia would be have been severely tested. The region would have suffered an output loss that is broadly similar to Europe and Western Hemisphere during the GFC. In particular, the cumulative output loss for Asia relative to the 2008Q3 annualized output level would have been larger by 4 percentage points given the rapid increase in credit to GDP of 1.9 percentage points annually pre-AFC, or by 5 percentage points after further incorporating the effects of rising dependence on wholesale funding and smaller foreign reserve buffers (Table 5).

Table 5. Estimated Impact on Output Performance if Asia were to have Weak Initial Conditions similar to those before the Asian Financial Crisis[1/]

	Initial Conditions				Estimated Impact on Output Performance Relative to Asia during the GFC					
	All Asia 2/		AFC countries 2/		Depth (percent)		Length (quarters)		Gain (percent of GDP)	
	Pre-AFC	Pre-GFC	Pre-AFC	Pre-GFC	All Asia	AFC coutnries	All Asia	AFC coutnries	All Asia	AFC coutnries
Financial vulnerabilities										
Change in credit to GDP	1.9	-1.6	4.6	0.1	1.1	1.5	1.0	1.4	-4.0	-5.4
Credit to deposit ratio	105.5	88.2	142.5	117.4	0.7	1.0	0.4	0.7	-2.1	-3.0
Banking system's net foreign assets	-0.4	7.8	-7.3	-1.4	0.7	0.5	0.1	0.1	-1.3	-0.9
External vulnerabilities										
Gross external debt	23.3	16.2	40.8	32.5	0.7	0.4	0.7	0.4	-2.5	-1.6
Foreign reserves to short-term debt	109.4	440.9	72.6	228.8	3.7	3.1	2.5	2.0	-10.8	-8.9
Current account deficit	0.4	-5.7	4.5	-4.6	0.6	0.9	0.4	0.5	-2.3	-3.4
Cumulative net non-direct investment inflow	0.5	0.1	4.2	-0.5	0.1	1.4	0.1	0.9	-0.3	-3.6
Preferred multivariate specifications 3/										
Gross external debt					1.6	2.1	1.2	1.2	-4.9	-5.6
Foreign reserves to short-term external debt					3.7	4.1	2.8	2.6	-11.7	-11.8

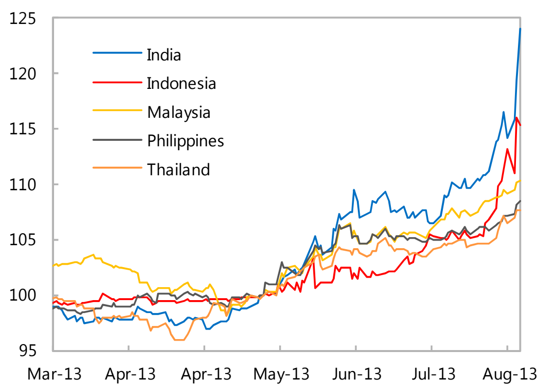
Source: IMF staff estimates.
1/ AFC stands for Asian financial crisis; GFC stands for global financial crisis.
2/ All Asia include all 14 major Asian countries included in the regression analysis. AFC countries include Indonesia, Korea, Malaysia, Philippines, and Thailand, all of which were severely hit by the AFC.
3/ Multivariate regressions are based on change in credit to GDP, credit to deposit ratio, and one of the following external vulnerability indicators: gross external debt and foreign reserves to short-term external debt.

Consistent with the existing literature on banking crisis, higher financial and external vulnerabilities before the GFC increased the likelihood of a banking crisis. Financial soundness indicators turn out to be significant—low capital to total assets, increasing non-performing loans to total loans, and high corporate leverage all increase the likelihood of a banking crisis. Likewise, higher credit growth and reliance on wholesale funding of credit also increase the likelihood of a banking crisis. External vulnerability indicators have more mixed results, but more non-FDI capital inflows and higher external debt are both associated with a higher likelihood of a banking crisis. To interpret the estimated coefficients beyond the direction of the effect, the elasticity of the probability to a change in the explanatory variables at the mean was calculated. The results show that the probability of a banking crisis is most sensitive to the credit to deposit ratio and corporate leverage, where an increase of one percent increases the probability by about 2 percent. The calculated elasticities are also quite high for the bank capital to asset ratio and the level of foreign reserves to GDP (Box 2).

V. Will Asia Continue To Be Resilient?

Asia's resilience was again tested in 2013 as news about the Fed's decision to taper quantitative easing led to a broad sell-off of emerging market assets. With investors discriminating among fundamentals and policies, those economies with larger financial and external vulnerabilities (e.g. higher wholesale funding or higher current account deficits) or have seen an increase in vulnerabilities, have been affected the most. Within Asia, India and Indonesia fall in this group. In both countries, current accounts deficits had widened and an increasing share was being financed by debt-creating inflows. Corporate leverage, including via direct external borrowing by unhedged firms, had also risen quickly in India.[23] In the three months from end-May to end-August 2013, the Indian rupee depreciated by 24 percent and Indonesian rupiah by 15 percent, compared with 3 percent for the rest of emerging and advanced Asia (Figure 11). In the process, Indonesia lost about 14 percent and India 6 percent of their foreign reserves. Market conditions have since calmed down, but risk premia in emerging markets have risen, leading to tighter funding conditions and higher volatility in almost all emerging market currencies.

Figure 11. Exchange Rates, 2013
(National Currency per US$; May 22, 2013=100)



Sources: Bloomberg; and IMF staff calculations.

Asia's underlying macroeconomic and external conditions have shifted since the GFC. In the post-GFC environment of low interest rates and abundant liquidity, Asia has been the recipient of substantial capital inflows from investors seeking higher rates of return. These inflows have led to the accumulation of foreign liabilities and rapid increases in domestic credit and asset prices, although it should be recognized that the acceleration in credit growth comes after a period of negative growth in the run up to the GFC (Table 6). On balance, financial vulnerabilities have not changed enough to make a significant difference to resilience, positive or negative. The deterioration in external factors, however, is more broad based and consistent with a weakening in resilience. Applying the estimated coefficients to

[23] See IMF (2013).

the initial conditions pre-GFC and at end-2012, shows that Asia's output resilience has weakened relative to the pre-GFC period. If history is a guide, these emerging risks, if unchecked, could lead to a significant build-up of risk in the economy.

Table 6. Estimated Impact on Output Performance if Asia were to have Today Initial Conditions 1/

	Initial Conditions		Estimated Impact on Output Performance Relative to Asia during the GFC		
	Pre-GFC	Today	Depth (percent)	Length (quarters)	Gain (percent of GDP)
Financial vulnerabilities					
Change in credit to GDP	-1.6	3.7	1.7	1.6	-6.2
Increase in bank NPLs to total loans	-7.0	-2.3	0.8	1.1	-0.9
Credit to deposit ratio	88.2	86.2	-0.1	-0.1	0.2
Increase in bank capital to total assets	1.1	0.6	0.2	0.2	-0.2
Banking system's net foreign assets	7.8	5.7	0.2	0.0	-0.3
External vulnerabilities					
Gross external debt	16.2	16.5	0.0	0.0	-0.1
Net external debt	-5.4	2.7	0.5	0.3	-1.5
Foreign reserves to short-term debt	440.9	358.6	0.6	0.4	-1.6
Current account deficit	-5.7	-1.2	0.4	0.3	-1.7
Cumulative net non-direct investment inflows	0.1	0.2	0.0	0.0	-0.1
Preferred multivariate specifications 2/					
Gross external debt			1.4	1.4	-4.5
Net external debt			1.1	2.1	-6.9
Foreign reserves to short-term debt			2.6	1.6	-7.1

Source: IMF staff estimates.
1/ GFC stands for global financial crisis.
2/ Multivariate regressions are based on change in credit to GDP, increase in bank NPLs to total loans, credit to deposit ration and one of the following external vulnerability indicators: gross external debt, net external debt, and foreign reserves to short-term external debt.

VI. Conclusion

Asia was hit hard by the GFC, but remained resilient as the region went into the crisis from a position of strength. A key reason for this was the experience of the AFC, which was a critical factor in shaping public sector policies and private sector behavior. The AFC triggered wide ranging financial and structural reforms that led to stronger banks and corporations. The AFC also made abundantly clear that sound macroeconomic policies, such as containing fiscal deficits and inflation, were necessary but not sufficient to ensure economic and financial prosperity; it was crucial to also take financial and external imbalances into consideration when formulating policies. The major improvements made included moderating credit expansion and reducing leverage in the financial system to a level that is more consistent with economic fundamentals, enhancing asset quality in the banking system, maintaining a more sustainable current account balance, thus containing reliance on foreign funding, and accumulating adequate foreign reserves to cushion a sudden reversal of capital inflows. These improvements were facilitated by the active use of macroprudential policies well before they were recognized as an essential component of the financial stability toolkit, and the overhaul of the financial regulation and oversight framework that forced changes in risk-taking by households and firms. These are the areas where strengthening initial conditions help improve output resilience the most. In addition, Asia benefited by being part of a fast growing region, with momentum from trading partner growth helping Asia to recover quickly.

Going forward, learning from experience must be an ongoing process that can enable Asia to fortify itself against future risks. Thus, in much the same way as with the AFC, the GFC provides an opportunity for Asia to take stock and draw lessons on how it should address new challenges, particularly from increased cross-border flows and greater integration with the rest of the world. Asia was visibly shaken by the recent turbulence in financial markets and, while it bounced back, the episode served as a timely reminder that complacency should be avoided at all cost.

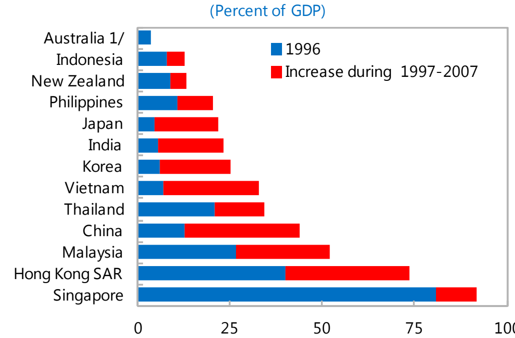
Box 1. The AFC and Post-Crisis Reform

The AFC was triggered in July 1997 when Thailand depleted its foreign reserves in defense of the baht which came under severe speculative attack. It was not until 1999 when real GDP recovered to its pre-crisis levels. The five Asian countries most severely and directly affected by the AFC were Indonesia, Korea, Malaysia, the Philippines, and Thailand. While the exact conditions in each country varied, the crisis was largely the result of financial imbalances due to significant reliance on foreign funding and inadequate financial sector oversight (Appendix Tables 4 and 5).

- Strong private capital inflows fueled a domestic demand boom, built up large unhedged foreign currency liabilities, and led to highly leveraged corporations. Private domestic credit, funded by capital inflows, increased substantially and fueled an unsustainable increase in real estate and stock prices. In most cases, the capital inflows were short-term and denominated in foreign currency, increasing the vulnerability to sudden stops.
- Tightly managed exchange rates made countries vulnerable to speculative attacks on their currencies. There were widespread currency and maturity mismatches, mainly due to the false impression that the exchange rate risk was small or nonexistent. Foreign reserves were not large enough to fully support fixed exchange rates, with short-term external debt exceeding foreign reserves in Indonesia, Korea, the Philippines, and Thailand, and, concurrently, several countries ran substantial and persistent current account deficits.
- The banking systems were highly vulnerable as a result of insufficient oversight following earlier liberalization. Many banks had inadequate risk management practices, while banking supervision was lax and financial legislation and regulation were lagging. Imprudent bank lending and loan portfolio risk management resulted in rapid credit expansion that eventually ended with substantial nonperforming loans.

The AFC experience prompted many countries in Asia, including those less directly affected by the AFC, to embark on an ambitious financial sector reform agenda. New laws and institutions were introduced to fill identified gaps in the regulatory and supervisory framework. Failed institutions were closed while the remaining viable banks were recapitalized and their legacy nonperforming loans removed and sold to restore profitability. Risk management policies, including rules on corporate governance and disclosure, were revamped with stiffer penalties for unsafe and unsound banking practices and expanded supervisory powers to intervene and conduct regular examinations.

Foreign Reserves , 1996-2007
(Percent of GDP)



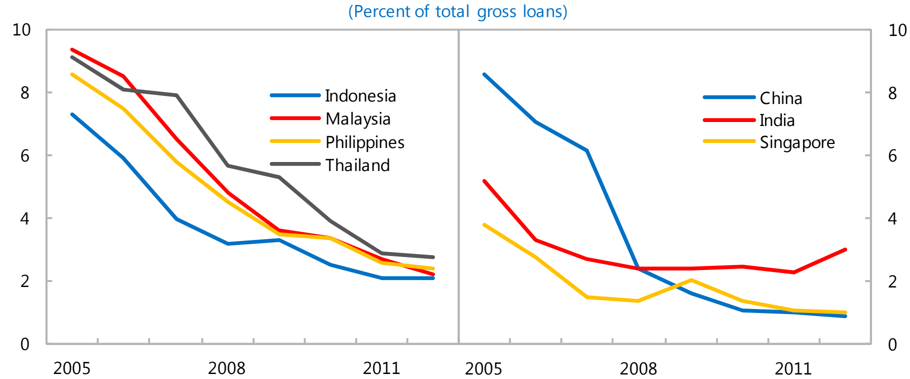
Sources: IMF, International Financial Statistics,; and IMF staff calculations.
1/ Foreign reserves declined by 0.8 percent of GDP during 1997-2007.

Among advanced economies, investment in modern market infrastructure became a priority to ensure the financial sector was able to cope with the demands of a rapidly growing region. In addition, many Asian countries have build up their stock of foreign reserves to provide a cushion against adverse external shocks.[24]

[24]Aizenman, Joshua, Brian Pinto, Vladyslav Sushko (2012) examines episodes of financial sector booms and contractions, and conclude that the effects on real economy from abrupt financial contractions are mitigated by buffers of foreign reserves.

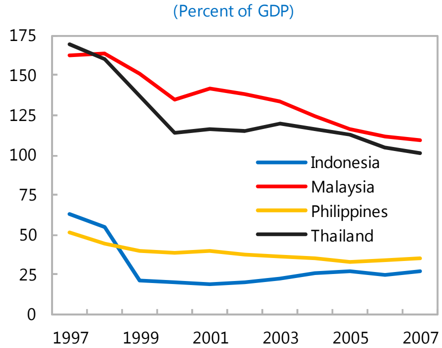
The private sector, including banks and corporations, strengthened their balance sheets, and credit growth was contained. In the short-term, rapid balance sheet restructuring was reflected in a sharp decline in banks' credit to the private sector, particularly in Indonesia, Malaysia, and Thailand. Over time, financial institutions cleaned up their balance sheets, improved risk management, and became more prudent in their risk taking and lending. Likewise, corporations undertook substantial deleveraging, enhanced corporate governance, and became more conservative in undertaking investment, which eventually restored corporate profitability, along with better transparency and competitiveness.

Nonperforming Loans, 2005-12
(Percent of total gross loans)

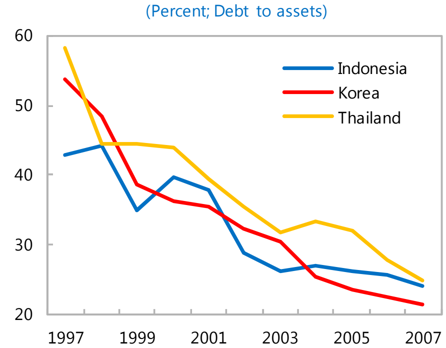


Sources: IMF, Financial Soundness Indicators database; and IMF staff calculations.

Private Domestic Credit, 1997-2007
(Percent of GDP)



Corporate Sector Deleveraging, 1997-2007
(Percent; Debt to assets)



Sources: IMF, Corporate Vulnerability Utility based on WorldScope database, and International Monetary Statistics; WorldScope database; and IMF staff calculations.

In late 2000s, the IMF's financial sector assessment programs (FSAPs) gave Asia high marks for strengthening its supervisory and regulatory regime in line with Basel Core Principles. By the time of the GFC, Asia's financial sector was in good health, and the supervisory and regulatory regimes for banking, insurance and securities were well developed and on par with international standards (Appendix 4).

Box 2. The Effect of Initial Conditions on the Likelihood of a Banking Crisis

A probit analysis was used to assess how financial and economic conditions before the GFC affected the probability of a banking crisis. The dependent variable takes the value one 1 for countries which had a systemic or borderline systemic banking crisis during the GFC according to the database assembled by Laeven and Valencia (2012). Financial and external variables were then individually used as the explanatory variables to examine their effect on the probability of a banking crisis (Appendix 3). Overall, financial and macro-financial indicators have more impact on than external vulnerabilities on the probability of a banking crises.[25]

- **Financial soundness indicators (FSIs) mostly have the expected signs and are statistically significant.** Low capital to total assets, increasing non-performing loans to total loans, and high corporate leverage all increases the likelihood of a banking crisis.
- **Macro-financial indicators have the expected signs and are mostly statistically significant.** Lower credit growth, lower credit to deposit ratio / reliance on non-deposit funding for credit, and lower corporate leverage decrease the likelihood of a banking crisis.
- **External vulnerability indicators have mixed results.** Smaller non-FDI capital inflows, lower gross external debt, and larger foreign reserves decrease the likelihood of a banking crisis, and have statistically significant coefficients. Other external vulnerability variables have insignificant results; notably the size of the current account deficit. However, no external variable comes out significant with the wrong sign.
- Excluding outliers **changes the results slightly.** Net non-FDI capital inflows are no longer statistically significant, and (ii) net external debt becomes significant with the expected sign.

Banking Crisis and Intitial Conditions Based on Financial and External Vulnerabilities

Estimated Bivariate Probit Regression Coeffcients

	All Countries	
	Coefficient	Sample Size
Change in credit to GDP	0.18***	82
R-square	0.26	
Credit to deposit ratio	0.013***	82
R-square	0.19	
Banking system's net foreign assets	0.00	80
R-square	0.03	
Bank capital to total assets	-0.14**	71
R-square	0.09	
Increase in bank NPL to total loans	0.12***	71
R-square	0.12	
Corporate leverage	0.08***	65
R-square	0.13	
Cumulative net non-direct investment inflows	0.06**	78
R-square	0.07	
Cumulative net capital inflows	-0.02	81
R-square	0.01	
Current account deficit	0.01	82
R-square	0.00	
External debt	0.01***	67
R-square	0.23	
Short-term external debt	...	...
R-square	...	
Foreign reserves to GDP	-0.07***	81
R-square	0.21	

Note: ***, ** and * indicate 1, 5 and 10 percent statistical significance, respecti

[25] Park, Ramayandi, and Shin (2013) report results from a probit analysis of currency crises. For the GFC they find the real effective exchange rate appreciation, credit growth, real GDP growth, and a large share of exports in GDP to increase the likelihood of a currency crisis.

Using probability implies that the interpretation of the coefficients is not straight forward. The direction of the effect from a change in an explanatory variable on the probability of an event can be seen from the sign of the coefficient, but the marginal probability effect depends of the value of the explanatory variable. To get some sense of the effect from a change in the explanatory variables on the probability of a banking crisis, the percentage change in the probability of a banking crisis in response to a percentage change in the explanatory variables at the mean was calculated (see Demirguc-Kunt and Detragiache, 1998). The highest elasticities were found for the credit to deposit ratio and corporate leverage, where an increase of one percent increases the probability by about 2 percent, but the calculated elasticities are also quite high for the bank capital to asset ratio and the level of foreign reserves to GDP.

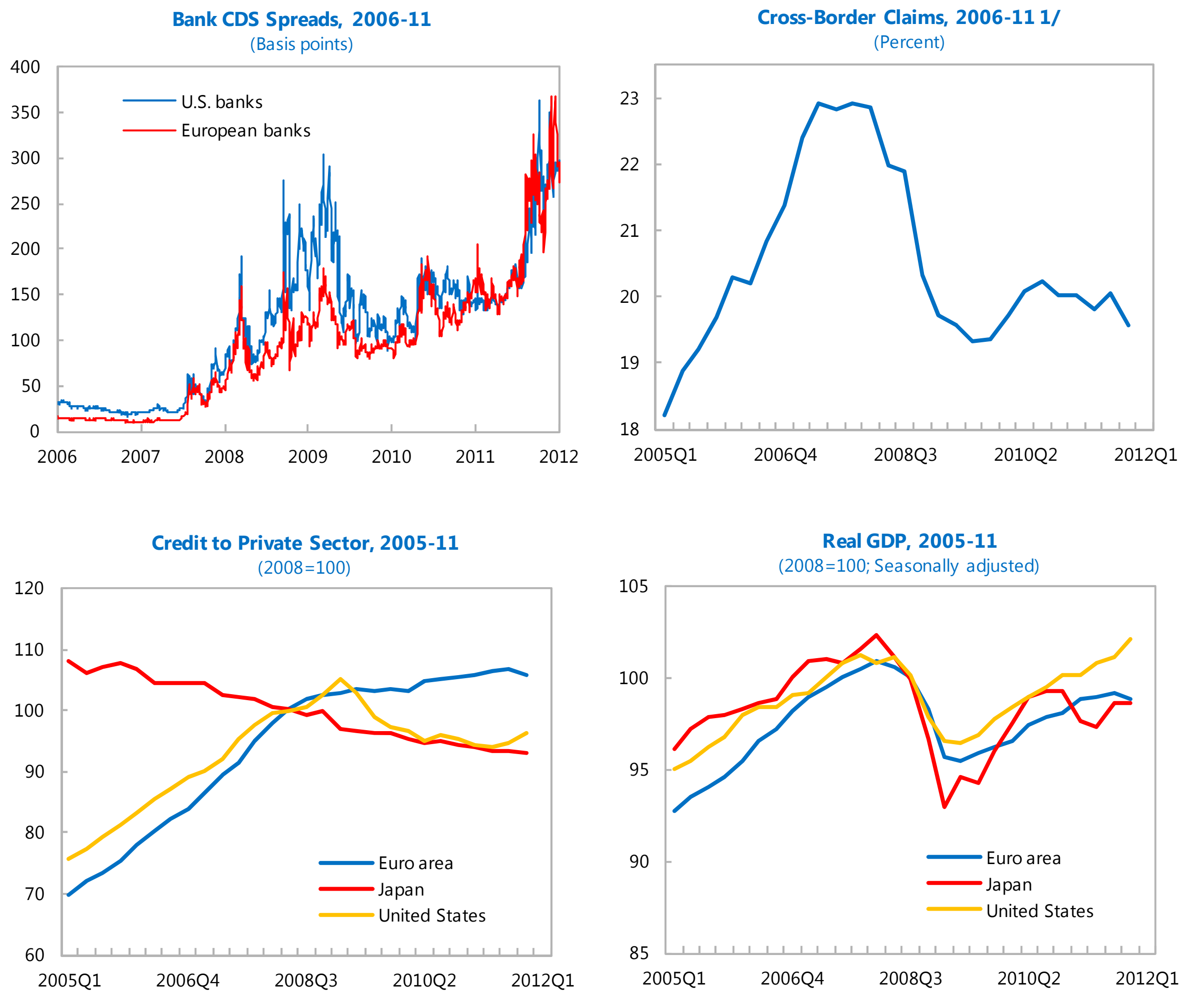
Effect on Probability of Banking Crisis*

	All Countries	Emerging markets
Change in credit to GDP	0.94	1.77
Credit to deposit ratio	2.04	4.64
Bank capital to total assets	-1.57	0.87
Increase in bank NPL to total loans	-0.76	-0.47
Corporate leverage	1.97	1.28
Cumulative net non-direct investment inflows	0.10	0.20
External debt	0.86	0.54
Foreign reserves to GDP	-1.76	-0.46

*/ Percentage change in the probability in response to a percentage change in explanatory variable

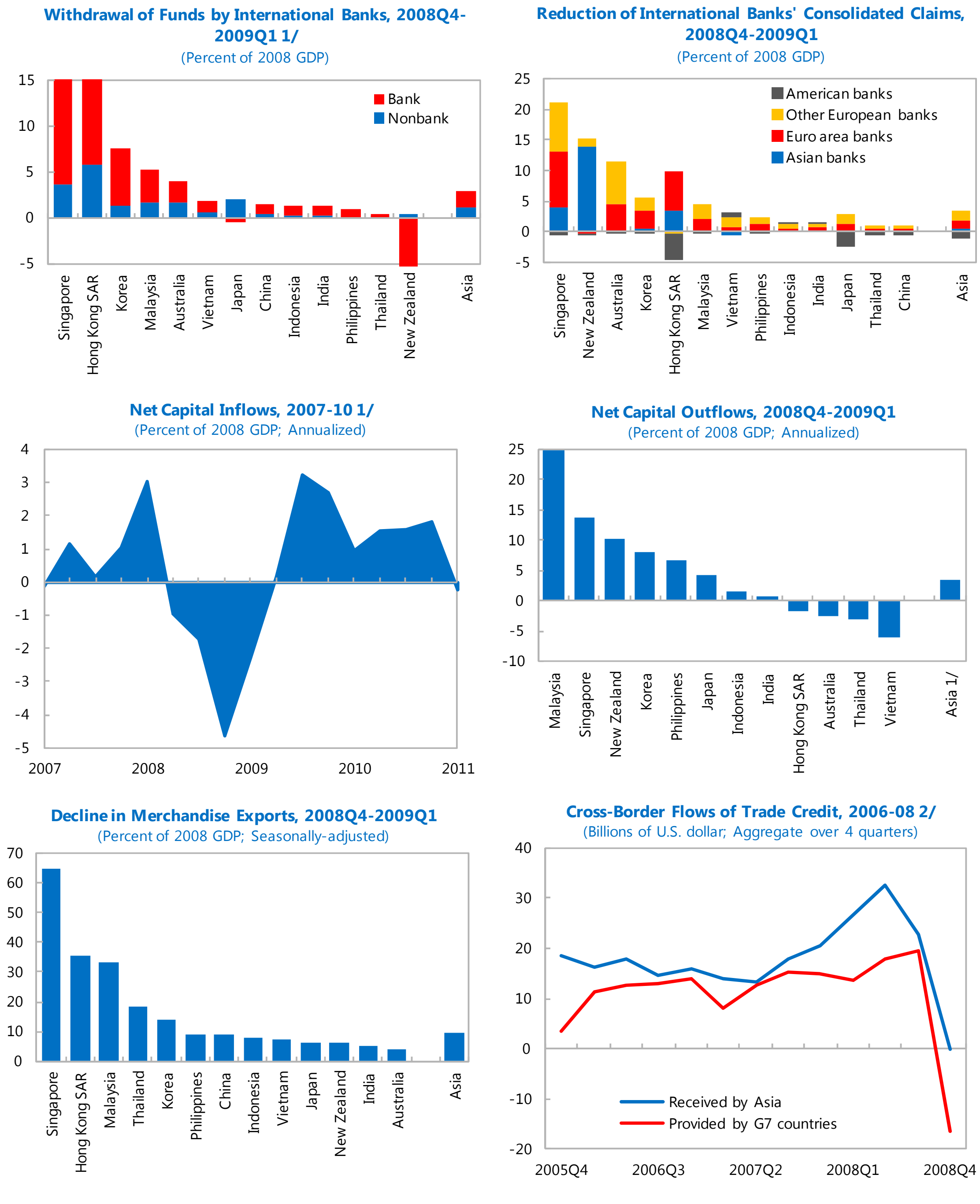
APPENDIX I. TABLES AND FIGURES

Figure 12. Global Financial Market Conditions



Sources: BIS, Locational and Consolidated Banking Statistics; Bloomberg; IMF, World Economic Outlook database; and IMF staff calculations.
1/ Based on banking systems' foreign assets to total assets in Japan, Euro area, the United Kingdom, and the United States.

Figure 13. Asia: Financial and Trade Shocks during the Global Financial Crisis

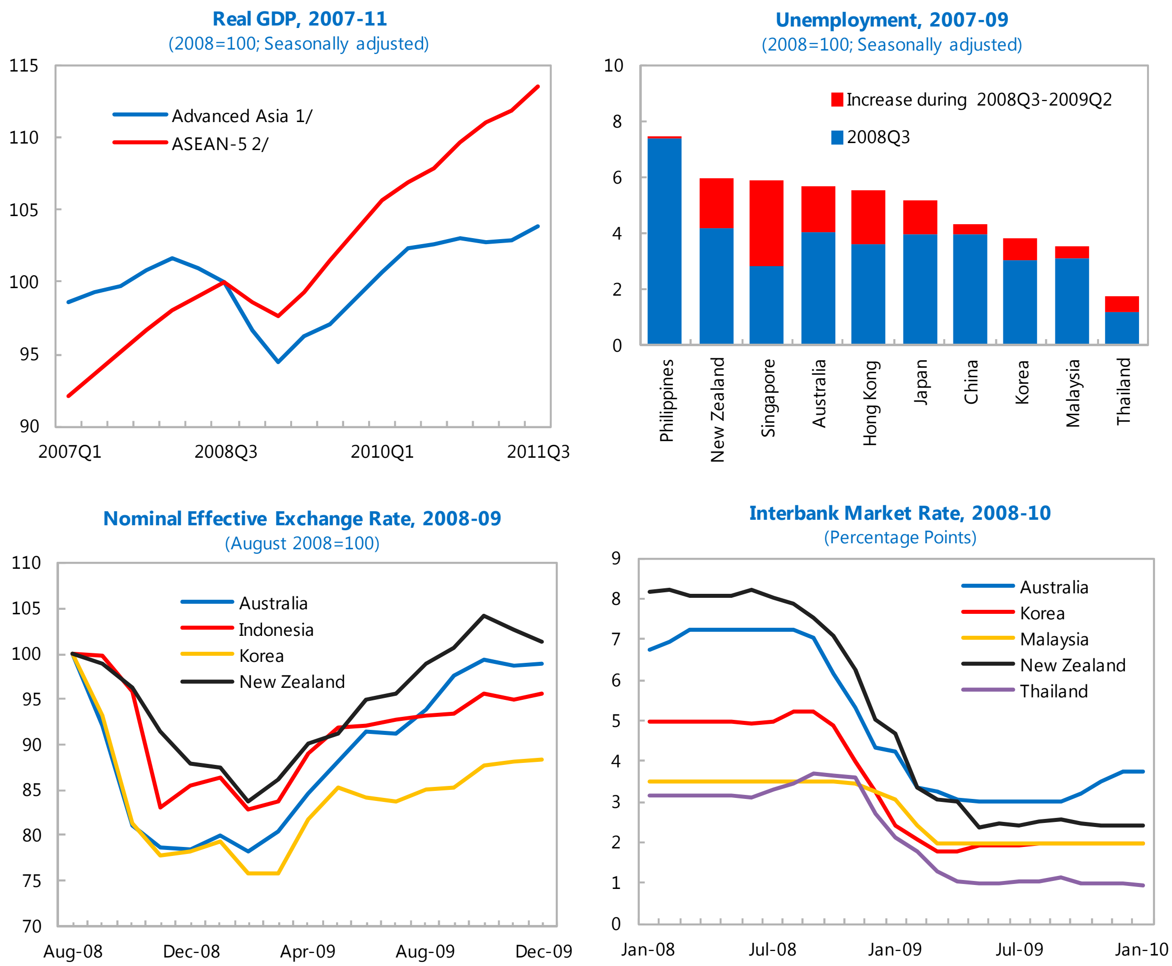


Sources: BIS, Locational and Consolidated Banking Statistics; IMF, Direction of Trade Statistics, International Financial Statistics, and World Economic Outlook database; and IMF staff calculations.

1/ International banks' withdrawal of funds from banks in Hong Kong and Sinapore amounted to 50 and 10 percent of GDP. New Zealand banks received inflows by about 15 percent of GDP, mainly from their parents.

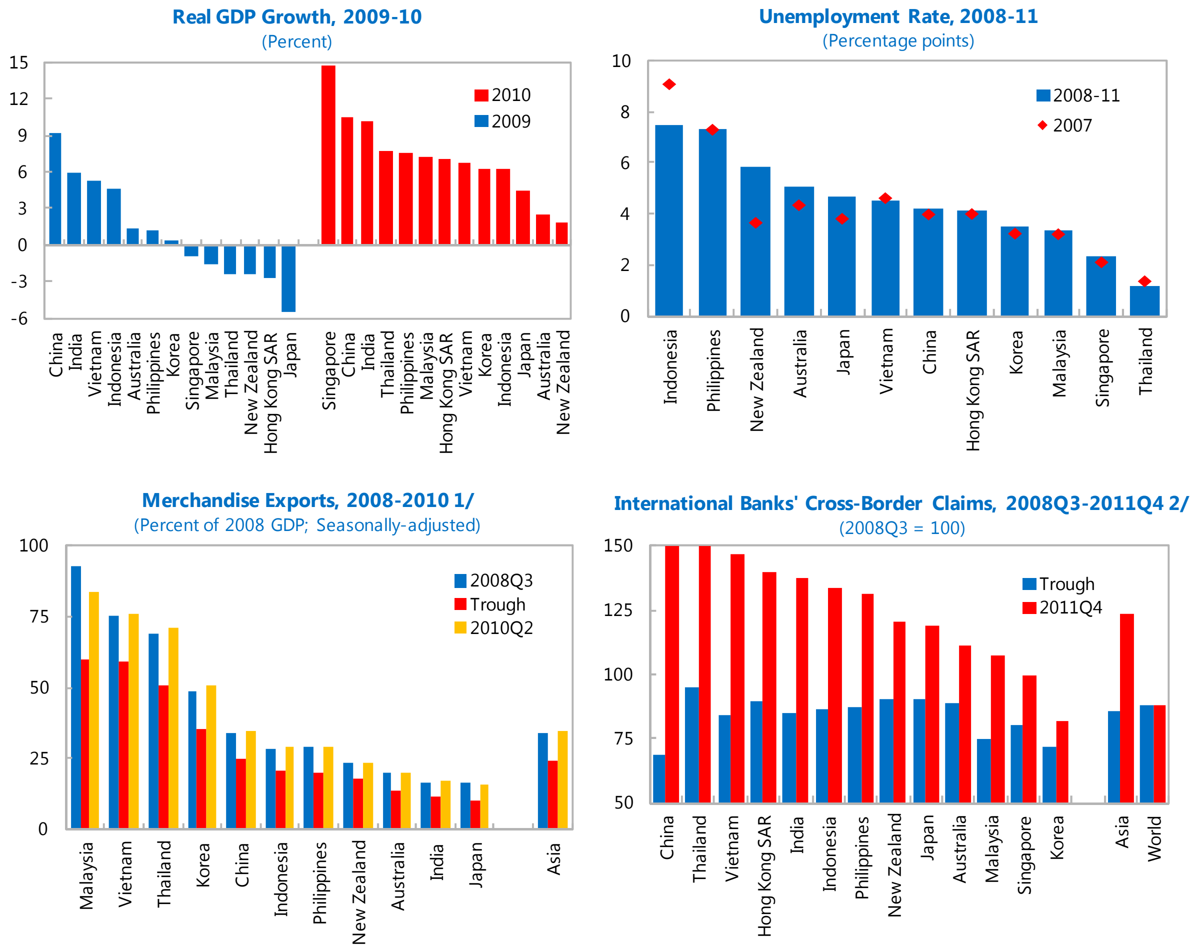
2/ Based on balance of payments data. Trade credit received by Asia reflecrs net liability inflows, and trade credit provided by G7 countries reflects net asset outflows.

Figure 14. Asia: Initial Impact of the Global Financial Crisis



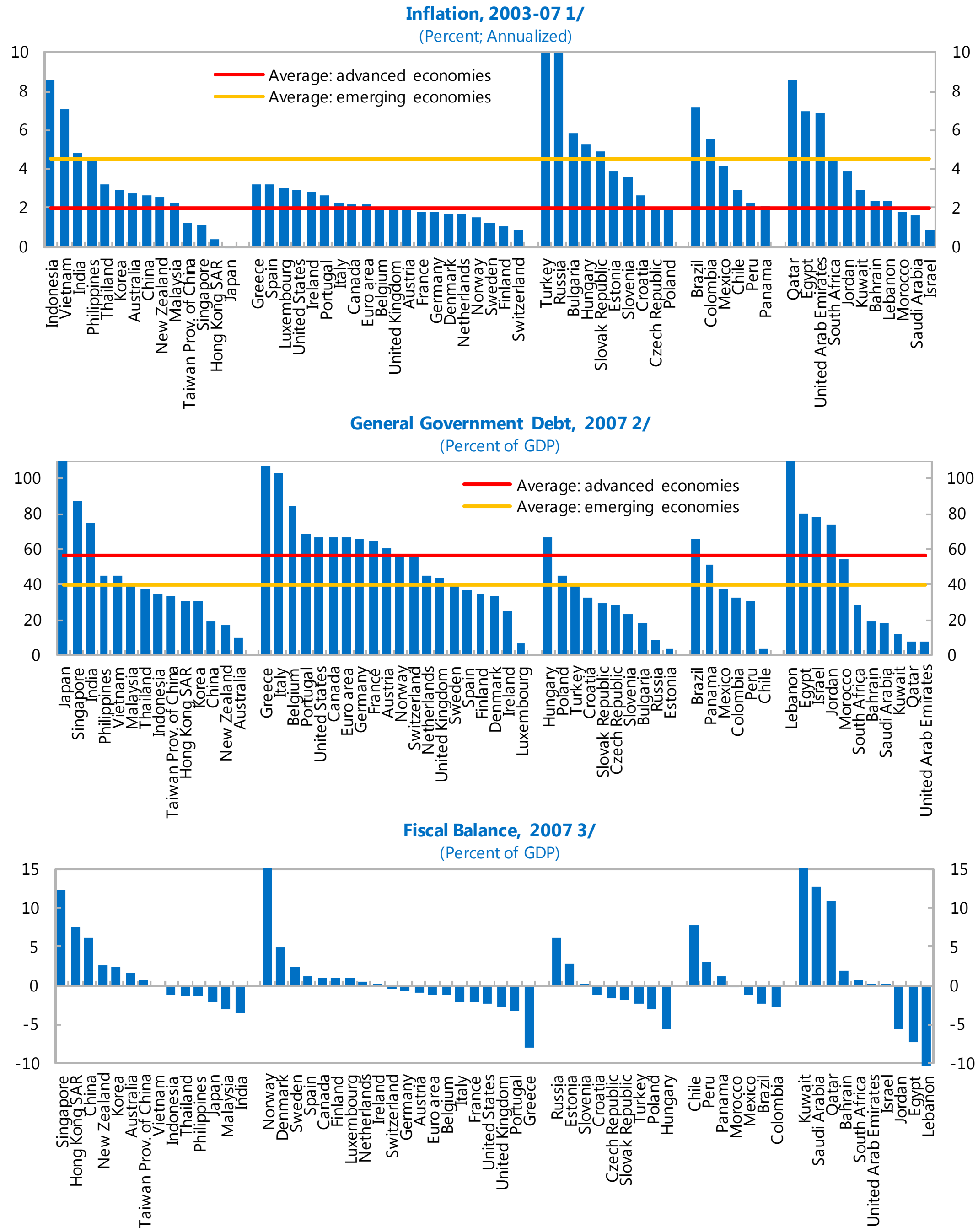
Sources: IMF, Information Notice System, International Financial Statistics, and World Economic Outlook database; and IMF staff calculations.
1/ Including Australia, Hong Kong SAR, Japan, Korea, New Zealand, Singapore, and Taiwan Province of China.
2/ Including Indonesia, Malaysia, Philippines, Thailand, and Vietnam.

Figure 15. Asia: Recovery from the Global Financial Crisis



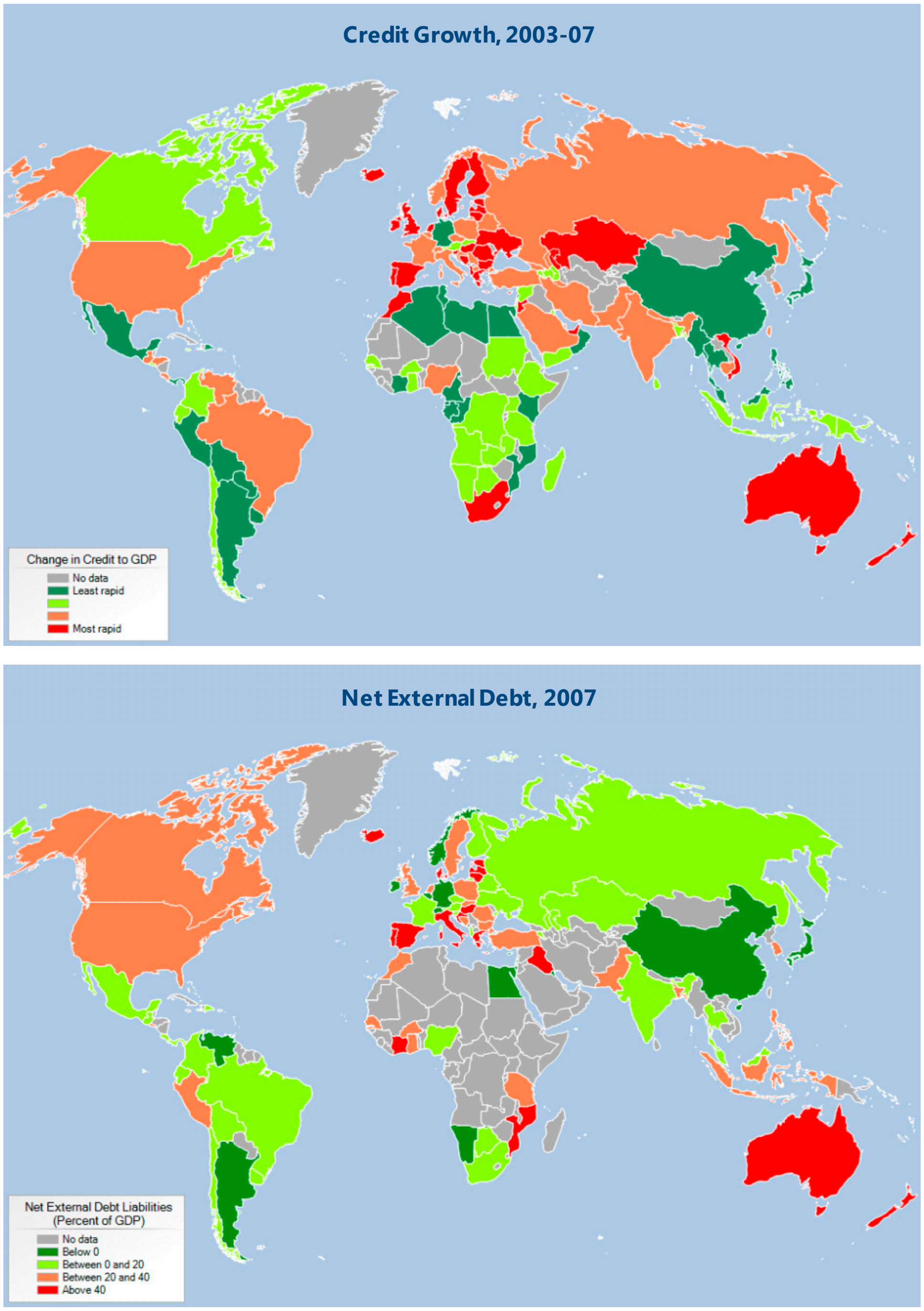
Sources: BIS, Locational Banking Statistics; IMF, Direction of Trade Statistics and World Economic Outlook database; and IMF staff calculations.
1/ Excluding Hong Kong SAR and Singapore given their large exports relative to GDP. They also experienced a strong rebound of exports.
2/ In 2011Q4, international banks' cross-border claims on China and Thailand were 230 and 170 percent of their 2008Q3 level, respectively.

Figure 16. Key Indicators of Macroeconomic Stability



Sources: IMF, World Economic Outlook; and IMF staff calculations.
1/ Inflation was 11 and 12 percent in Russia and Turkey, respectively. Japan has a minimal negative inflation of 0.05 percent.
2/ Government debt amouted to about 180 percent of GDP in Japan, 170 percent of GDP in Lebanon.
3/ In Kuwait and Norway, the fiscal balance was in surplus of 39 and 18 percent of GDP, respectively.. In Lebanon, the fiscal deficit was 11 percent of GDP.

Figure 17. Key Indicators of Financial and External Vulnerabilities



Sources: Haver Analytics; IMF, International Financial Statistics and World Economic Outlook database; and IMF staff calculations.

Appendix Table 1. Asia: GDP and Size of Financial Sector, 2007

	GDP (In billions of U.S. dollar)	Financial Sector (In percent of GDP)			
		Banking System Assets	Stock Market Capitalizaiton	Outstanding Bond Issuance	Overall Size
Australia	945	140	149	83	372
China	3,494	157	110	48	316
Hong Kong SAR	212	541	1,715	25	2,281
India	1,160	72	157	40	269
Indonesia	432	47	47	20	114
Japan	4,356	234	104	203	541
Korea	1,049	114	105	103	321
Malaysia	194	159	168	111	438
New Zealand	133	162	33	18	213
Philippines	149	67	68	36	171
Singapore	178	181	280	55	516
Taiwan Province of China	393	230	178	51	459
Thailand	247	127	86	51	264
Vietnam	71	119	44	…	163

Sources: BIS, Securities Statistics; Bloomberg; Haver Analytics; IMF, International Financial Statistics and World Economic Outlook database; and Imf staff calculations.

Appendix Table 2. Asia: Effects on Output, Inflation and Unemployment

	Real GDP growth (percent; annualized)				Inflation (percent; annualized)				Unemployment rate (percent)			
	AFC		GFC		AFC		GFC		AFC		GFC	
	1994-96	1998	2005-07	2009	1994-96	1998	2005-07	2009	1994-96	1998	2005-07	2009
Countries severely hit by the AFC												
Indonesia	7.9	-13.1	5.8	4.6	8.8	58.0	10.1	4.8	5.5	5.5	10.2	7.9
Malaysia	9.7	-7.4	5.6	-1.5	3.5	5.3	2.9	0.6	2.9	3.2	3.4	3.7
Korea	8.3	-5.7	4.7	0.3	5.2	7.5	2.5	2.8	2.2	7.0	3.5	3.7
Philippines	5.0	-0.6	5.5	1.1	8.5	9.4	5.0	4.2	9.2	10.1	8.9	7.5
Thailand	8.0	-10.5	4.9	-2.3	5.6	8.0	3.8	-0.9	0.0	0.0	1.1	0.9
Advanced economies												
Australia	4.1	5.0	3.5	1.4	3.1	0.9	2.9	1.8	8.9	7.7	4.7	5.6
Japan	1.8	-2.0	1.7	-5.5	0.2	0.7	0.0	-1.3	3.1	4.1	4.1	5.1
New Zealand	4.7	0.2	3.2	-1.6	2.6	1.3	2.9	2.1	7.0	7.7	3.8	6.1
Newly industrialized countries												
Hong Kong SAR	4.2	-6.0	7.0	-2.5	8.1	2.8	1.7	0.6	2.6	4.7	4.8	5.2
Singapore	8.5	-2.2	8.3	-0.8	2.1	-0.3	1.2	0.6	1.7	2.5	2.6	3.0
Taiwan Province of China	6.5	3.5	5.4	-1.8	3.6	1.7	1.6	-0.9	2.0	2.7	4.0	5.9
Emerging market economies												
China	11.3	7.8	12.7	9.2	16.5	-0.8	2.7	-0.7	2.9	3.1	4.1	4.3
India	7.0	6.0	9.5	5.0	9.8	13.2	5.6	10.9	...	...	...	...
Vietnam	9.2	5.8	8.4	5.3	10.7	8.1	8.1	6.7	7.3	6.9	4.9	4.6

Sources: IMF, World Economic Outlook database; and IMF staff calculations.

Appendix Table 3. Asia: Stocks

	Real Export Growth (percent)		FX Market Pressure 1/ (2010 = 100)		Deleveraging of International Banks 2/ (percent)			
	AFC	GFC	AFC	GFC	AFC		GFC	
	1997-98	2008-09	1997-98	2008-09	1997-98	1997-99	2008-09	2008-10
Countries severely hit by the AFC								
Indonesia	9.5	-0.1	641	160	6.6	18.5	6.8	-14.5
Malaysia	3.0	-4.7	601	122	14.8	23.1	24.2	10.0
Korea	16.3	2.7	496	166	21.8	29.2	22.2	11.1
Philippines	-1.9	-5.3	452	128	-1.0	-0.4	11.0	-19.4
Thailand	7.7	-3.7	633	155	29.8	52.4	-4.3	-46.8
Advanced economies								
Australia	6.2	2.8	92	167	-1.4	-17.1	5.9	-4.0
Japan	4.2	-11.4	145	169	12.7	29.5	-1.6	-7.4
New Zealand	2.8	0.7	129	141	7.8	-10.8	-53.4	-5.6
Newly industrialized countries								
Hong Kong SAR	0.2	-3.8	359	184	15.0	41.7	10.8	-12.6
Singapore	3.0	-1.5	277	171	10.8	20.0	22.4	10.4
Taiwan Province of China	5.2	-3.9	…	…	3.6	16.0	33.3	-13.9
Emerging market economies								
China	23.1	-0.1	…	128	-6.1	6.4	24.0	-38.0
India	4.7	5.1	169	198	-2.3	0.4	12.4	-20.5
Vietnam	16.5	8.1	…	…	3.8	6.5	6.4	-11.9

Sources: BIS, Locational Banking Statistics; Haver Analytics; IMF, Information Notice System, International Financial Statistics, and World Economic Outlook database; and IMF staff calculations.
1/ Based on a weighted average of 12-month volatility of changes in the nominal effective exchange rate, foreign reserves and money-market interest rates.
2/ Based on the decline in cross-border claims of BIS-reporting banks.

Appendix Table 4. Asia: Policy Buffers

	Fiscal Balance (percent of GDP)		Government Debt (percent of GDP)		Foreign Reserves (percent of GDP)		Nominal Exchange Rate Volatility 1/	
	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC
	1996	2007	1996	2007	1996	2007	1996-97	2007-08
Countries severely hit by the AFC								
Indonesia	1.2	-1.0	…	35.1	8.0	12.7	1.0	2.9
Malaysia	2.0	-2.7	35.7	41.2	26.8	52.2	1.4	0.8
Korea	2.5	2.3	8.6	30.7	5.9	25.0	1.0	4.7
Philippines	0.6	-0.3	54.7	44.6	11.0	20.2	0.7	5.7
Thailand	2.7	0.2	14.9	37.3	20.7	34.5	0.3	1.7
Advanced economies								
Australia	-0.9	1.3	29.3	9.7	3.4	2.6	2.9	5.2
Japan	-5.5	-2.1	99.0	183.0	4.6	21.9	7.3	5.9
New Zealand	2.5	3.2	39.1	17.2	8.7	13.0	0.6	4.2
Newly industrialized countries								
Hong Kong SAR	2.1	7.7	…	30.1	39.5	72.1	0.4	0.7
Singapore	8.7	12.2	70.7	87.3	80.9	91.5	0.3	0.7
Taiwan Province of China	-6.8	-1.4	…	33.3	…	…	0.9	1.0
Emerging market economies								
China	-1.5	0.9	6.8	19.6	12.5	43.8	0.9	1.2
India	-5.8	-4.8	68.7	75.0	5.4	23.0	1.3	3.4
Vietnam	…	-2.2	…	44.6	7.0	33.0	1.5	1.6

Sources: IMF, International Financial Statistics, Information Notice System, and World Economic Outlook database; and IMF staff calculations.
1/ Variance of monthly exchange rate movements over 12 months: July 1996 - June 1997 and September 2007 - August 2008.

Appendix Table 5. Asia: Credit Expansion, Bank Funding, and Corporate Sector Strength

	Change in Private Domestic Credit to GDP (percentage points)		Real Domestic Demand Growth 1/ (percent; annualized)		Private Domestic Credit to Resident Deposits (percent)		Bank Net Foreign Liabilities to Total Assets (percent)		Corproate Leverage: Debt to Total Assets (percent)		Corporate Sector Probability of Default 2/ (percent)	
	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC
	1992-96	2003-07	1992-96	2003-07	1996	2007	1996	2007	1997	2008	1997	2008
Countries severely hit by the AFC												
Indonesia	6.8	6.5	9.2	5.0	120.0	72.5	2.6	1.1	42.8	25.3	8.6	27.3
Malaysia	69.6	-29.2	10.1	6.8	137.1	97.4	4.3	-0.9	28.3	25.6	17.1	11.6
Korea	3.0	14.8	7.5	3.3	147.8	125.6	2.7	1.0	53.8	25.5	19.1	11.9
Philippines	27.4	-2.1	4.7	3.3	103.3	64.1	10.0	-6.4	38.7	29.7	21.4	18.7
Thailand	60.0	-13.8	8.1	5.3	192.1	110.1	18.1	-6.0	58.2	27.4	39.6	13.3
Advanced economies												
Australia	8.0	46.4	4.0	5.3	125.7	209.2	11.4	19.9	26.3	38.2	0.5	8.5
Japan	9.3	-29.9	1.6	1.1	95.2	77.2	-1.7	-8.1	32.4	21.7	1.9	2.8
New Zealand	16.9	35.0	4.8	4.8	118.6	169.2	18.5	31.4	31.1	30.5	0.0	1.3
Newly industrialized countries												
Hong Kong SAR	20.0	-8.3	6.5	4.2	95.7	47.5	-3.3	-28.7	24.7	18.6	3.2	11.0
Singapore	14.5	-17.2	8.0	5.5	125.2	82.9	8.3	-0.8	15.8	22.4	1.2	16.0
Taiwan Province of China	0.0	18.7	6.7	2.8	101.8	101.6	-0.3	-2.8	26.8	21.6	0.0	12.7
Emerging market economies												
China	2.1	-13.9	13.0	10.8	105.7	80.8	0.4	-3.3	26.4	25.7	6.1	30.5
India	0.3	14.4	5.4	9.7	66.7	74.5	...	...	29.7	24.0	3.2	1.2
Vietnam	18.7	50.2	12.1	10.4	150.7	103.3	-0.2	-1.8	...	24.4	...	46.1

Sources: IMF, Corporate Vulnerability Utility based on WorldScope database, International Financial Statistics and World Economic Outlook; and IMF staff calculations.
1/ For Vietnam, the AFC figure is 1993-1996.
2/ Probability of default over the one-year ahead period based on the Black-Scholes-Merton model.

Appendix Table 6. Asia: External Vulnerabilities

	Current Account Deficit (percent of GDP)		Accumulated Net Capital Inflows (percent of GDP)		External Debt (percent of GDP)		Short-term Debt to Foreign Reserves 1/ (percent)		Real Exchange Rate Appreciation 2/ (percent)	
	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC	AFC	GFC
	1996	2007	1994-96	2005-07	1997	2008	1997	2008	1995-97	2006-08
Countries severely hit by the AFC										
Indonesia	3.2	-1.6	13.2	0.9	67.6	30.4	216.6	56.7	11.7	3.3
Malaysia	4.4	-15.4	19.7	-19.9	44.0	29.6	71.9	36.6	9.4	3.6
Korea	4.0	-2.1	9.7	0.9	31.4	34.1	147.2	89.5	0.2	-17.1
Philippines	4.2	-4.8	29.7	4.7	54.8	37.5	191.5	43.1	21.7	16.1
Thailand	7.9	-6.3	32.2	7.5	72.4	27.9	180.5	34.2	14.9	4.6
Advanced economies										
Australia	3.4	6.2	13.4	16.1	...	...	...	...	12.3	12.2
Japan	-1.4	-4.9	-3.7	-9.3	...	...	...	...	-26.0	-9.6
New Zealand	5.8	8.1	16.5	32.6	...	...	...	...	11.3	1.7
Newly industrialized countries										
Hong Kong SAR	2.5	-12.1	-9.8	-31.9	...	301.1	...	...	15.7	-10.8
Singapore	-14.8	-26.1	-29.3	-34.1	...	...	...	...	5.7	5.6
Taiwan Province of China	-3.8	-8.9	-6.5	-13.9	...	22.6	...	...	0.7	-5.3
Emerging market economies										
China	-0.8	-10.1	15.8	8.3	13.7	8.6	20.0	13.4	22.1	15.4
India	1.6	0.7	6.5	15.4	22.2	18.0	49.6	22.9	10.6	3.7
Vietnam	8.2	9.8	31.0	35.4	51.8	30.5	...	18.4	12.7	16.7

Sources: IMF, Information Notice System and World Economic Outlook database; and IMF staff calculations.
1/ For Korea, the AFC figure is 1998.
2/ Real exchange rate appreciation over 26 months: April 1995 - June 1997 and June 2006 - August 2008.

APPENDIX II. ASEAN-5 FINANCIAL SECTOR REFORM FOLLOWING THE AFC*

Indonesia
Amendments to the banking law
Modify requirements regarding bank secrecy. End restrictions on foreign ownership of banks. Enable the Indonesian Bank Restructuring Agency to transfer assets and to foreclose against a nonperforming debtor.
Strengthening the prudential and regulatory framework
New regulations regarding loan classification; loan provisioning: and the treatment of debt restructuring operations. New liquidity management reporting requirements. Banks required to submit a liquidity report twice monthly for their global consolidated operations, including the foreign currency liquidity profile, and actions to the bank intends to take to cover any liquidity shortfall or absorb any liquidity surplus. New regulations to tighten rules for connected lending. Disclosure of financial statements. Banks required to publish their financial statements quarterly, beginning April 1999.
Banks resolution framework
The Deposit Insurance Corporation, Lembaga Penjamin Simpanan (LPS) Law of 2004 established a coordination committee comprising the Ministry of Finance, the Bank of Indonesia and the LPS to determine the policy for the resolution and handling of a failing bank that is expected to have a systemic effect.
Korea
Reforms of institutional arrangements, based on Presidential Commission on Financial Reform in 1997
Significantly strengthened the independence of the Bank of Korea. Consolidated financial sector supervision in a single Financial Supervisory Commission and unified supervisory authority by the Financial Supervisory Service separate from the government. Legislation to grant the Financial Supervisory Commission power to license and de-license financial institutions, as well as to supervise specialized and development banks. Merging deposit insurance protection agencies into the new Korea Deposit Insurance Corporation, which was provided with powers and funds to pay back deposits in failed institutions and, if necessary, to also provide recapitalization funds to banks. Establishment of a Financial Restructuring Unit within the Financial Supervisory Commission to oversee and coordinate the restructuring of the financial sector.
Strengthened prudential standards and supervision procedures

New loan classification standards and provisioning rules under which loans more than three months overdue will be classified as substandard, and the general provisioning requirement was increased. Regulations to require the provisioning for securities losses and to cease the inclusion in Tier 2 capital of all provisions for nonperforming loans. Loan classification and provisioning guidelines to take into account a borrower's future capacity to repay in classifying and provisioning loans. Strengthened prudential supervision and regulation of foreign exchange operations by commercial and merchant banks, including requiring short-term assets to cover at least 70 percent of short-term liabilities, and long-term borrowing to cover more than 50 percent of long-term assets. Banks to maintain overall foreign currency exposure limits per counterparty, including foreign currency loans, guarantees, security investments, and offshore finance. A maturity ladder approach requiring banks to report maturity mismatches for different time brackets, and with limits on mismatches. Exposure limits to single borrowers and groups and regulations for connected lending were tightened. Full foreign ownership of merchant banks allowed.
Malaysia
Measures to strengthen the financial sector introduced in 1998
Stricter loan classification and provisioning standards. Classification standards to be brought to best practice standards; 20 percent provisioning requirement against uncollateralized portions of substandard loans; off-balance sheet items incorporated in the loan classification and provisioning system. Tightened rules for accounting interest in suspense, such that banks would be required to reverse unpaid interest out of income and record it in the interest-in-suspense account. Tighter capital adequacy framework. Increased risk-weighted capital adequacy requirements of finance companies from 8 percent to 10 percent; minimum capital for finance companies increased from 5 million ringgit to 300 million ringgit; compliance with capital adequacy requirement required each financial quarter. Single borrower limit reduced from 30 percent to 25 percent of capital funds. Aggregate statistics on nonperforming loans, provisions, and capital positions for all financial institutions to be published monthly by the Bank Negara Malaysia. All institutions to report and publish key indicators of financial soundness on a quarterly basis. Banks required to report on the ratio of nonperforming loans broken down into substandard, doubtful, and loss; loans by sectors on a quarterly basis. More intensive and rigorous supervision of banks through monthly stress tests by Bank Negara Malaysia and a requirement for similar exercises by individual institutions on the basis of parameters set by Bank Negara Malaysia.

A prudentially based framework for assessing bank liquidity risks was introduced, effective August 2, 1998. Bank Negara Malaysia-facilitated merger program of finance companies on market-based criteria.
Ten-year Financial Sector Masterplan for 2001–2010
Bank merger program designed to take advantage of economies of scale and to determine an exit strategy for the weakest banks. Domestic banks given broad flexibility to form their own merger groups. Changes to regulation, and supervision, in line with best practices, including implementing risk-based supervision with more focused supervisory attention for weak institutions; refined calculation of risk weightings for capital adequacy; implementation of a system of incremental enforcement action; and early warning system.
Philippines
Broad financial sector reform program
Raised minimum capital requirements for banks, and phased out lower capital requirements for certain universal banks. Banks required to make a general loan loss provision of 2 percent and specific loan-loss, provisions of 5 percent for loans especially mentioned, and 25 percent for secured substandard loans. The Bangko Sentral ng Pilipinas requiring banks to start marking to market their trading securities portfolio. All banks listed on the Philippine Stock Exchange instructed to publicly disclose detailed information on a quarterly basis, including the level of nonperforming loans, and the ratio of nonperforming loans to the total loan portfolio Consolidated supervision of financial conglomerates. Stricter licensing guidelines for establishing banks, focusing on the statement of income and expenses; evidence of asset ownership; and in the case of a foreign bank, certification by the home supervisory authority that it agrees with the proposed investment. Changed focus of supervision activities from compliance-based and checklist-driven assessments of banks’ condition to a forward-looking and risk-based framework. Improved rating methodologies. The CAMEL rating system revised, including to ensure that the composite rating will never be better than the bank’s individual factor rating for capital adequacy. External auditors of banks required to report to the Bangko Sentral ng Pilipinas all matters that could adversely affect the financial condition of their clients, any serious irregularity that may jeopardize the interests of depositors and creditors, and any losses incurred that substantially reduce the bank’s capital.
Addressing recognition and resolution of weak banks
Intensified bank monitoring of selected banks.

Measures to improve the ability of PDIC to act as the receiver of banks, including selling assets of distressed banks to pay for the administration costs related to receivership, and faster approval by the Monetary Board of a proposed liquidation. Prompt corrective action and explicit procedures for bank capital shortfalls.
Later measures
Memorandum of Agreement between the SEC and the Bangko Sentral ng Pilipinas (2001). Anti-Money Laundering Act (2001).
Thailand
Revamping of the prudential framework
Tightening of loan classification and loans had to be classified into five categories. Strict rules on interest accrual were established. Provisioning requirements gradually tightened to bring them in line with international best practice. Rules for classification and provisioning of restructured loans to set clear incentives for banks and finance companies to actively initiate restructuring of nonperforming loans. New regulation to requiring collateral for loans above a certain size to independently appraised.
Strategy to restructure and rehabilitate the financial system
Establish the Financial Sector Restructuring Agency to deal with suspended finance companies, replacing the Bank of Thailand and the ministry of finance temporarily as decision maker on all matters related to financial sector restructuring. Amend the Commercial Banking Act and the Finance Company Act to empower the Bank of Thailand to request capital reductions, capital increases, or changes in management in troubled commercial banks and finance companies. Establish an asset management company to deal with assets of the finance companies that had their operations suspended, or impaired assets in any financial institution in which the Financial Institutions Development Fund had acquired shares (intervened) and assumed management control. Amend the Bank of Thailand Act to empower the Financial Institutions Development Fund to lend to these institutions with or without collateral, raise the fee charged to financial institutions whose depositors and creditors were protected, and make explicit the government's financial support of the Bank of Thailand.

*/ Based on IMF Occasional Paper 188 *Financial Sector Crisis and Restructuring: Lessons from Asia,* and Financial Sector Stability Assessment reports for Financial Sector Assessment Programs undertaken in the countries.

APPENDIX III. INITIAL CONDITIONS VARIABLES AND SAMPLES

Initial Condition Variables

*Change in credit to GD*P: Cumulative 5 year change in bank domestic credit to the private sector as percent of GDP, *IFS and WEO*.

Increase in bank NPLs to total loans: Percentage point increase over 5 years in the ratio of bank nonperforming loans to total loans, *GFSR.*

Credit to deposit ratio: Ratio of bank domestic private sector credit to resident customer deposits, *IFS*.

Banking system's net foreign assets: Net foreign assets of banks to GDP, *IFS*.

Increase in bank capital to total assets: Percentage point increase over 5 years in the ratio of bank capital to assets.

Gross external debt: Gross external debt as percent of GDP, *WEO*. Data available only for emerging and developing economies.

Net external debt: Net external debt liabilities in the International Investment Position as percent of GDP, *IFS and WEO*.

Foreign reserves to short-term external debt: Level of foreign reserves to short-term external debt,IFS and WEO. Short-term external debt data are available only for emerging and developing economies.

Current account deficit: Current account deficit as percent of GDP, *WEO*.

Cumulative net non-direct investment flows: Net non-FDI capital account inflows during 5 years as percent of GDP, *WEO*.

Samples

GFC: through end-2007

AFC: through end-1996

2012: through end-2012 or latest

APPENDIX IV. RECENT FSAPS IN ASIA

China. The 2011 FSAP noted that China had made remarkable progress in its transition toward a more commercially-oriented and financially sound system. Improvements continue to be made to the structure, performance, transparency, and oversight of financial institutions and markets. As a result, the financial sector entered the GFC from a position of relative strength. However, despite ongoing reform and financial strength, China confronts a steady buildup of financial sector vulnerabilities. The main near-term domestic risks to the financial system were: (i) the impact of the recent sharp credit expansion on banks' asset quality; (ii) the rise of off-balance sheet exposures and of lending outside of the formal banking sector; (iii) the relatively high level of real estate prices; and (iv) the increase in imbalances due to the current economic growth pattern. Key recommendations included (i) advance the process of interest rate and exchange rate reform while ensuring that appropriate credit risk management practices in financial institutions are in place; (ii) clearly delineate the roles and functioning of policy financial institutions from commercial financial institutions; (iii) empower the PBC and three supervisory commissions with focused mandates, operational autonomy and flexibility, increased resources and skilled personnel, and strengthen interagency coordination to meet the challenges of a rapidly evolving financial sector; (iv) develop a framework for regulation and supervision of financial holding companies, financial conglomerates, and informal financial firms; (v) introduce a more forward-looking assessment of credit risk and eliminate deviations from the capital framework for credit and market risk; (vi) establish a permanent committee of financial stability, with the PBC as its secretariat; (vii) build a macro prudential framework for measurement and management of systemic risks; (viii) introduce a deposit insurance scheme; and (ix) laws concerning the insolvency of financial institutions need to be reviewed and strengthened in all sectors.

Australia. The 2012 FSAP Update concluded that Australia's financial system is sound, resilient, and well managed. The global outlook, however, remains uncertain and Australia faces long standing structural issues that will remain key sources of risk over the medium-term. In particular, the financial system is dominated by four large banks that rely on foreign wholesale funding to finance residential mortgages, which are the banks' single largest asset. A combination of high household debt and elevated house prices increases the risk in this portfolio. Nevertheless, these risks are mitigated by the fact that the authorities have considerable policy space to respond to negative shocks given low public debt, a flexible exchange rate, some scope for monetary easing, and a well capitalized and supervised banking system. Key recommendations included (i) develop a top down stress testing framework and publish top down stress test results in the Financial Stability Review; (ii) devote more resources to stress testing; (iii) introduce higher loss absorbency for systemic banks; (iv) intensify on-site supervision of bank liquidity and upgrade daily liquidity reporting requirements to ensure consistency; (v) re-evaluate the merits of ex-ante funding for the FCS with a view to converting it to an ex-ante funded scheme Treasury/CFR;

(vi) conduct frequent and focused crisis simulations and other forms of resolution testing; and (vii) continue recovery planning and introduce resolution planning.

Japan. The 2012 FSAP Update concluded that important progress has been made since the 2003 FSAP assessment to strengthen and stabilize the financial system. Significant restructuring was encouraged among large banks and insurance companies, nonperforming loans were reduced, capital positions improved, and supervision and oversight improved. This progress and an effective policy response helped the Japanese financial system withstand one of the most severe output contractions experienced among the G-7 during the global financial crisis. Recommendations included: (i) close monitoring and contingency planning, especially with regard to risks related to the Japanese government bond market, sovereign funding pressures, regional bank vulnerabilities, and credit quality (ii) further advances in the regulatory and supervisory regime to better anticipate and manage systemic risks; (iii).among all agencies, mechanisms for systemic and macroprudential oversight could be enhanced and more forward-looking cross-sectoral approaches should be adopted; (iv) cross-border risk monitoring arrangements deepened given the growing activities of Japanese financial institutions overseas; (v) broad-based financial reform plan could contribute to an enabling environment for private sector growth as the economy recovers and undergoes more ambitious fiscal consolidation.

India. The 2012 FSAP found that India has made remarkable progress toward developing a stable financial system but confronts a build-up of financial sector vulnerabilities. The main near-term risks to the financial system are a worsening of bank asset quality and renewed pressures on systemic liquidity. The prominent role of the state in the financial sector contributes to a build-up of fiscal contingent liabilities and creates a risk of capital misallocation that may constrain economic growth. Recommendations included: (i) greater de jure independence of regulatory agencies; (ii) consolidated supervision of financial conglomerates; (iii) reductions in the large exposures and related-party lending limits in banks; (iv) Enhance RBI monitoring of corporate indebtedness, refinancing risk, and foreign exchange exposures; (v) improve the performance and financial strength of public financial institutions and subject them to full supervision and regulation; (vi) strengthen oversight of banks' overseas operations through Memoranda of Understanding: (v) strengthen coordination mechanisms among domestic supervisors through MOUs and formal frameworks; (vi) gradual reduction in the statutory liquidity ratio; (vii) strengthen resolution tools by granting stronger powers to supervisors to resolve nonviable entities in an orderly fashion; and (viii) develop and periodically test arrangements to deal with a major disruption to the financial system.

Indonesia. The 2010 FSAP noted that a decisive and successful response, as well as a decade of sound policies and structural reform, helped Indonesia recover quickly from the 2008 global crisis. However, lingering concerns over weak enforcement of the rule of law, transparency, and governance issues, weigh on market perceptions. Addressing these weaknesses should be a priority. The banking system was seen as generally healthy. While banks are vulnerable to credit, interest rate, and liquidity risks, a high capital and earnings buffer has provided a cushion against macroeconomic volatility. Recommendations included (i) revised regulation to strengthen the quality of capital by bringing risk weights to at least Basel I levels and tightening the accounting definition of Tier 1 capital; (ii) revised regulations to strengthen the regulatory definition of exposure and asset classification and provisioning norms; (iii) Establish regular contacts with domestic and foreign supervisors to strengthen consolidated supervision and home-host cooperation; (iv) Submit legislation for prompt corrective action to remove discretion from the process, and limit the time banks can spend under intensive supervision; (v) strengthen stress testing capability (vi) review financial sector supervision and regulation to ensure micro-macro prudential coordination; (vii) increase the deposit insurance fund commensurate with the increased size of deposits covered; and (viii) amend legislation to enhance the scope and strength of legal protection of bank supervisors and securities regulators.

Malaysia. The 2013 FSAP main findings were that Malaysia's financial system has weathered the recent global financial crisis well, helped by limited reliance of financial intermediaries on cross-border funding, a well developed supervisory and regulatory regime, and a well capitalized banking system. Stress tests suggest that banks are resilient to a range of economic and market shocks; though the high level of reliance on demand deposits is a potential vulnerability. Other risks faced by the financial system include those related to rapid loan growth, rising house prices, and high household leverage, which call for enhanced monitoring of household leverage and a review of the effectiveness of the macroprudential measures. Recommendations included: (i) enhance monitoring of household sector leverage; (ii) adopt multi-year top-down and bottom-up macroeconomic stress testing, and introduce more conservative credit loss parameters in bottom up exercise (iii) strengthen framework for consolidated supervision to address FHCs in such areas as consolidated capital standards and risk management expectations; (iv) implement proposed new Financial Services Act and Islamic Financial Services Act at an early date; and strengthen legal and regulatory requirements for Islamic banks; (v) strengthen the definition of connected lending; and (vi) Formalize a high-level committee with the responsibility for ongoing systemic risk monitoring, information sharing, and crisis action

Philippines. The 2010 FSAP Update found that the banking sector has been strengthened considerably since the Asian crisis of the late 1990s and today appears generally resilient to a broad range of macroeconomic risks. Considerable progress has been made toward implementing the recommendations of the initial FSAP, particularly in banking supervision, but also in strengthening the bank resolution framework and nonbank supervision. Recommendations included: (i) establish a credit bureau with positive and negative credit information that includes the whole banking system and information about utility payments: (ii) expand legal protection for all supervisory staff; (iii) amend General banking law and New Central Banking Act to give power to the BSP (the Central Bank of the Philippines) to set prudential rules without changing laws; (iv) Amend Prompt corrective action (PCA) regulation to make it more progressive and timely; (v) involve Philippine Deposit Insurance

Corporation early on in dealing with PCA failure bank; (vi) allow conservator /receiver to take full control to restructure a bank without shareholder approval once capital adequacy breaches a regulatory threshold; and (vii) amend law for a bridge bank resolution mechanism.

Thailand. The 2008 FSAP noted that the soundness of Thailand's financial system had been strengthened since the financial crisis of the late 1990s. Substantial progress has been made in upgrading the regulatory and supervisory system and improving macroeconomic management. Notwithstanding these improvements, policymakers faced several critical challenges to further enhance the stability and efficiency of the financial system. From simulated stress-test scenarios, Thailand banks remain vulnerable to a significant slowdown in domestic economic growth, with liquidity risk found to be material for a few banks. These findings underscore the importance of continued close supervisory attention by the Bank of Thailand, in particular to weak banks in the system. Recommendations include: (i) passage of pending legal reforms to address weaknesses in the financial supervisory framework, including establishing legal independence of the heads of the supervisory agencies and provisions for objective and transparent standards for dismissal; (ii) improve coordination among the supervisory agencies through regular consultations and greater sharing of drafts policies and regulations at the staff level. Improve process of consultations with market participants; (iii) transition from a blanket guarantee to a limited deposit insurance system; (iv) gradually reduce the government's equity stakes in the private commercial banks; (v) reduce the large stock of NPLs and distressed assets in the Thailand financial sector and state-owned asset management companies; (vi) accurately identify and monitor the level and aging of NPLs in banks; and (vii) provide tax incentives for writing off NPLs.

References

Aizenman, Joshua, Brian Pinto, and Vladyslav Sushko, 2012, "Financial Sector Ups and Downs and the Real Sector: Up by the Stairs and Down by the Parachute," University of California Santa Cruz Department of Economics Working Paper 689.

Borensztein, Eduardo, and Jong-Wha Lee, 2000, "Financial Crisis and Credit Crunch in Korea - Evidence from Firm-Level Data," IMF WP/00/25 (Washington: International Monetary Fund).

FitchRatings, 2008a, "Japanese Major Banks: Exposures to Subprime and Credit Products" (February).

FitchRatings, 2008b, "Banks in Asia Excluding Japan: Update on Exposure to Subprime and Structured Credit Products" (April).

Gourinchas, Pierre-Olivier and Maurice Obstfeld, 2012, "Stories of the Twentieth Century for the Twenty First," American Economic Journal: Macroeconomics, Vol.4 (1).

Hunt, Chris, 2009, "Banking crises in New Zealand – An Historical Perspective," Reserve Bank of New Zealand: Bulletin, Vol. 72, No. 4 (December).

International Monetary Fund, 2000, "Recovery from the Asian Crisis and the Role of the IMF," IMF Issues Brief 00/05.

———, 2007, "Ten Years after the Crisis: How Much Stronger is Asia?," *Regional Economic Outlook: Asia and Pacific* (Washington, October).

———, 2008a, "Overview," *Regional Economic Outlook: Asia and Pacific* (Washington, April).

———, 2008b, "Overview," *Regional Economic Outlook: Asia and Pacific* (Washington, November).

———, 2009a, "Asia's Recovery in the Global Context," *Regional Economic Outlook: Asia and Pacific* (Washington, October).

———, 2009b, "Overview," *Regional Economic Outlook: Asia and Pacific* (Washington, May).

———, 2009c, "Recessions and Recoveries in Asia: What Can the Past Teach Us about the Present Recession?," *Regional Economic Outlook: Asia and Pacific* (Washington, May).

———, 2009d, "Update on Fiscal Stimulus and Financial Sector Measures," (Washington, April).

———, 2011a, "Assessing Reserve Adequacy," IMF Policy Paper (Washington).

———, 2011b, "Hong Kong SAR – 2011 Article IV Consultation," IMF Staff Country Report No. 11/348 (Washington).

———, 2012a, *Fiscal Monitor*, (Washington, October).

———, 2012b, "The Liberalization and Management of Capital Flows: An Institutional View," IMF Policy Paper (Washington).

———, 2013, *Global Financial Stability Report*, (Washington, October).

Kaplan, Ethan, and Dani Rodrik, 2001, "Did the Malaysian Capital Controls Work?," NBER Working Paper 8142.

Laeven, Luc, and Fabian Valencia, 2012, "Systemic Banking Crises: A New Database," IMF Working Paper WP/12/163 (Washington: International Monetary Fund).

Lane, Timothy, Atish Ghosh, Javier Hamann, Steven Phillips, Marianne Schulze-Ghattas, and Tsidi Tsikata, 1999, *IMF-Supported Programs in Indonesia, Korea, and Thailand – A Preliminary Assessment*, IMF Occasional Paper 178 (Washington: International Monetary Fund).

Lim, Cheng Hoon, Francesco Columba, Alejo Costa, Piyabha Kongsamut, Akira Otani, Mustafa Saiyid, Torsten Wezel, and Xiaoyong Wu, 2011, "Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences," IMF WP/11/238 (Washington: International Monetary Fund).

Lim, Mah-Hui, and Soo-Khoon Goh, 2012, "How Malaysia Weathered the Financial Crisis: Policies and Possible Lessons," in *How to Prevent the Next Crisis*, edited by Aniket Bhushan (Ottawa: The North-South Institute).

Lim, Cheng Hoon, Rishi Ramchand, Hong Wang, and Xiaoyong Wu, 2013, "Institutional Arrangements for Macroprudential Policy in Asia IMF," IMF WP/13/165 (Washington: International Monetary Fund).

Park, Donghyun, Arief Ramayandi, and Kwanho Shin, 2013, "Why Did Asian Countries Fare Better during the Global Financial Crisis than during the Asian Financial Crisis?," in Changyong Rhee and Adam S. Posen (eds.), *Responding to Financial Crisis: Lessons from*

Asia then, the United States and Europe Now, Asian Development Bank and Peterson Institute for International Economics (Washington).

Vinals, Jose, and Jonathan Fiechter, "The Making of Good Supervision: Learning to Say 'No'," IMF Staff Position Note 10/08 (Washington: International Monetary Fund).

———, Ceyla Pazarbasioglu, Laura Kodres, Aditya Narain, and Marina Moretti, "Shaping the New Financial System," IMF Staff Position Note 10/15 (Washington: International Monetary Fund).