

INTERNATIONAL MONETARY FUND

**How Did Emerging Markets Cope in the Crisis?**

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In consultation with other departments

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**Scope.** This paper examines the performance of emerging market economies (EMs) during the recent global crisis and draws policy conclusions. It considers how EMs were affected by the initial impact of the crisis, examines the extent to which they were able to undertake countercyclical policies to moderate the impact, and highlights factors that have influenced the pace and timing of their recovery. Finally, it considers policy challenges facing EMs as the crisis subsides. This paper sheds light on the role of reserves in crises, and provides contextual background for work on the future financing role of the IMF.

**Takeaways.** The paper's primary message is that countries that had improved policy fundamentals and reduced vulnerabilities in the pre-crisis period reaped the benefits of these reforms during the crisis. Specifically: (i) The initial impact of the crisis was less pronounced in EMs that had better pre-crisis external vulnerability indicators. Reserve holdings helped protect EMs from the sharp rise in global risk aversion but these benefits diminished at very high levels of reserve holdings; (ii) Countries that entered the crisis with more policy space and less binding financing constraints were able to react more aggressively with fiscal and monetary policy; (iii) Recovery from the crisis was faster in EMs that gave a bigger fiscal stimulus, had stronger pre-crisis fundamentals, and had faster growing trading partners; (iv) There is considerable heterogeneity in the policy challenges facing EMs as they exit from the crisis. Countries with a high level of vulnerabilities still need to undertake further adjustment. However, countries that entered the crisis with relatively good fundamentals are recovering faster and may be constrained in their policy options due to accommodative policies in advanced economies (AEs).

**Data and methods.** The analysis is based on the Spring 2010 World Economic Outlook data, public sources (Haver, CEIC, and others), and internal staff assessments of vulnerabilities.

**Staff.** The paper was prepared by a team from SPR led by R. Baqir and comprising M. Chivakul, G. Gray, B. Joshi, P. Kehayova, R. Llaudes, G. Presciuttini, M. Saenz, and F. Salman with contributions from I. Asmundson and M. Saito, under the supervision of A. Husain. It draws on the findings of missions to Indonesia, the Philippines, and Russian Federation by a team comprising R. Baqir (head), M. Chivakul, and F. Salman (all SPR).

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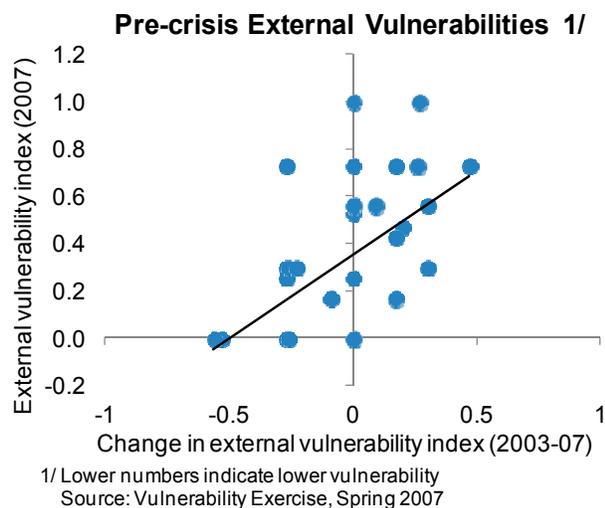
## I. INTRODUCTION AND SUMMARY

1. **The recent crisis marked the largest shock to the world economy in the post-war era.** After years of strong global growth, the implosion in advanced economy financial centers quickly affected emerging market economies (EMs). Financial markets froze in the aftermath of the Lehman bankruptcy in September 2008 and EMs faced an externally driven collapse in trade and pronounced financial volatility, magnified by deleveraging by banks worldwide. Growth of the global economy fell 6 percentage points from its pre-crisis peak to its trough in 2009, the largest straight fall in global growth in the post-war era.
2. **The crisis had a pronounced but varied impact on EMs.** On average, real output in EMs fell about 4 percent between the third quarter of 2008 and the first quarter of 2009, the most intense period of the crisis. But this average performance masked considerable variation across EMs. Real output contracted 11 percent during this period in the worst affected quartile of EMs, mostly in emerging Europe. On the other hand, output *rose* 1 percent during the same period in the least affected quartile. Similarly, the impact of the crisis on EM financial markets varied considerably. Sovereign spreads rose by more than 1,000 basis points for some EMs through the crisis but by only around 100 basis points for some others.
3. **As a result of the crisis, a number of EMs turned to the IMF for financial support.** Increases in lending resources as well as reforms to the lending framework enabled the IMF to quickly react to global developments and put in place 24 arrangements, many with exceptional access, and including the recently introduced Flexible Credit Line. A recent review provided a preliminary assessment of policy reactions (see [Review of Recent Crisis Programs](#)), program design, and outcomes under IMF-supported programs. During the Board discussion of that paper, several Directors requested a broader look at how EMs coped in the crisis.
4. **This paper provides a preliminary assessment of the emerging markets' experience in the global crisis.** First, with a view to distilling policy messages, it identifies factors that led to some countries being less affected by the global crisis than others (Section II). Second, the paper documents EMs' unprecedented policy response to the crisis. It explains why some EMs were able to respond more aggressively and are recovering quicker than others (Section III). Third, the paper presents three country case studies to complement the empirical analysis and illustrate some of the main messages from the paper (Section IV). Finally, the paper takes stock of the outlook for EMs in the aftermath of the crisis and concludes with preliminary lessons from their experience with the crisis (Section V).
5. **The paper's primary message is that countries that had improved policy fundamentals and reduced vulnerabilities in the pre-crisis period reaped the benefits of these reforms during the crisis.** This theme permeates the main results in the paper:
  - *Impact of crisis:* Controlling for other determinants of impact such as trade and financial openness, countries that had better pre-crisis fundamentals and vulnerability

indicators experienced less severe output contractions and widening of sovereign spreads. Higher international reserves holdings, by reducing external vulnerability, helped buffer the impact of the crisis. But reserves had diminishing returns: at very high levels of reserves there is little discernable evidence of their moderating impact on output collapse. As expected, countries that were more open to trade and financial linkages were more affected.

- *Policy response:* Countries that entered the crisis with more policy space and less binding financing constraints were able to react with more aggressive fiscal and monetary stimuli. Fiscal policy in particular responded more strongly than implied by historical behavior.
- *Recovery:* Countries that had better pre-crisis fundamentals and those that were able to sustain public spending growth are recovering more quickly from the crisis.
- *Exit issues and outlook:* EMs that entered the crisis with high vulnerabilities were able to smooth adjustment due to quick access to financing, including from the IMF. Their challenge is to sustain adjustment in the coming years to improve their vulnerability indicators. On the other hand, EMs that had low pre-crisis vulnerabilities are further ahead in the recovery cycle than advanced economies (AEs). Some may be constrained from withdrawing stimulus due to possible spillovers from accommodative policies in AEs as monetary tightening may fuel capital inflows. In light of such spillovers, these countries may need to adjust their policy mix and/or consider price-based capital controls and prudential measures, where appropriate, to cope with surges in capital inflows.

6. **The role played by pre-crisis vulnerabilities has important implications for IMF surveillance.** During the thick of the crisis around the time of Lehman Brothers' bankruptcy, EM assets fell across the board. At the time it was not clear whether EMs that had invested in improving policy fundamentals in the preceding years would fare any better than others. The main message from this paper is that markets *do* discriminate across EMs and prior progress was rewarded. Countries that entered the crisis with lower vulnerabilities had worked to reduce them in the preceding period (text figure). This message also highlights the need for EMs emerging from the crisis with high vulnerabilities to protect themselves against future shocks. It also underlines the relevance of vulnerability indicators for IMF surveillance and policy advice.



7. **This paper complements other work in the IMF.** First, it provides contextual background to work on the future financing role of the IMF (see the [Fund’s Mandate—Future Financing Role](#)). In particular, the analysis in this paper with respect to the role of reserves and constraints in policy reaction is relevant for a consideration of how the IMF can best meet the needs of its membership. It also complements ongoing work in the IMF on exit issues from crisis intervention policies (see [Exiting from Crisis Intervention Policies](#)), the state of public finances (IMF, 2009a), and strategies for fiscal consolidation in the post-crisis world (see [Strategies for Fiscal Consolidation in the Post-Crisis World](#)). An update of the earlier review of crisis programs is underway, and will be presented separately. Regional perspectives on how EMs coped with the crisis are covered in recent issues of the IMF’s *Regional Economic Outlook* series (IMF 2009b, 2009c).<sup>1</sup>

## II. IMPACT OF THE CRISIS

8. **Even though the global crisis started in AE financial centers, it took a heavy toll on EMs.** The median EM suffered about as large a decline in output as the median AE, but the impact was more varied in EMs (see table). Several EMs were affected more than the worst-hit AEs while some other EMs continued to grow through the crisis period. Similarly, while on average EMs experienced as large a decline in stock markets and as large a widening of spreads as AEs, there was considerable cross-country variability. What explains these differing outcomes?

	Impact of the Crisis	
	Emerging Markets	Advanced Economies
Output collapse 1/		
Median	-4.9	-4.5
25th percentile	-8.4	-6.6
75th percentile	-2.0	-2.9
Stock market collapse 1/		
Median	-57.1	-55.4
25th percentile	-72.0	-64.1
75th percentile	-45.2	-49.0
Rise in sovereign spreads 2/		
Median	462	465
25th percentile	287	...
75th percentile	772	...

1/ Measured as percent change from peak to trough.  
 2/ Measured as increase in basis points from trough to peak. For AEs, table reports rise in spreads on US corporates rated BBB.  
 Source: Haver; Bloomberg; Fund staff calculations.

9. **The message from this section is that countries with higher pre-crisis vulnerabilities and trade and financial linkages with the global economy were more impacted by the crisis.** One of the factors that lowered pre-crisis vulnerability was higher international reserves in relation to short-term external financing needs. Nevertheless, additional reserves were less useful at limiting output collapse at very high levels of reserves. The analysis also indicates that countries that experienced pre-crisis credit booms experienced sharper output falls during the crisis, although to a lesser extent than during previous crisis episodes. Such credit booms were typically foreign-financed and more pronounced for countries with fixed exchange rate regimes.

10. **Pre-crisis vulnerabilities and policy fundamentals can be measured in different ways.**<sup>2</sup> Measuring vulnerabilities consistently across countries and over time can be a

<sup>1</sup> Other papers that discuss the impact of the crisis on emerging markets include Bergl of and others (2009), Berkmen and others (2009), Ghosh and others (2009), Rose and Spiegel (2009a, 2009b), Taylor (2009), and BIS (2009a, 2009b).

<sup>2</sup> The terms “vulnerabilities” and “policy fundamentals” are used interchangeably in this paper.

challenging task. The IMF developed a methodology for this purpose as part of the internal semi-annual vulnerability exercise for emerging market economies (VEE).<sup>3</sup> Given that for most EMs this was an externally driven crisis, this paper primarily uses the indicator-based external vulnerability index from the spring 2007 round of the VEE, the last before the onset of market volatility in late 2007. A sub-theme from this paper is that the external vulnerability index does remarkably well in explaining the experience of EMs in this crisis. The terms “low,” “medium,” and “high” vulnerability as used in the rest of the paper pertain to the ratings on this vulnerability index in the Spring 2007 round of the VEE. Of the “high” vulnerability group, about half the countries were in Emerging Europe. The country sample used in the paper is provided in the Annex.

11. **The impact of the crisis can be measured along several dimensions:**

- ***Impact on the real economy.*** The preferred measure in this paper is the percent change in seasonally adjusted quarterly GDP from each country’s peak to its respective trough during the crisis.<sup>4</sup> Box 2 describes additional measures of real impact that were explored as part of the analysis.
- ***Impact on financial markets and the banking sector.*** This is measured, for each country, by the (a) change in the average monthly stock market index during the crisis; (b) collapse in real private sector credit growth from its peak to trough and the difference between pre- and post-crisis average monthly credit flows in percent of GDP; and (c) rise in the average monthly EMBI sovereign spread from its trough to peak (in basis points). As for output loss, county variation in peaks and troughs is taken into account.

12. **Recoupling led to re-decoupling in the financial transmission of the crisis.** To assess how investors differentiated between countries, Figure 1 traces daily stock market indices across AEs and EMs by their level of vulnerability in Spring 2007. Similar to several other studies, the start of the crisis is taken to be August 9, 2007 when three funds that had invested in subprime mortgages were suspended from trading and the Fed, ECB, and BoJ undertook coordinated liquidity injection.<sup>5</sup> Three phases of transmission emerge:

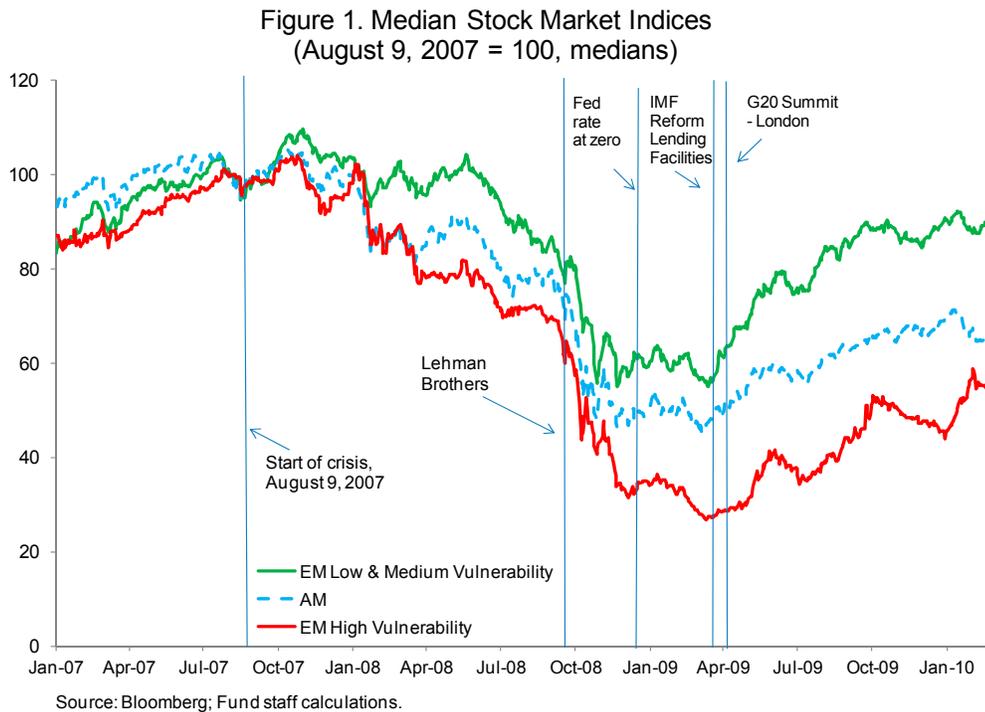
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<sup>3</sup> The VEE was established in 2001 to inform staff’s surveillance of emerging market countries. It examines several indicators against thresholds in the public, external, financial, and corporate sectors, to classify a country as having a “low,” “medium,” or “high” underlying vulnerability in each sector and overall. For confidentiality reasons it is not published. Box 1 provides more details.

<sup>4</sup> An alternative measure of impact could be the change in output between 2008Q3 and 2009Q1, the peak and trough, respectively, for the typical EM. However, there is considerable country level variation in peaks and troughs and using this approach would have been accurate for only around one half of the EMs in the sample.

<sup>5</sup> See Cecchetti (2008) and Taylor and Williams (2008).

- **Decoupling.** First, some EMs seemed to decouple from AEs between the start of the crisis and collapse of Lehman. Until a few weeks before Lehman's bankruptcy announcement, stock markets in low and medium pre-crisis vulnerability EMs were 15 percent below their levels of August 2007, while those in AEs and high vulnerability EMs had already fallen around 30 percent.
- **Re-coupling.** This differentiation came to an end in the second phase as Lehman's collapse triggered panic in the global economic landscape and all EMs fell almost uniformly.
- **Re-decoupling.** With the return of stability in the third phase of transmission, EMs re-decoupled and a striking gap opened between high vulnerability countries and others. Overall, since August 2007, while stock markets in low and medium vulnerability countries have broadly recovered to pre-crisis levels, those in countries with high vulnerabilities on the eve of the crisis remain depressed.



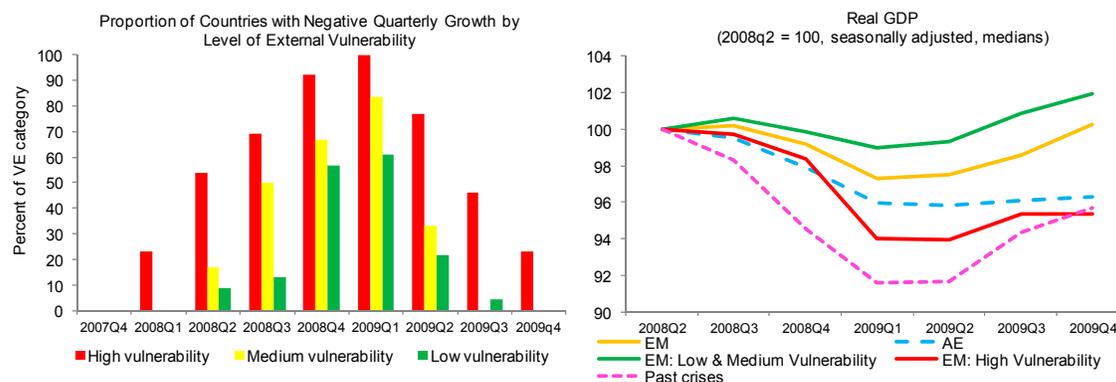
13. **Looking at the macroeconomic impact, countries that experienced a decline in vulnerabilities before the crisis came out well ahead of others.** This is illustrated in both the *timing* of experiencing a fall in output and the *magnitude* of the decline:

**Timing of collapse in real activity.** By the third quarter of 2008, the majority of countries that had high or medium pre-crisis vulnerabilities were contracting (Figure 2). In contrast, low pre-crisis vulnerability EMs held out longer before

succumbing to global headwinds. Even through the worst of the crisis in 2009Q1, many low vulnerability countries did not experience a fall in output.

- ***Magnitude of collapse in real activity.*** A similar message emerges from a comparison of the magnitude of the fall. Countries with low and medium vulnerabilities suffered much smaller output collapses than other EMs. These countries also contracted much less than AEs.

Figure 2. Impact of Crisis on Output

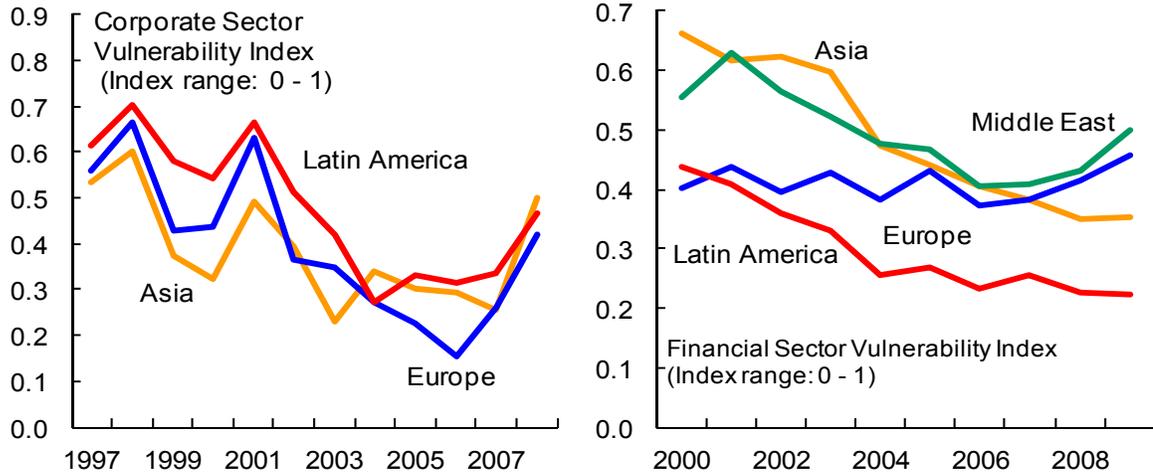


Source: VEE Spring 2007; Haver; National authorities; Fund staff calculations

14. **Highly vulnerable EMs experienced a smaller initial fall in output during this crisis than EMs in past crises.**<sup>6</sup> The global coordinated response to this crisis and the provision of quick and large amounts of financing from international institutions, including the IMF, allowed countries to smooth adjustment. In addition, past EM crises often involved banking crises, which was not the case this time round. This was partly due to the crisis having emerged in AE financial centers, but also probably owed to the general absence of currency crises that could have severely impaired banks and corporate balance sheets. Moreover, many EMs entered this crisis on the back of improvements in financial and corporate sectors vulnerability indicators (Figure 3). An exception is the average trend for European EMs, where financial sector vulnerabilities did not improve during 2000–07, unlike in other regions where there was an improvement.

<sup>6</sup> Past capital account crisis cases—for comparison purposes—are Mexico (1994), Indonesia (1997), Korea (1997), Malaysia (1997), Philippines (1997), Thailand (1997), Brazil (1998), Colombia (1998), Ecuador (1998), Russia (1998), Turkey (2000), Argentina (2001), and Uruguay (2001). Dates in parentheses are those of crisis inception. Comparisons with past crises should be interpreted with caution, owing to differing external circumstances prevailing during different episodes. Ramakrishnan and Zalduendo (2006) and Reinhart and Rogoff (2008) use similar country samples of past crises.

Figure 3. Financial and Corporate Vulnerabilities



Source: VEE Fall 2009 (lower values of the index indicate lower vulnerability).

**Table 1. Potential Determinants of Impact on Real Output on EMs During the Crisis 1/**

**Pre - Crisis Policy Fundamentals (2007)**

- 1 Exchange rate regime, MCM classification, March-07
- 2 FX regime, Reinhart Rogoff classification
- 3 Inflation targeting framework
- 4 Debt stabilizing primary balance
- 5 Primary gap
- 6 External public sector debt
- 7 Short-term public debt at residual maturity
- 8 Public sector debt linked to FX
- 9 Primary balance, % GDP
- 10 Cyclically adjusted primary balance
- 11 External debt, total, % GDP
- 12 External debt, ST, % GDP
- 13 External debt, ST at RM, % GDP
- 14 General gov't debt to GDP
- 15 Fiscal impulse
- 16 Change in primary balance to GDP

**Measures of pre-crisis overheating**

- 1 Real GDP growth between 2003 & 2007
- 2 Real domestic credit growth between 2003 & 2007
- 3 Percent change in CPI between 2003 & 2007
- 4 Credit to GDP 2007

**Measures of trade linkages**

- 1 Exports to advanced economies
- 2 Exports to US, % GDP
- 3 Manufactures exports
- 4 Openness (X+M)/GDP
- 5 Export earnings: non-fuel primary commodities
- 6 Oil exports, % GDP
- 7 Fuel exporter dummy

**Measures of financial linkages**

- 1 Total external financing requirements, % GDP
- 2 Foreign currency loans (% of total loans)
- 3 Loan to deposits ratio
- 4 Claims on private sector, % GDP
- 5 Total external financing requirements, % GDP
- 6 Total capital inflows
- 7 Foreign ownership in % of total assets 2007
- 8 Financial connectedness (Foreign assets + liabilities)/GDP

**Other controls**

- 1 Population
- 2 Per capita GDP
- 3 PPP valuation of country GDP
- 4 NEER peak to trough percent change
- 5 Regional dummies

1/ Each one of these indicators was tried in addition to the three core indicators mentioned in Table 2 in the text to check the robustness of results presented in the text. See also Berkmen and others (2009) for a further list of possible explanatory variables.

15. **Econometric analysis was used to assess the impact of pre-crisis external vulnerabilities on output collapse, controlling for global linkages.** The primary regression specification used in this paper explains the fall in real output as a function of (a) pre-crisis vulnerabilities; (b) trade connectedness with the rest of the world; and (c) international financial integration. After trying several alternative measures for each of these three categories, the following three measures best explained the cross-country variation of impact: (a) the external vulnerability index in the Spring 2007 round of the VEE; (b) the percent change in domestic demand of AE trading partners weighted by trade shares and computed over a similar period to the peak-to-trough change in each EM's output; and (c) the consolidated stock of claims of BIS reporting banks (immediate borrower basis) on EMs in percent of the EM's GDP in December 2007. A number of other indicators, including regional dummies, were tried as part of the empirical analysis, either as alternatives for the above three or as additional controls, but they did not affect the central findings (Table 1).

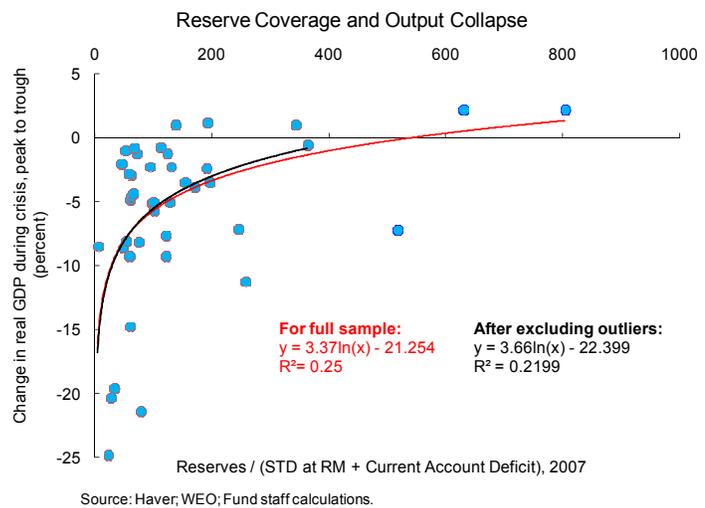
16. **The least vulnerable EMs, on average, contracted 6½ percentage points less than the most vulnerable EMs** (Table 2). All four factors that influence the external vulnerability index were also individually significant, with the exception of external debt in percent of exports (Table 2, columns 2–5).<sup>7</sup> More externally vulnerable EMs, in particular those with high current account deficits, may have experienced sharper declines in domestic demand, contributing to the decline in output. Other standard sectoral vulnerability indicators—fiscal, financial, corporate—do not stand out as significant factors in explaining the output decline.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	All EMs	All EMs	All EMs	All EMs	All EMs	EMs with GIR/STD < 100%	EMs with GIR/STD ≥ 100%
External section vulnerability index (ranged 0 - 1)	-6.40 ** (3.04)						
Domestic demand growth in AE trading partners (percent)	1.44 ** (0.68)	1.47 ** (0.63)	1.68 *** (0.53)	1.63 *** (0.59)	1.53 ** (0.65)	0.91 (1.34)	1.60 * (0.87)
Foreign bank claims (percent of GDP, expressed in logs)	-1.7 * (0.92)	-1.90 ** (0.81)	-1.85 ** (0.83)	-0.86 (1.08)	-1.90 * (1.00)	-2.50 * (1.37)	-1.07 (1.25)
GIR in percent of (short-term debt at residual maturity plus current account deficit, expressed in logs)		2.84 *** (0.86)				8.00 *** (2.56)	2.63 * (1.31)
Current account balance (percent of GDP)			0.17 * (0.08)				
External debt (percent of GDP)				-0.09 ** (0.04)			
External debt (percent of exports)					-2.40 (1.59)		
Observations	40	41	45	42	42	22	19
R-squared	0.44	0.49	0.40	0.44	0.40	0.55	0.25

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Source: VEE Spring 2007; GEE; IFS; WEO. Fund staff calculations.

<sup>7</sup> As noted in Box 1, these four factors cannot be added simultaneously to the regression due to collinearity.

17. **Pre-crisis reserve holdings were associated with positive but diminishing returns with respect to output collapse.** As one of the components of the vulnerability index, a higher ratio of reserves to external financing requirements—defined as the sum of short-term debt (at residual maturity) and the current account deficit—helped to reduce external vulnerabilities (Table 2, column 2). Higher reserves can facilitate continued rollover of external debt, thereby cushioning the potential real effects of liquidity shortages, and can also support general market confidence. To explore potential nonlinearities in the relationship, the sixth and seventh columns in Table 2 report the results from the specification of the second column run separately for the sample split at 100 percent of coverage of short term debt, a commonly used threshold. Higher reserves had a significant payoff at low levels of reserve coverage but much less so at high levels of coverage, especially if the costs of holding reserves are taken into account (Rodrik, 2006).<sup>8</sup> Other specifications yielded the same message. Peak-to-trough percent change in output was regressed on reserves, short-term debt, and current account balance, each expressed in percent of GDP. The reserves variable was significant at lower reserve levels when the sample was split at 100 (or 150) percent of reserve coverage of short term debt or at the median level of reserves-to-GDP ratio. Results were examined to ensure they were not being driven by outliers.



18. **Trade linkages were another important determinant of output collapse.** Coefficients from the first regression in Table 2 indicate that EMs experienced an additional 1½ percentage point reduction in real output during the crisis for every percentage point fall in domestic demand in their advanced economy trading partners. Large EMs, for whom exports formed a smaller component of their aggregate demand (such as Indonesia and India), consequently experienced smaller real shocks. As has been documented elsewhere, trade fell more in this crisis than in past global recessions, in part a reflection of increasing interconnectedness and the responsiveness of global supply chains (Freund, 2009). Nevertheless, contrary to early concerns, problems with trade finance were not a principal

<sup>8</sup> Blanchard and others (2010) do not find a significant role for international reserves in explaining output collapse once they control for short-term debt. However, they do not explore potential non-linear relationships between reserves and output collapse. Also, this paper uses data on more emerging markets and has a different measure of output collapse that uses country-specific variation in timing of peaks and troughs of output during the crisis (see Box 2).

cause of the sharp collapse in trade (Box 3). Also, even though trade dispute filings intensified during the crisis, a wholesale rise in protectionism did not materialize (Box 4).

**Table 3. Determinants of Peak-to-Trough Real Credit Growth**

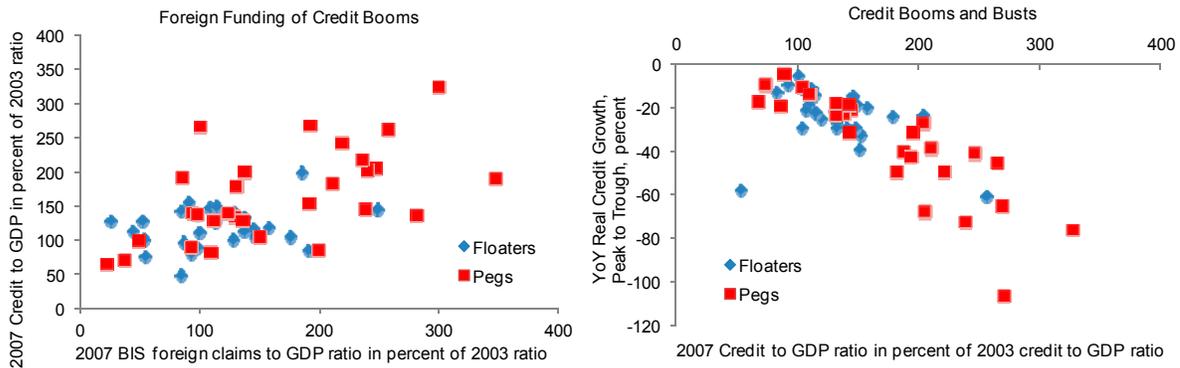
	Peak-to-trough change in real credit growth (1)	Change in credit flows to GDP 1/ (2)
2007 credit to GDP ratio in percent of 2003 ratio	-0.21 *** (-0.03)	-0.004 *** (-0.001)
Change in money market rate from August 2008 to peak	-0.59 *** (-0.18)	0.004 (-0.009)
Constant	6.39 (-3.84)	0.06 (-0.20)
Observations	37	40
R-Squared	0.76	0.22

Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1/ Change in average monthly credit flows to GDP is defined as the difference between average monthly private sector credit flows from Sep. 2008 to Dec. 2009, and Jun. 2007 to Aug. 2008 in percent of 2008 GDP.

Source: IFS; WEO; Fund staff calculations.

Figure 4. Credit Developments



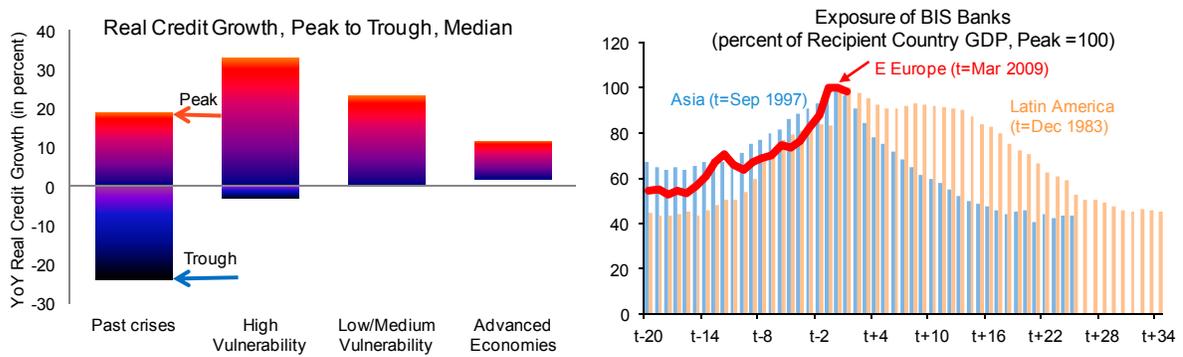
Source: WEO; IFS; BIS; Fund staff calculations.

19. **Pre-crisis credit booms—which in many cases were funded from abroad—generally ended in credit and output busts.** Cross border claims of BIS reporting banks on EMs on the eve of the crisis ranged from close to zero to around 37 percent of GDP across countries in the sample. Such lending was typically associated with credit booms and subsequent credit busts, especially for countries with fixed exchange rates (Table 3 and Figure 4). A country that had double the average level of claims of about 7 percent of GDP experienced an additional 1¼ percentage points in output reduction (Table 2). Credit busts were also associated with sharp increases in money market rates which is suggestive of a

credit crunch.<sup>9</sup> The impact of global deleveraging on credit growth in EMs was particularly pronounced in Emerging Europe where cross-border lending had been growing sharply before the crisis. When global wholesale funding markets dried up and international banks were forced to stop asset growth as part of global deleveraging, domestic credit growth fell from pre-crisis highs to close to zero. This is consistent with the finding (e.g., Kamil and Rai, 2010) that EMs whose banking systems were primarily funded by domestic deposits were better able to sustain credit growth and support activity through the crisis.<sup>10</sup>

20. **Notwithstanding global deleveraging, credit busts in EMs have been less damaging than during past crises (Figure 5).** The *change* in the growth rate of private credit was more pronounced for countries with high pre-crisis vulnerabilities.<sup>11</sup> Nevertheless, through 2009Q4 these countries had not experienced *sharply negative* credit growth as in past crises. This was despite the fact that pre-crisis credit booms had been more pronounced this time round than in past crises. The seemingly benign outcome may reflect the lack of currency and banking crises and the support provided by the international community, although it is possible that some EMs have yet to reach their credit growth trough.<sup>12</sup>

Figure 5. Deleveraging



Source: VEE Spring 2007; IFS; BIS.

21. **Pre-crisis external vulnerabilities also help to explain the rise in sovereign spreads during the crisis** (Table 4). Controlling for other factors, the country considered most externally vulnerable in March 2007 experienced 220 basis points (bps) more in rising

<sup>9</sup> See also Aisen and Franken (2010) who find that larger pre-crisis credit booms and the increase in money market rates during the crisis were important determinants of post-crisis credit slowdown.

<sup>10</sup> See also Zettelmeyer and others (2009) for a discussion of the role of foreign banks during the crisis.

<sup>11</sup> Using firm level data in 24 EMs, Tong and Wei (2009) find that pre-crisis exposure to non-FDI capital flows worsened the credit crunch, while exposure to FDI flows was associated with less constraints on credit.

<sup>12</sup> One helpful initiative in this crisis, as compared to past crises, was the European Bank Coordination Initiative under which private banks affirmed their commitments to maintain overall exposure to the countries covered by the initiative.

spreads during the crisis than the country considered least vulnerable (Table 4, column 1). In addition, as in the regressions explaining the extent of output collapse, the ratio of reserves to short-term external financing needs influenced market perceptions of a country's sovereign risk during the crisis (Table 4, column 2), and countries with greater reserves coverage experienced a smaller increase in spreads. In a crisis situation, a comfortable reserve position can bolster market confidence and signal a country's ability to continue servicing its external debt. Two other factors also affected sovereign spreads: cumulative inflation in the years preceding the crisis and having an inflation-targeting regime. Both likely affected market perceptions of whether macroeconomic stability would be maintained.

**Table 4. Determinants of the Change in Spreads from Trough to Peak (in Percent)**

	(1)	(2)
External vulnerability, Spring 2007	2.20 ** (1.05)	
Inflation targeters	-1.24 (0.75)	-1.80 *** (0.63)
Change in CPI from 2003 to 2007 (inflation in 2003-2007 period)	0.13 *** (0.02)	0.11 *** (0.02)
Reserve cover of ST debt at RM and CA deficit		-0.93 ** (0.40)
Constant	1.22 (0.97)	6.87 *** (1.81)
Observations	38	38
R-squared	0.63	0.65

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

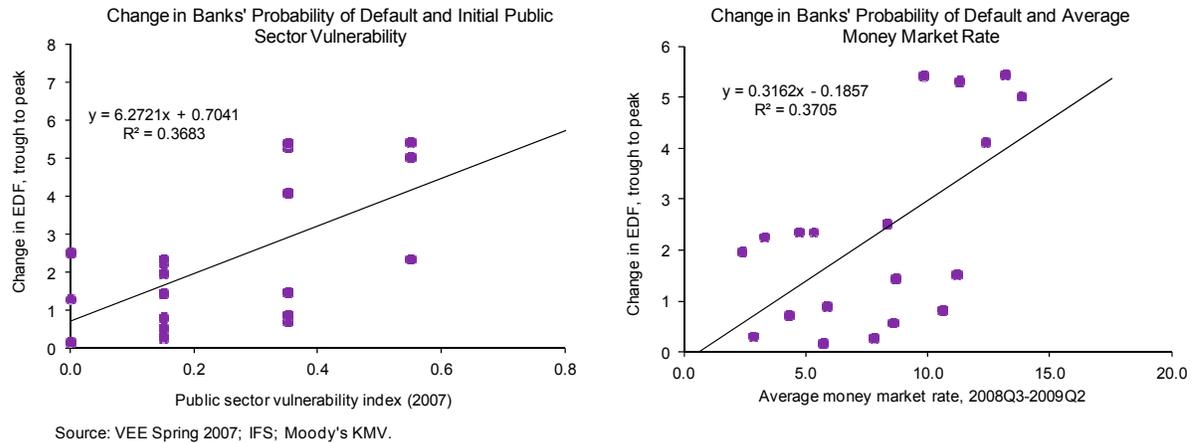
Source: VEE Spring 2007; WEO; Bloomberg; Fund staff calculations.

**22. Countries with greater initial fiscal vulnerabilities and where interbank liquidity dried up experienced higher banking sector risks during the crisis (Figure 6).** There are relatively few objective measures of banking sector risks that are available as a time series for a cross-section of countries. One of these, Moody's measure of expected default frequency (EDF), is used to measure the increase in banks' default probability from the pre-crisis trough to its peak during the crisis.<sup>13</sup> Countries that entered the crisis with higher fiscal vulnerabilities, as measured by the public sector vulnerability index, experienced a higher rise in this measure of default probability, likely reflecting market concerns that such countries may not have the means to easily address possible bank solvency problems. Also, as expected, higher default probabilities were associated with tighter inter-bank liquidity

<sup>13</sup> EDF is the calculated probability that a firm may default within the one-year (ahead) period. Data are available from Moody's KMV where EDF is calculated based on each firm's market value of assets, its volatility, and its current capital structure. EDFs for banking groups are available for 21 emerging markets. Peak-to-trough EDF is computed based on the monthly (end of month) median EDF for each EM banking group during January 2007–January 2010.

conditions, as measured by money market rates, reflecting in part risks in the banking system, including counterparty risk.

Figure 6. Banks' Probability of Default

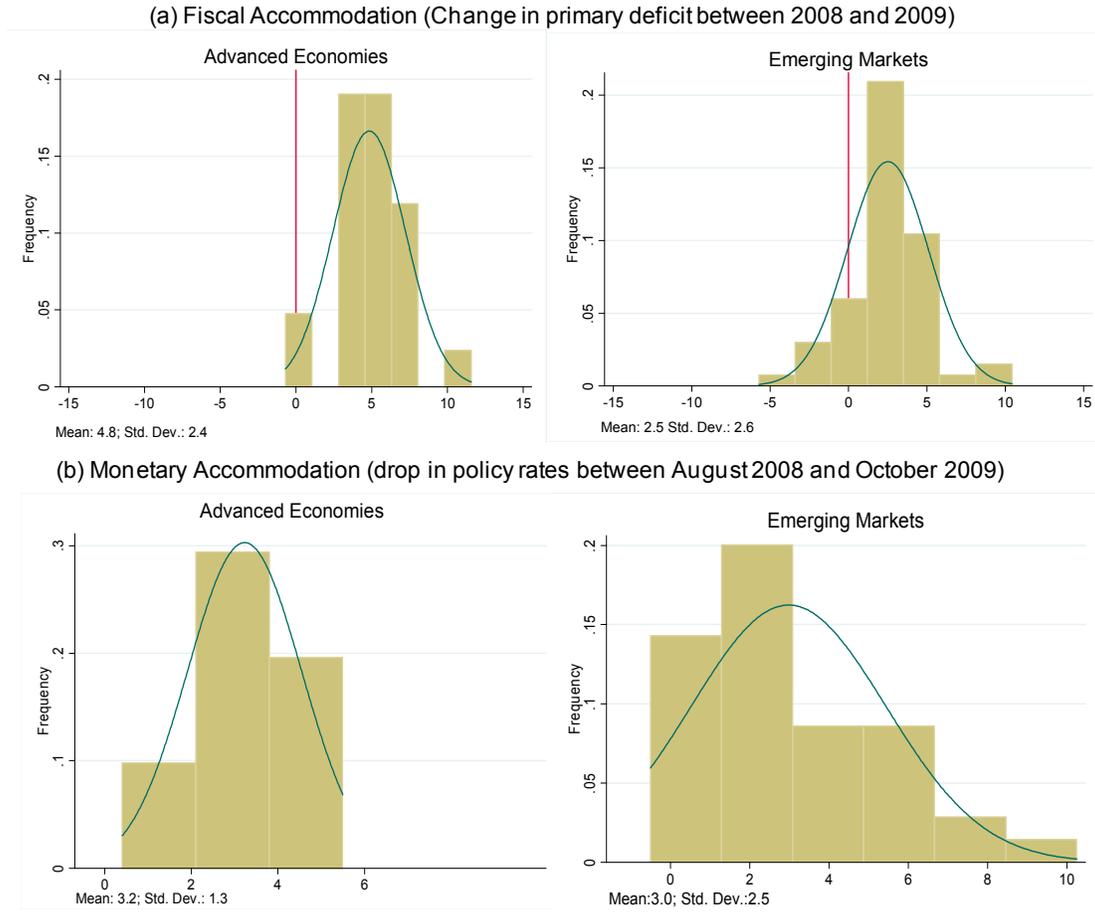


### III. POLICY RESPONSE AND RECOVERY

23. **The large collapse in economic activity was met by an unprecedented policy response.** EMs responded to the crisis with significant fiscal and monetary measures to stem the decline in aggregate demand (Figure 7).

- Even accounting for stimulus measures already in place in 2008, EMs provided substantial fiscal accommodation—defined as a one-year change in primary balance—in 2009 of close to 2½ percent of GDP on average. This was in contrast to past EM crises, where fiscal positions typically tightened in the year following the crisis (see [Review of Recent Crisis Programs paper](#)). AEs provided even larger accommodation of 4¾ percent of GDP on average, partly reflecting financial sector restructuring costs.
- There was also significant monetary stimulus. Monetary policy rates in EMs were lowered by 300 bps on average, similar to the reduction of about 320 bps among AEs. The response was more varied in EMs reflecting in part higher pre-crisis rates.

Figure 7. Fiscal and Monetary Easing in Emerging Markets and Advanced Economies



Source: WEO; Haver; Fund staff calculations.

24. **The analysis in this section indicates that countries that entered the crisis with better fundamentals were able to respond with more counter-cyclical policy easing.** Not surprisingly therefore, pre-crisis fundamentals—that is, greater policy space as reflected by lower public debt, better fiscal balances, and lower inflation—are also shaping EMs’ recovery, including by allowing for a stronger fiscal reaction to the crisis. Countries with high pre-crisis external vulnerability had, on average, less fiscal accommodation and less monetary stimulus than those with low or medium vulnerabilities. This section explores in greater detail the extent of, and constraints on, fiscal and monetary policy during the crisis and identifies factors underpinning the current recovery.

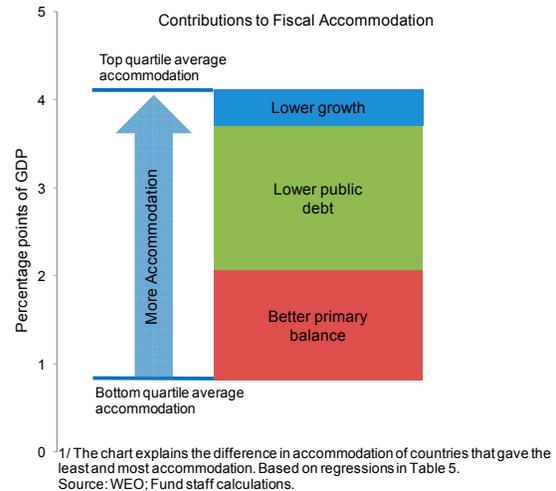
### Fiscal response

25. **The extent of fiscal accommodation among EMs in 2009 depended crucially on the available fiscal space, determined by pre-crisis fundamentals.** While most EMs kept fiscal policy accommodative during the crisis, some responded more aggressively than others. This took various forms: not reacting to a fall in revenue (resulting from a collapse in output)

with commensurate expenditure cuts, allowing automatic stabilizers to work, and instituting new discretionary expenditure and/or revenue measures. The change in the primary deficit varied from around 1 percent for the quartile with the least fiscal response to around 4 percent for the one with the highest response.<sup>14</sup>

	(1)	(2)	(3)
Primary balance (lagged)	0.24 ** (0.12)	0.26 ** (0.12)	
Overall balance (lagged)			0.38 ** (0.15)
Public Debt (lagged)	-3.54 *** (0.94)	-2.96 *** (1.07)	-0.40 (1.51)
Growth		-4.63 (6.21)	-8.18 (6.44)
Constant	4.30 *** (0.54)	3.98 *** (0.58)	3.57 *** (0.57)
Observations	48	48	48
R-squared	0.30	0.31	0.36

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \*p<0.1  
Source: WEO; Fund staff calculations.



**26. Cross-country analysis of EM responses in 2009 indicates that higher pre-crisis primary balances and lower public debt levels allowed greater fiscal accommodation during the crisis.** These two factors accounted for most of the explained variation in accommodation across countries (Table 5). In addition, there is some evidence that fiscal accommodation was greater where needed most, that is, where growth collapsed the most.<sup>15</sup> Inclusion of overall—rather than primary—balance to capture constraints placed by interest payments does not change these results.

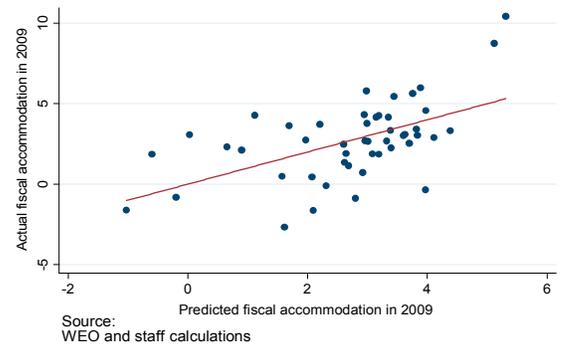
<sup>14</sup> These changes in fiscal balance can also be decomposed into their cyclical (automatic stabilizers) and discretionary (fiscal stimulus) components. On average, EMs also managed to provide fiscal stimulus (defined as the change in the cyclically adjusted primary deficit). As the latter definition depends on the derivation of output gaps—which may have changed considerably for EMs given the large dislocations brought about by the crisis—the analysis in this chapter relies mostly on changes in the primary balance. Main results also hold when the cyclically adjusted measure is used. See report on the review of recent crisis programs (see [Review of Recent Crisis Programs paper](#)), Box 6, for a discussion of measuring fiscal stance.

<sup>15</sup> Growth was included to account for the fiscal deficit rising due to the fall in nominal GDP (and associated fall in revenue) though it was not statistically significant. Econometrically, growth is an endogenous variable in this regression as it can be affected by the primary surplus. Since growth and primary surplus are negatively correlated—a higher fiscal surplus reduces aggregate demand—the coefficient is biased towards zero. This could potentially account for the weak statistical significance of this result. Instrumental variables estimation was not a viable alternative given the relatively small number of observations.

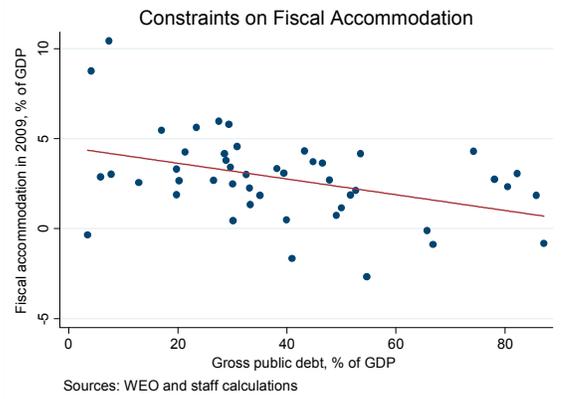
27. **While the empirical framework works well to explain the fiscal response on average, there are important country-specific differences.** The largest differences

between the actual accommodation and the one predicted by the model arise among commodity exporters like Russia and Chile, where the fall in commodity revenues to the budget account for the differences (text figure).<sup>16</sup> On the other hand, financing constraints seem to have forced several countries to accommodate less than that predicted by the model. The absence of fiscal space in some of these countries implies that they were even more constrained than the average estimates of the regressions suggest.<sup>17</sup>

Comparing Actual and Predicted Fiscal Accommodation in 2009



28. **The role of financing constraints in limiting the fiscal response is also evident in other ways.** While strong correlations among various possible explanatory variables preclude systematic examination of the various constraints on fiscal behavior, bivariate correlations indicate roles played by available financing. One simple measure of the degree of financing constraint is the level of public debt. Countries with higher pre-crisis public debt levels were more constrained in accommodation in 2009 (text figure).



29. **EMs' fiscal policy response was greater than can be predicted from past performance.** Two separate approaches were undertaken to explore whether the 2009 crisis was met with an unprecedented fiscal response. Both indicated a stronger-than-predicted response in 2009 (See Box 5). Using an out-of-sample prediction from pre-crisis behavior, the analysis calculated an "extra" accommodation in 2009 for the average EM of around 2 percentage points of GDP, with all regions showing higher-than-predicted fiscal accommodation. Another approach—directly examining the differential behavior in 2009—also found a similar result. The amount of "extra" stimulus was more limited in countries with higher pre-crisis foreign claims of BIS reporting banks and higher pre-crisis EMBI

<sup>16</sup> The role of commodity exporters was explored more systematically by including a dummy variable for countries heavily dependent on commodity-related revenues and by running the same set of regressions excluding such countries. In general, the main results presented above hold.

<sup>17</sup> In the case of Estonia, constraints may have also reflected the policy goal to meet the Maastricht criteria in 2009 itself.

spreads, likely reflecting further constraints on external financing including from a sudden stop of capital inflows (Table 6).

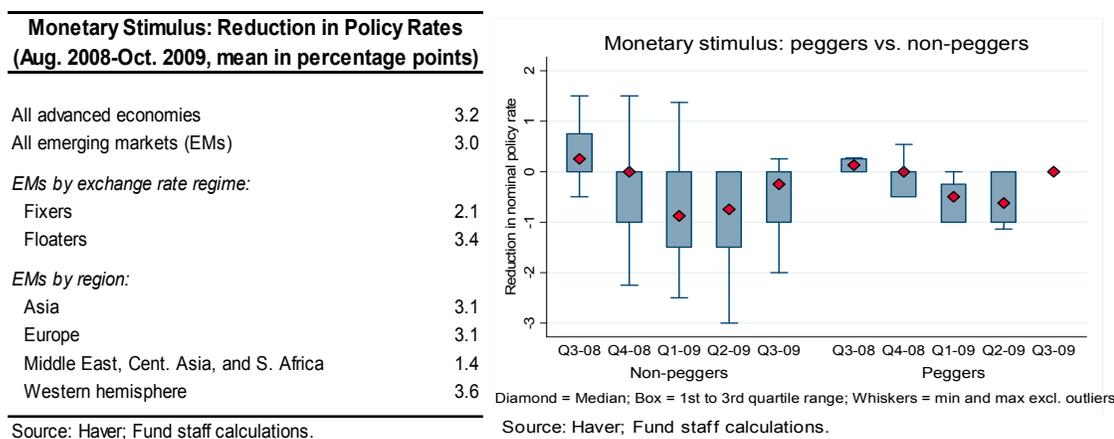
Pre-crisis exposure of BIS-reporting banks (% of GDP)	-0.12 *** (0.04)
EMBI in August 2008	-0.49 * (0.28)
Constant	3.95 *** (0.87)
Observations	34
R-squared	0.11

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Source: BIS; Bloomberg; Fund staff calculations.

## Monetary response

30. **Monetary responses to the crisis varied widely across EMs, reflecting differences in exchange rate regimes, external funding costs, and the level of pre-crisis policy rates.** Measured by the reduction in policy rates, on average, EMs provided a similar-sized monetary response as AEs (Figure 7). Across EMs, those in the Western Hemisphere provided the largest average stimulus, while those in the Middle East—where inflation rates were higher and many countries have pegs—had less space for monetary easing. In terms of timing, the bulk of the monetary stimulus was provided in the first half of 2009 by which time the extent of the global recession had become clear (Figure 8).<sup>18</sup>

Figure 8: Monetary Stimulus



<sup>18</sup> Ishi and others (2009) focus on the use of unconventional central bank measures, such as credit and quantitative easing, and report that EMs use of such measures was constrained compared to AEs. Nevertheless, credit policy played an important role in the policy response of some EMs. Important examples include China’s directed credit policies and Korea’s expansion of SME credit guarantees. Money market rates, analyzed later in this section, are likely to reflect, at least partially, the liquidity impact of unconventional measures.

31. **Countries with credible monetary policy frameworks, reflected in low or falling inflation, provided more monetary stimulus.** Table 7 shows factors that can help explain the drop in the policy rate across EMs between August 2008 and October 2009: policy rates and inflation on the eve of the output collapse, and inflation dynamics during the crisis. These factors accounted for around 60 percent of the observed reduction in policy rates across EMs. On average, countries that had one percentage point higher inflation in August 2008 lowered policy rates 32 bps less than other EMs. Similarly, the drop in inflation in the intervening period (in a global disinflationary environment) provided space for further policy easing. EMs that entered the crisis with higher policy rates had greater space for easing (greater distance from the zero lower bound). Finally, as expected, policy rates showed less sensitivity to these factors in fixed exchange rate regimes as illustrated by the interaction terms in the second specification in Table 7.

**Table 7. Determinants of Monetary Stimulus  
(Cross Section)**

	(1)	(2)
Change in inflation 2009	-0.31 *** (0.06)	-0.36 *** (0.06)
Policy rate Aug. 2008	0.60 *** (0.10)	0.66 *** (0.11)
Inflation 2008	-0.32 *** (0.07)	-0.36 *** (0.08)
Change in inflation 2009*peg		0.61 ** (0.25)
Policy rate Aug. 2008*peg		-0.22 (0.46)
Inflation 2008*peg		0.58 *** (0.16)
Peg dummy		0.11 (0.63)
Constant	0.10 (0.72)	-0.36 (0.79)
Observations	36	36
R-squared	0.58	0.64

Notes: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: WEO; Haver; IMF AREAR; Fund staff calculations.

32. **Countries with pegged exchange rates or those that were perceived by markets to be more risky—as reflected in higher EMBI spreads—were constrained in their ability to lower policy rates.** The levels of policy rates in 30 EMs during 2008Q1–2009Q3 are explained in a panel regression by lagged inflation, the output gap (standard Taylor-rule variables), and EMBI spreads (Table 8, first column). The panel nature of this analysis supplements the cross-sectional analysis discussed above by providing additional detail on how policy rates changed over time. As expected, countries with greater output gaps (output in excess of potential output) and higher inflation kept policy rates higher than others. Furthermore, countries with higher EMBI sovereign spreads kept policy rates higher. This could also capture international liquidity supply factors that weighed on authorities' ability to

lower rates without significant variation in exchange rates. As in the cross-country results discussed above, the interest rate response to each of these variables was significantly smaller for exchange rate peggers as shown by the interaction terms in the specification.

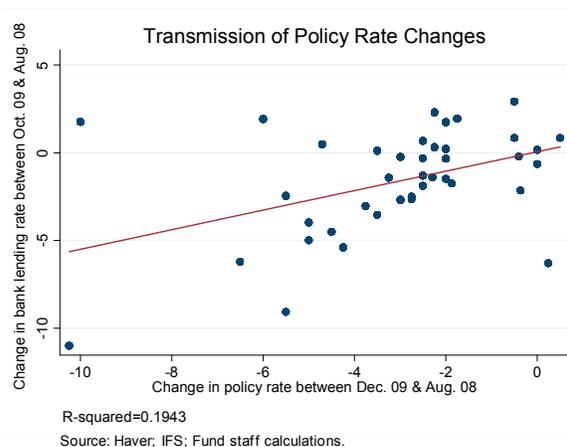
<b>Table 8. Interest Rate Determinants 1/</b>		
	Policy rate level	Money market rate level
	(1)	(2)
EMBI	0.19 *** (0.04)	0.79 *** (0.07)
EMBI * peg	-0.39 *** (0.14)	-0.24 (0.16)
Output gap (t-1)	0.41 *** (0.05)	0.69 *** (0.09)
Output gap (t-1) * peg	-0.27 *** (0.10)	-0.70 *** (0.16)
Inflation (t-1)	0.12 *** (0.02)	0.10 *** (0.03)
Inflation (t-1) * peg	-0.10 * (0.05)	0.11 (0.08)
Constant	5.40 *** (0.24)	2.77 *** (0.46)
Observations	206	200
R-squared	0.48	0.57
Number of countries	30	30

Notes: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1/ Panel with quarterly data.

Source: Bloomberg; WEO; IMF AREAR; Fund staff calculations.

33. **Similarly, money market interest rates did not decline as rapidly for countries with higher risk premia.** The effect of EMBI spreads was higher for money market rates than for policy rates (2<sup>nd</sup> column of Table 8). The transmission of policy rate changes was therefore more constrained in countries subject to higher investor risk aversion. In general, transmission of policy rate changes to changes in the rates that banks charge borrowers was less than one for one (text figure) though there was considerable variation across countries in the extent of transmission.



34. **Countries that had more room for lowering rates also allowed more exchange rate depreciation.** In the thick of the crisis, exchange rates came under pressure as global

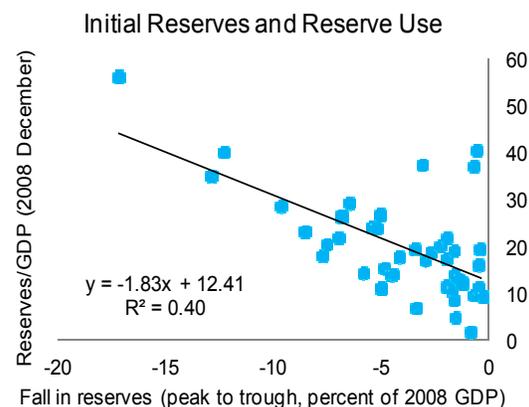
risk aversion rose. In response, countries used reserves to stem the pace of decline. Those that had more reserves were able to intervene more (Table 9). As expected, exchange rates depreciated more where countries had more space to cut policy rates (i.e., those with lower initial inflation or higher initial policy rate).

**Table 9. Exchange Rate Depreciations and Use of Reserves**

	ER depreciation (1)	Change in NIR/GDP (2)
Reserve/(ST debt + CA), 2007	-0.02 (0.02)	-0.02 *** (0.01)
Policy rate, Aug. 2008	2.13 *** (0.74)	-0.51 * (0.26)
Inflation in 2008	-1.44 *** (0.51)	-0.03 (0.18)
Constant	17.60 ** (8.04)	6.40 ** (2.77)
Observations	29	29
R-squared	0.36	0.30

Notes: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: WEO; Fund staff calculations.



Source: IFS, WEO, Fund staff calculations.

## Recovery

35. **Recovery was underway in most EMs by late 2009, but with considerable variation across countries.** On average, real GDP expanded 3 percent in EMs during the last three quarters of 2009. However, as in the impact of the crisis, this masked considerable cross-country variation. Non-peggers were recovering much faster than peggers. Across regions, the recovery was most pronounced in Asia and least in Emerging Europe. A similar pattern emerges using data on growth in industrial production from each country's trough to December 2009.

<b>Recovery from the Crisis (averages, percent)</b>		
	GDP growth, 2009Q4/ 2009Q1 (1)	Industrial production growth 1/ (2)
All EMs	3.1	10.8
<i>By exchange rate regime:</i>		
Fixed exchange rate regimes	0.2	-1.6
Flexible exchange rate regimes	3.9	14.0
<i>By region:</i>		
Asia	6.4	26.7
Europe	1.2	4.3
MCD	4.8	10.9
Western hemisphere	3.1	9.7

1/ From each country's trough to Dec. 2009.

Source: Haver; IMF AREAR; Fund staff calculations.

36. **Countries with better pre-crisis economic fundamentals and those that gave more fiscal stimulus are recovering faster.** Countries that had better vulnerability indicators on the eve of the crisis were the last to experience negative growth and first to start growing again. Regression analysis of the determinants of the strength of recovery (Table 10) provides two key takeaways:

<b>Table 10. Determinants of GDP Growth Recovery 1/</b>				
	(1)	(2)	(3)	(4)
GDP growth during contraction	-0.21 ** (0.08)	-0.22 *** (0.07)	-0.33 *** (0.11)	-0.30 ** (0.11)
External vulnerability in 2007	-6.02 *** (2.02)		-3.70 (2.16)	
Trading partners' import recovery	0.21 (0.27)	0.57 ** (0.24)	0.30 (0.31)	0.49 * (0.28)
Peg dummy	-2.54 * (1.27)	-3.23 * (1.60)	-1.72 (1.31)	-2.26 (1.42)
Reserves, in percent of short-term debt at residual maturity + current acct. deficit		0.01 *** (0.0)		
Growth in public demand			0.16 * (0.08)	0.19 ** (0.08)
Constant	5.54 *** (0.63)	3.42 *** (0.78)	4.17 *** (0.91)	3.84 *** (0.87)
Observations	39	38	31	32
R-squared	0.44	0.42	0.49	0.44

Notes: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1/ The dependent variable is the growth rate over the last three quarters of 2009 (observed, not projected).

Source: VEE Spring 2007; GEE; WEO; Fund staff calculations.

- Countries that entered the crisis with better vulnerability indicators, including reserve coverage of short external financing requirements, are recovering faster. The coefficient on reserve coverage is considerably smaller than in Table 2 even after factoring in the semi-log specification used in Table 2. This is not surprising since liquidity and debt rollover concerns become more acute when conditions are deteriorating than when they are improving.
- Countries that sustained stronger public spending during 2009 are recovering faster. The specification uses real public consumption and investment growth in 2009 from national accounts data to capture the fiscal contribution to aggregate demand. Fiscal revenues (e.g. tax cuts) likely also played a role in stimulating demand, but their discretionary component is hard to gauge.<sup>19</sup>

The table further demonstrates three additional determinants of recovery.<sup>20</sup> First, there is a “bounce-back” effect: countries that contracted the most during the crisis have also

<sup>19</sup> Using reserve coverage and spending growth simultaneously causes both to lose statistical significance, likely due to collinearity between the two: as shown earlier, pre-crisis vulnerabilities constrained policy responses.

<sup>20</sup> Two factors which did not turn out to have significance in explaining recovery include commodity prices and monetary stimulus. Commodity exporters were not found to recover faster than other countries once other variables (listed in Table 10) were controlled for. No evidence was found on monetary stimulus (measured as reduction in interest rates or expansion in base money) contributing to recovery either, probably reflecting normal lags in the transmission of monetary policy and the fact that the transmission mechanism itself appears to have been distorted during the crisis, as indicated by a rising spread between lending and deposit rates.

experienced faster recoveries. This is suggestive of overshooting during the crisis. Second, as to be expected, recovery was helped by growth in trading partners. This points to one of the risks in the outlook for EMs: a double-dip recession in AEs could jeopardize EM recovery. This could be especially important for EMs that rely heavily on external demand from a larger partner, such as Mexico on the U.S. Conversely, EMs with substantial trade links to other fast-growing EMs, such as India and China, could see faster recoveries. Thus trade linkages amplified both the initial impact of the crisis and the recovery from it. Third, countries with flexible exchange rate regimes are recovering faster than those with pegs, even after controlling for external vulnerabilities and the initial fall in output.<sup>21</sup>

37. **Analysis using industrial production data highlights the importance of public spending and the exchange rate regime.** Industrial production (IP) is a convenient measure of economic activity as it is available at higher frequency than GDP, and reacted earlier to external real and financial shocks. Recovery is measured by growth in IP from the trough of the crisis until December 2009. As with GDP, regression results indicate that faster growing trading partners, stronger fiscal stimulus as measured by growth in public sector demand, and a flexible exchange rate regime are some of the factors contributing to a stronger recovery in industrial production. The faster recovery among those with flexible exchange rate regimes may reflect faster adjustment in relative prices. As with GDP recovery, growth in public sector demand has a positive effect on industrial production recovery.

	(1)	(2)
IP growth during contraction	-0.62 ** (0.25)	-0.96 *** (0.21)
Trading partners' import recovery	2.59 *** (0.86)	1.23 (1.22)
Growth in public demand		0.69 *** (0.22)
Peg dummy	-9.79 * (5.00)	-12.56 * (6.60)
Constant	10.74 *** (3.18)	0.89 (4.29)
Observations	36	28
R-squared	0.40	0.57

Notes: Robust standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1/ Measured as growth between the trough of the crisis and Dec. 2009.

Source: Haver; GEE; IMF AREAR; Fund staff calculations.

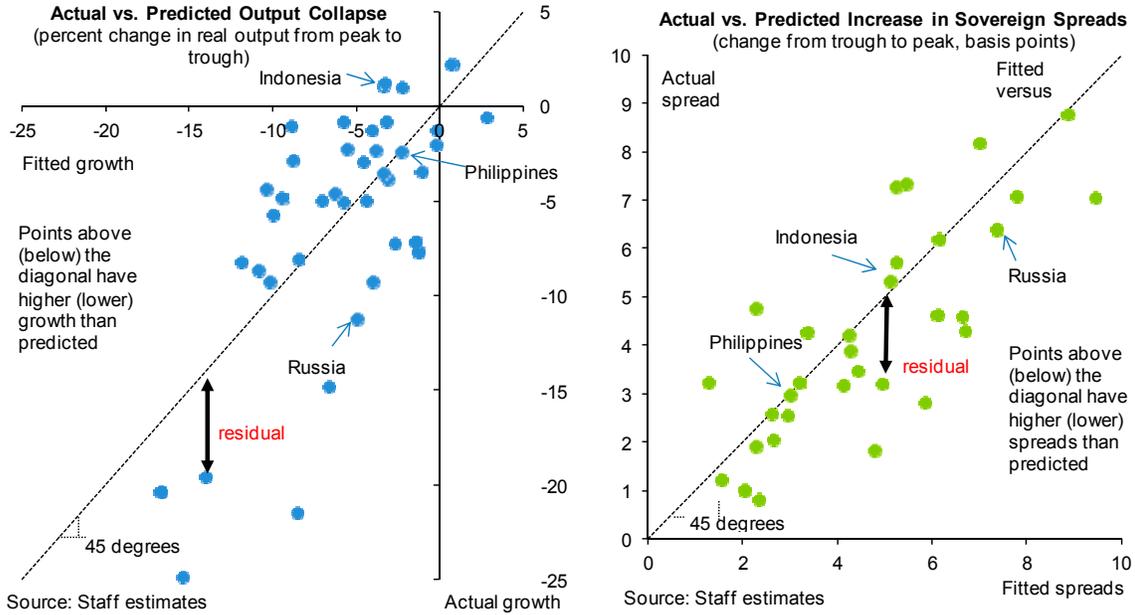
#### IV. COUNTRY CASES

38. **While the empirical framework of this paper explains well the experience of EMs on average, there is important country specific variability in outcomes (Figure 9).** The results presented in the preceding sections account for about a quarter to three-quarters of the observed experiences of emerging markets, depending on the particular specification. Nevertheless, with only about 50 EMs in the main sample, it is statistically difficult to have

<sup>21</sup> The Spring 2010 WEO (Box 1.1) finds no evidence of impact of the exchange rate regime on the growth performance for 2009 as a whole. The analysis in this paper differs in that the focus is on recovery from the crisis using quarterly growth since the trough of real output. WEO also notes that the exchange rate regime is a policy variable which may bias the coefficient on the peg dummy upward, as countries would have an incentive to switch to more flexible regimes in response to the shock.

too many explanatory factors. Thus there are important differences in some cases between outcomes that could be explained by the empirical models and actual experience.

Figure 9. Impact of Crisis: Country Variability in Outcomes

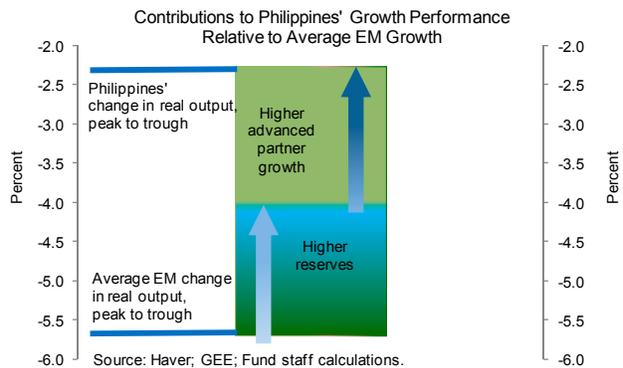


Source: Haver; Bloomberg; Fund staff calculations.

39. **This section complements the analysis of the previous sections by digging deeper into three specific country cases: Philippines, Russian Federation, and Indonesia.** These three cases were chosen because they illustrate the preceding analysis in different ways but also highlight the role of other factors that could not be considered in a systematic way in the preceding sections. Philippines fits the predictions of the model quite well but also benefited from stronger-than-expected remittances during the crisis. Output fell sharply in Russia and more so than can be explained by the analysis in Section II. Russia also made more use of reserves than nearly all EMs and gave a large fiscal stimulus. Finally, Indonesia was one of the few countries to have sustained growth through the crisis even though it experienced sharp financial market volatility, more than could be explained by the regressions.

**The Philippines**

40. **The Philippines weathered the crisis well owing to past reforms.** The significant progress made in recent years on fiscal consolidation and financial sector reforms contributed to a marked turnaround in investor sentiment. The authorities used the opportunity of increased inflows to build reserve buffers



Source: Haver; GEE; Fund staff calculations.

while also allowing exchange rate flexibility. Thus the Philippines entered the crisis on the back of significant improvement in external vulnerabilities that afforded a relatively smaller output impact. Based on the empirical estimation in Section II, output would have fallen 4 percent had the Philippines entered the crisis with its external vulnerabilities as in 2005, instead of the actual fall from peak to trough of 2¼ percent.

41. **Improved fiscal fundamentals allowed for considerable fiscal stimulus during the crisis of around 2¼ percent of GDP in 2009.** Due to VAT and other reforms, the government balance improved significantly and public debt fell by some 35 percentage points of GDP from 2004 to 2008, providing substantial fiscal space. The fiscal package in 2009, in response to the global crisis, was calibrated to match the projected fall in the contribution to growth from external demand, and focused on infrastructure and social spending to support growth and protect the poor. The better fiscal fundamentals also allowed the Philippines to secure necessary financing during the crisis despite the disruption to international debt markets.

42. **Remittances and lack of prior overheating also helped the Philippines weather the crisis.** At around 11 percent of GDP in 2009, remittances are an important component of the overall external position and a key driver of domestic demand. Contrary to prior expectations, remittances held up during the crisis. The Philippines did not experience the kind of overheating some other EMs experienced in the run up to the crisis. Thus it had fewer pre-crisis excesses and consequently a smaller economic bust.

43. **A strengthened financial sector also helped.** As highlighted in the recent Financial System Stability Assessment, the Philippines made significant progress in financial sector reforms since 2004. These included strengthening supervision of market, liquidity, and credit concentration risk. Reflecting these efforts, banks' asset quality and capitalization levels noticeably improved in the years preceding the crisis. Like in most EMs, the Philippine financial sector did not have significant direct exposure to subprime assets on the eve of the crisis. Instead the bigger risk for Philippine banks was from mark-to-market losses on holdings of government bonds on banks' balance sheets. The authorities gave banks temporary regulatory relief on mark-to-market requirements which was later reversed. In addition, the central bank created a dollar repo facility to help with the distribution of dollar liquidity in the system and address concerns of counter-party risk in the interbank market. All in all Philippines banks were able to enjoy credit and deposit growth through the crisis.

## **Russia**

44. **Russia experienced a sharper-than-expected contraction in output during the crisis.** Led by a collapse in domestic demand, output fell sharply by about 11 percentage points of GDP from peak to trough, one of the largest output collapses in EMs. This is all the more surprising since compared to the average EM, Russia had much lower external vulnerabilities and foreign bank claims (in percent of GDP) going into the crisis, two of the

factors that were important in explaining the experience on average across EMs. Thus, the model in Section II explains only about half of the actual fall in Russia's output.

45. **Oil prices are an important factor to understand output collapse in Russia.** As oil prices collapsed in the midst of the global recession, market participants revised their outlook for the economy and the ruble. Domestic demand plunged due to the immediate terms of trade shock but also in anticipation of a bleaker outlook. At the same time, capital outflows, banks' increased risk aversion, and an associated credit crunch exacerbated the collapse. High oil prices may also have masked inefficiencies in un-restructured sectors.<sup>22</sup>

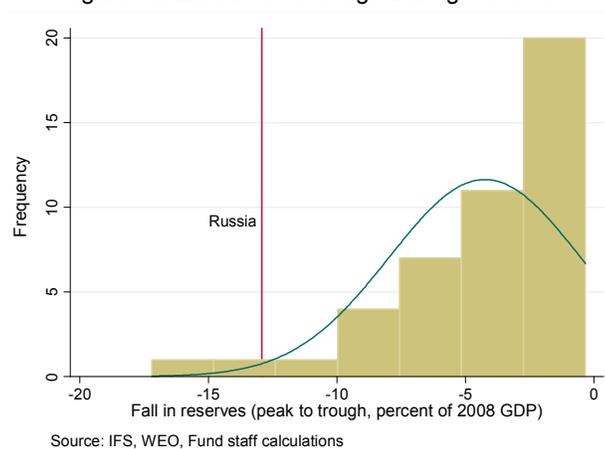
46. **In addition, a pre-crisis credit boom fueled in part by a rigid exchange rate regime helps explain the eventual impact of the crisis.** Through 2007, Russia was growing at 7 percent per year on average, driven by high oil prices, domestic demand, and a credit boom. Given the policy of maintaining the exchange rate, balance of payment surpluses—mainly through the capital account and reflected in reserve accumulation—laid the basis for a large monetary and credit expansion. As a result, by the time of the crisis, some corporates and banks had become increasingly reliant on short-term capital flows.

47. **The fall in oil prices and state of the banking and corporate sectors help explain the large use of reserves in Russia.** As the crisis unfolded, Russia spent more than \$200 billion of its reserves (representing 13 percent of 2008 GDP, one of the largest declines amongst EMs) in tempering the pressure on the ruble, but eventually allowed for a significant fall in the exchange rate (Figure 10). A sharp depreciation early on in the crisis could have had pronounced implications on corporate and bank balance sheets, potentially creating a systemic event. Having reserves helped Russia to avoid such an outcome by allowing some space for corporates and banks to adjust to a revised global outlook with lower oil prices. Nevertheless, this strategy also had costs. Some market participants were able to benefit from speculating on the eventual devaluation and some of the problem banks will eventually need to be dealt with to resume intermediation and support the recovery. Real private sector credit growth in Russia was -6½ percent (y/y) in December 2009 compared to about one percent (y/y) for EMs on average.

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<sup>22</sup> Recent research suggests that Russia continues to be highly vulnerable to declines in energy prices (Kvintradze, 2010).

Figure 10. EM Reserve Usage During the Crisis



48. **With low public debt and almost no financing constraints, Russia was able to give a large fiscal stimulus.** With a 10½ percent of GDP loosening of the primary balance between 2008 and 2009, the magnitude of Russia’s fiscal accommodation is one of the largest among EMs. Even, after taking into account the oil revenue collapse, the magnitude of the accommodation at 6½ percent of GDP was still one of the largest in the sample. Having available fiscal space allowed Russia to respond aggressively to the output collapse.

### Indonesia

49. **As a large EM less reliant on international trade, Indonesia grew through the crisis.** Domestic demand constituted the bulk of output in Indonesia (around 90 percent of real GDP in 2007). Thus, even though Indonesia’s advanced economy trading partners experienced a sharper decline in domestic demand of 3¼ percent compared to that for the average EM of around 2¾ percent, the impact on Indonesia’s economy was much lower. Many other EMs that also either grew through the crisis or experienced a small adverse impact had large domestic markets (China, Egypt, India).<sup>23</sup> Indonesia also benefited from increased spending associated with national elections in 2009.

50. **Nevertheless Indonesia’s sovereign spreads rose substantially.** Market nervousness was exacerbated early in the crisis by debt problems of a large conglomerate and markets began to doubt the extent of reported external exposures. In part, market participants still had memories of the Asian crisis where external liabilities turned out to be larger than anticipated. Indonesia was able to temper this market volatility by a combination of factors. Having reserve buffers helped. Also, Indonesia did not experience any systemic stress in the financial system, again due to prior reforms and strong capital and liquidity positions. Finally,

<sup>23</sup> When a formal measure of the size of the economy, or openness, is included in the regressions of Section II it does not perform well. In part this could reflect that the contribution made by external demand to domestic value added cannot be captured well by such simple measures.

Indonesia was able to secure contingent financing from the World Bank, AsDB, Australia, and Japan for \$5½ billion in budget support, as well as additional external swap and credit lines from China and the Chiang Mai Initiative, all of which contributed to restore market stability. The beneficial impact of accessing this facility is a useful illustration of the usefulness of having available adequate contingent financing instruments.

51. **Indonesia is recovering faster than many others EMs in part due to a well-timed stimulus.** From 2009Q1 to 2009Q4, output grew 4½ percent, above the EM average of 3 percent for the same period. For reasons not related to the crisis, Indonesia had already planned tax cuts going into 2009. Thus, fiscal stimulus was one step ahead of the curve. As the crisis struck, the authorities topped up the existing fiscal loosening with cash transfers and other social spending to protect the poor and support domestic demand. The monetary policy response and liquidity management by Bank Indonesia also supported the recovery.

## V. EXIT ISSUES AND LESSONS

52. **The recovery currently underway highlights considerable heterogeneity in the policy challenges facing EMs.** As noted earlier, economic fundamentals prevailing before the crisis affected its depth and the available space to respond with countercyclical policy measures. Those fundamentals are also important as EMs emerge from the crisis, and this implies a bifurcated policy agenda for the medium term:

- EMs that entered the crisis with high vulnerabilities generally still have substantial imbalances.<sup>24</sup> These EMs need to sustain adjustment, a task made complicated by the fact that they suffered a bigger loss in output than low vulnerability countries.
- Those that entered the crisis with better economic fundamentals, however, face immediate cyclical concerns: if they respond to the recovery in output and inflation by raising interest rates while AEs maintain accommodative monetary policies, they risk exacerbating capital inflows (unless accompanied by a high degree of exchange rate flexibility). However, they risk overheating and igniting asset price bubbles if they do not tighten.

### Challenges faced by high vulnerability countries

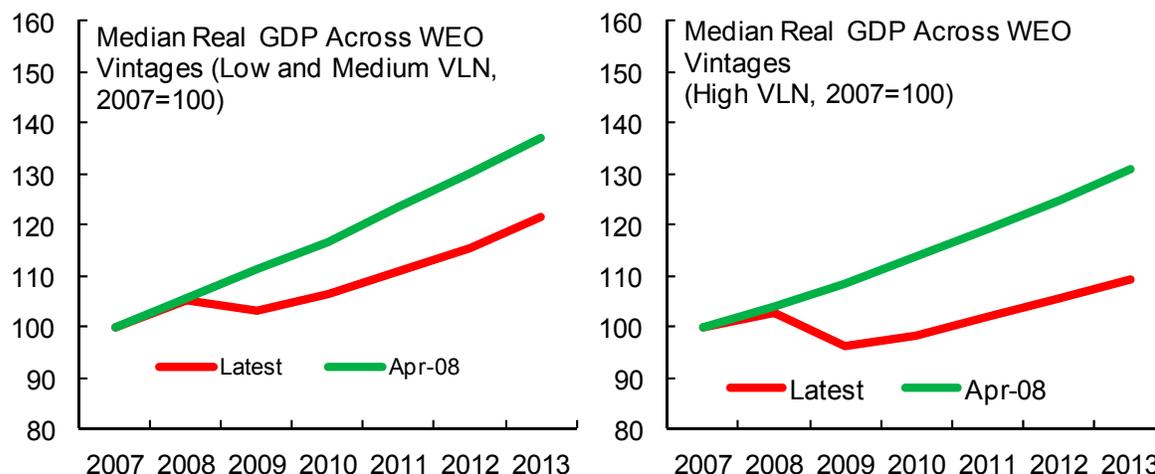
53. **The current crisis is expected to lead to a sharp loss in output over the medium term.** This loss is expected to be protracted, as illustrated by revisions to medium-term output projections between April 2008 (before the crisis) and the latest set of projections from the IMF's *World Economic Outlook* (WEO, Figure 11). This outlook is consistent with

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<sup>24</sup> The converse of this statement is also generally true: those EMs with low and medium vulnerabilities before the crisis still mostly remain at low risk. But there are a few exceptions where imbalances have deteriorated significantly in the past few years.

findings in the literature that contractions after crises are followed neither by a fast recovery nor a recovery in trend output.<sup>25</sup>

Figure 11. Permanent Output Losses



Source: WEO; Fund staff calculations.

54. **Weaker pre-crisis initial fundamentals are associated with larger projected output losses.** The projected medium-term output loss was estimated from the difference between IMF staff's latest WEO projections for real output in 2013 and WEO projections for 2013 real output prepared in April 2008.<sup>26</sup> This loss in medium-term output was 16 percentage points for EMs with low and medium pre-crisis vulnerabilities and 21 percent for those with high pre-crisis vulnerabilities. These results were confirmed in a cross-country regression framework (Table 12): controlling for other plausible factors, countries with greater vulnerabilities and faster credit growth before the crisis are projected to experience a bigger loss in medium-term output. The effects of an IMF-supported program are hard to detect in this empirical framework. On the one hand, a successful IMF program would be expected to bolster medium-term growth prospects. On the other, countries come to the IMF after they have experienced significant distress that could have taken a toll on their medium-term growth prospects. Since the two effects work in opposite directions, it is not surprising that we do not find evidence for a significant effect of an IMF-supported program on medium-term output loss.

<sup>25</sup> Cerra and Saxena (2008) find in a study of 190 episodes that output losses after financial and political crises are large and highly persistent. Abiad and others (2009) also concludes that initial conditions have a significant impact on output losses after financial crises, with short-term output declines a good predictor of medium-term losses.

<sup>26</sup> In the 2008 WEO, 2013 was the last year for which projections were available.

**Table 12. Determinants of Change in Projected 2013 Real GDP Between the April 2008 and April 2010 WEO Vintages (in Percent of 2007 Real GDP)**

	(1)	(2)	(3)
Vulnerability index (as of March 2007)	24.88 *** (6.81)	17.48 *** (6.30)	6.92 (8.72)
Program dummy (=1 if program)		0.28 (2.09)	-0.97 (2.12)
Real credit growth (2003-07)		0.08 *** (0.02)	-0.01 (0.04)
Interaction (credit * Vulnerability)			0.26 * (0.14)
Constant	7.63 *** (2.39)	5.11 * (2.55)	8.45 *** (3.09)
Observations	44	44	44
R-squared	0.15	0.47	0.51

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

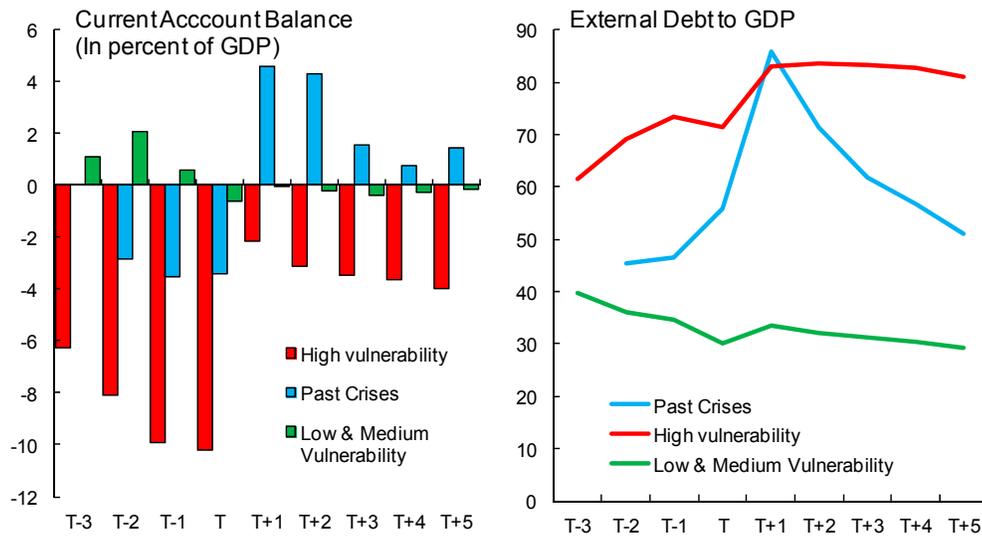
Source: VEE Spring 2007; IFS; WEO; Fund staff calculations.

**55. The projected large permanent output loss has significant implications for medium-term solvency and implied required adjustment:**

- In the past, crises have led to abrupt and large adjustments in the current account, with much of that adjustment remaining permanent (Ghosh and others, 2005). The external debt-to-GDP ratio normally increased at the onset of the crisis, due to the impact of devaluations on the denominator, but corrected quickly as current account surpluses reduced the stock of debt (lowering the numerator), and a resumption of growth and reversal of exchange rate overshooting increased the denominator (Figure 12). The debt-to-GDP ratio normally fell by 5–10 percentage points within five years of the crisis.
- EMs that entered the current crisis with high vulnerabilities have higher levels of external indebtedness than past crisis cases and are likely to remain vulnerable in the near future. This reflects persistent, albeit reduced, current account deficits, implying that the numerator will continue to grow.<sup>27</sup> Moreover, the permanent output loss and low inflation will depress the denominator. This will lead to a 10–15 percentage point increase in debt-to-GDP, little of which is presently projected to be reversed in the next five years.

<sup>27</sup> A number of highly vulnerable EMs saw significant current account corrections during the crisis (Figure 12). But because their starting positions were weak, on average they are expected to continue to run current account deficits, a contrast to past crisis cases during which EMs' current accounts generally moved into surplus.

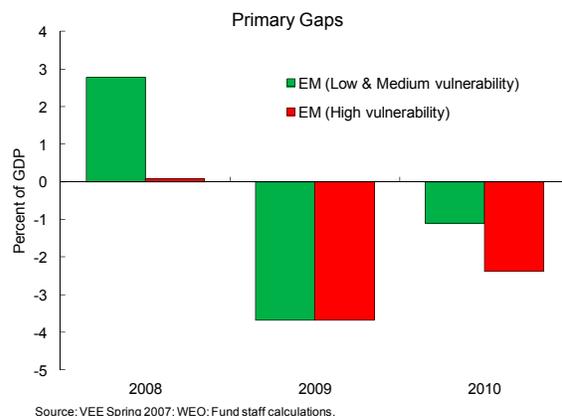
Figure 12. External Imbalances



Note: Time is expressed in years relative to "T", which represents the year of the crisis for past capital account crises, and 2008 for the current group of emerging markets.  
Source: VEE Spring 2007; WEO; Fund staff calculations.

56. **An increasing number of countries with high external vulnerabilities have recently accumulated fiscal vulnerabilities that will require a policy response.** Most of the countries that had high external vulnerabilities before the crisis remain exposed now, with only a handful of borderline cases transitioning to lower levels of vulnerability. In addition, a number of countries with high pre-crisis external vulnerabilities have seen fiscal vulnerabilities emerge for the first time as the collapse of private-sector booms has led to a falling off in tax revenues and sharp widening in budget deficits. In these cases, fiscal consolidation will help address both aspects of their vulnerabilities as it will stem the rise in public debt and facilitate the necessary external adjustment.<sup>28</sup> By contrast, many low vulnerability countries substantially lowered public debt levels in the run-up to the crisis, and have seen little deterioration since.

57. **These medium-term challenges weigh heavily on policy priorities in the post-crisis period.** To avoid further shocks, high vulnerability countries will need to tighten fiscal policies to accelerate external adjustment and help address fiscal sustainability concerns, a step that will be complicated by the weakness of post-crisis recoveries in these countries. Primary gaps—



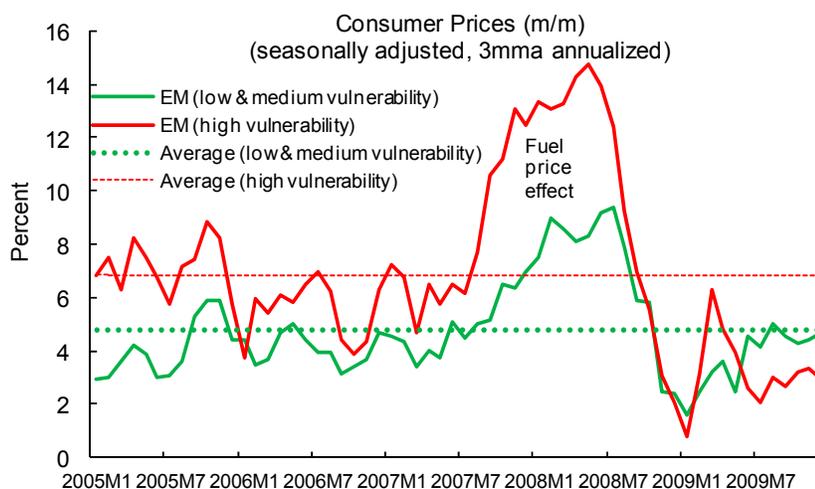
<sup>28</sup> As highlighted in IMF (2010a), economies that are facing large public deficits and debt and related pressures on sovereign risk premiums should already begin to pursue fiscal consolidation.

the difference between the projected primary balance and the primary balance that would stabilize the debt-to-output ratio—are smaller in low vulnerability countries (text figure). Since they are growing more rapidly, much less effort is required on their part to stabilize public debt and avoid a deterioration in fundamentals, putting them in a stronger fiscal position than many AEs.<sup>29</sup> Countries heavily impacted by the crisis will also need to undertake structural reforms to improve medium-term growth prospects. Such reforms could address, for example, competitiveness and financial sector issues in some EMs.

### Challenges faced by low vulnerability countries

58. **EMs that are recovering quickly face rising capital inflows, closing output gaps and rising inflation.** Capital inflows turned positive in the second half of 2009 for countries with low pre-crisis vulnerabilities, but remained more subdued for high vulnerability EMs. While on average recovery in EMs is at par with AEs, countries with low pre-crisis vulnerabilities are further ahead in the cycle, benefiting in some cases from the strong recovery in commodity prices. Inflation in these EMs has picked up relatively quickly and is currently close to its average since 2005 (Figure 13). While this partly reflects energy price effects, and there has been less of an increase in core inflation, inflationary expectations are often influenced by headline inflation. By contrast, countries with high pre-existing vulnerabilities show more subdued headline inflation, with several cases of deflation emerging.

Figure 13. Inflation in EMs



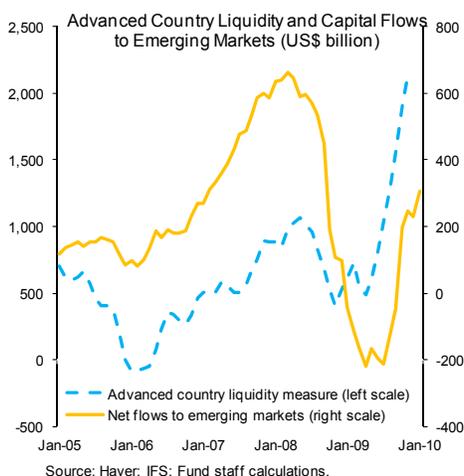
Source: VEE Spring 2007; Haver; IFS; Fund staff calculations.

<sup>29</sup> Overall, the need for adjustment is lower for EMs than AEs, as EMs had lower debt-to-GDP ratios and better fiscal positions at the onset of the crisis (see [Strategies for Fiscal Consolidation in the Post-Crisis World](#)).

59. **Fast recovering EMs appear to be taking a cautious approach to the withdrawal of monetary stimulus.** Standard Taylor-rule regressions were run for a sample of EMs based on 2000–07 data for output gaps, inflation, and lagged interest rates. Predicted interest rates in many fast-recovering countries are significantly higher than their actual rates at present—by over 100 bps on average across all low- and medium-vulnerability EMs. Thus, these countries are presently maintaining lower interest rates than they would have based on past responses to output and inflation developments.

60. **Some fast-growing EMs may be constrained in their monetary policy decisions by possible spillovers from accommodative policies in AEs.** That some EMs are keeping rates lower than predicted may partly be due to lingering uncertainty over the domestic and global recoveries. But it might also—at least in part—reflect concern that raising interest rates when policy rates in major advanced economies remain near historic lows could prompt excessive and unwanted capital inflows which could, in turn, fuel asset price bubbles.<sup>30</sup> Countries may also be concerned about the associated appreciation in exchange rates which could dampen recoveries in many export-oriented economies. Such monetary policy constraints may also be prompting some countries to alter their fiscal/monetary policy mix and withdraw more fiscal stimulus than they would in the absence of monetary policy constraints.

61. **Capital inflows have resumed in EMs that came out relatively unscathed from the crisis.** Such flows could be driven by a combination of push and pull factors. Historically, accommodative monetary policies in AEs have been associated with rising capital flows to EMs (text figure). Continued easy policies in the near term in AEs could thus push even more capital to EMs. At the same time, EMs that are recovering briskly from the crisis with better fiscal sustainability indicators than AEs may continue to pull capital by offering promising investment opportunities in a high growth macroeconomic environment. Overall, such inflows are just returning to pre-crisis levels. Although they do not generally pose a problem yet, surges in such flows going forward may complicate policy challenges for EMs recovering quickly from the crisis.

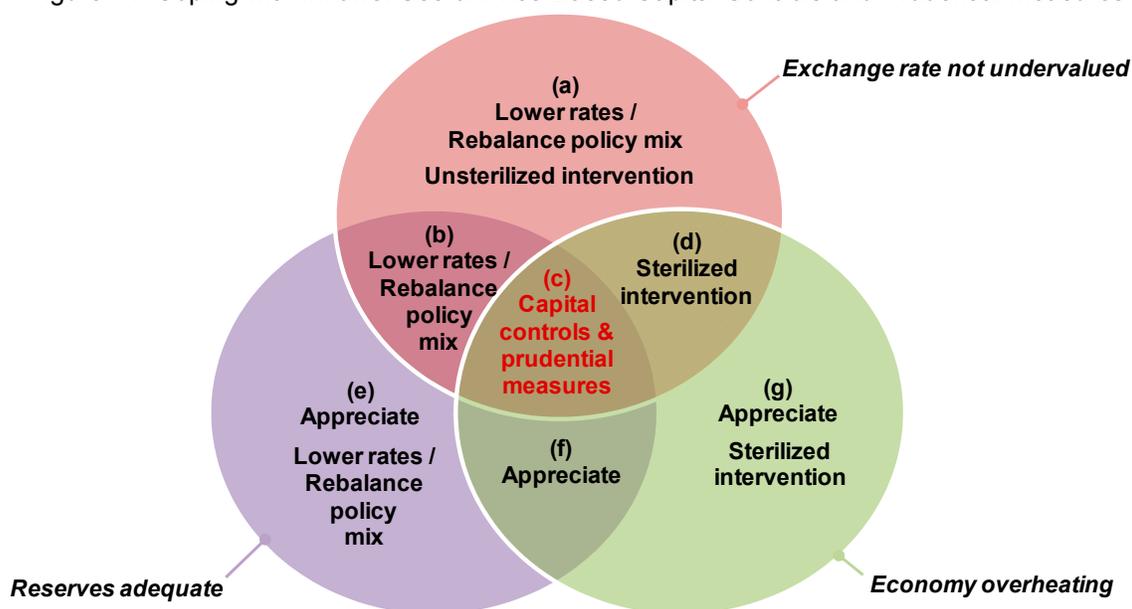


62. **A conventional response to coping with inflows would involve altering the macro policy mix and improving the financial regulation and supervision framework.** Such options include allowing the exchange rate to appreciate, building reserves, easing monetary

<sup>30</sup> The importance of transparency, disclosure, and consultation across countries in the formulation and implementation of exit strategies is highlighted in [Exiting from Crisis Intervention Policies report](#).

policy, tightening fiscal policy, and improving the prudential framework. Tightening fiscal policy may be particularly relevant in countries that have recently implemented a fiscal stimulus. Nevertheless, tightening fiscal policy may entail political challenges and take time to implement. Also, improving regulation and supervision frameworks generally takes time to implement while fast-moving surges in capital inflows could present an immediate problem to monetary authorities. Thus, countries may be forced to rely on monetary and exchange rate tools which may also have limitations.

Figure 14. Coping with Inflows: Use of Price-Based Capital Controls and Prudential Measures



Notes: Each circle represents cases where the relevant condition is met. For example, the top most circle ("Exchange rate not undervalued") represents cases where the exchange rate is assessed to not be clearly undervalued. The intersection of all three circles (the area marked "c")--where use of capital controls and prudential measures may be helpful--reflects cases where the exchange rate is not undervalued, reserves are judged to be adequate, and the economy is overheating. Other intersections similarly represent other confluences of factors. For example, the top left intersection (area "b") represents cases where the exchange rate is not undervalued, reserves are judged to be adequate and the economy is *not* overheating (since the case is outside the "Economy overheating" circle). Areas of no intersection represent cases where one of the circles--but not the other two--is applicable. For example, the bottom right area ("g") represents cases where the economy is overheating, the exchange rate is assessed to be fairly valued or undervalued, and reserves are judged to be inadequate. "Lower rates / Rebalance policy mix" refers to loosening monetary policy; to the extent that fiscal policy is tightened, there would be more room to lower policy rates.

63. **In certain cases countries may consider price-based capital controls and prudential measures to cope with capital inflows.** Three economic factors are relevant in deciding when such measures may be helpful: exchange rate valuation, reserve adequacy, and the risk of overheating (Figure 14).<sup>31</sup> Price-based capital controls and prudential measures have a clearer case where the exchange rate is not undervalued, reserve build-up is

<sup>31</sup> See also Ostry and others (2010) and IMF (2010b).

not needed, and the economy is at risk of overheating (where the inflation outlook is not benign, there is an incipient credit or asset price boom, or fiscal tightening is not desirable or feasible). In practice, assessing the degree of overvaluation is subject to significant uncertainty and the mere presence of large inflows may signal market expectation that the currency is undervalued. Therefore, some currency appreciation might need to be tolerated as part of the adjustment process even for countries where the exchange rate is not judged to be significantly undervalued.

### **Lessons from the Crisis**

64. **EMs' heterogeneous experience during the crisis underscores the importance of economic fundamentals and global linkages.** Controlling for factors beyond their control, EMs with smaller initial imbalances went into recession later, and suffered considerably smaller declines in output during the first stage of the crisis. As they had greater space to loosen fiscal and monetary policy, their post-crisis recoveries have come earlier and faster. This marks a significant contrast to past crises, during which almost all EMs had to tighten monetary policy to avert a loss in confidence albeit with considerable output losses. Moreover, the pay-off from better fundamentals is likely to be long-lasting, as they are expected to experience about five percentage points less of a reduction in permanent output compared with economies with weaker fundamentals. Countries with stronger external linkages—higher dependence on demand from AEs or larger exposure to foreign bank claims—experienced sharper falls in output during the crisis. At the same time, recovery in trading partners is helping EMs come out of the crisis. Short-term challenges may have been met for many EMs—due to policy measures discussed above as well as the quick availability of exceptional/official financing—but longer-term challenges remain to prevent future crises.

65. **Reserves, up to a limit, helped dampen the impact of the crisis on EMs.** Higher levels of pre-crisis reserve cover were associated with less deterioration in both sovereign spreads and output during the crisis. However, this effect was subject to diminishing returns: EMs enjoyed little additional benefit for having reserves in excess of the sum of short-term debt and the current account deficit. Also, for countries with flexible exchange rate regimes, building appropriate reserve buffers should not jeopardize the commitment to maintaining currency flexibility. Indeed, countries that used reserves to moderate the impact of the crisis also allowed the exchange rate to bear part of the adjustment.

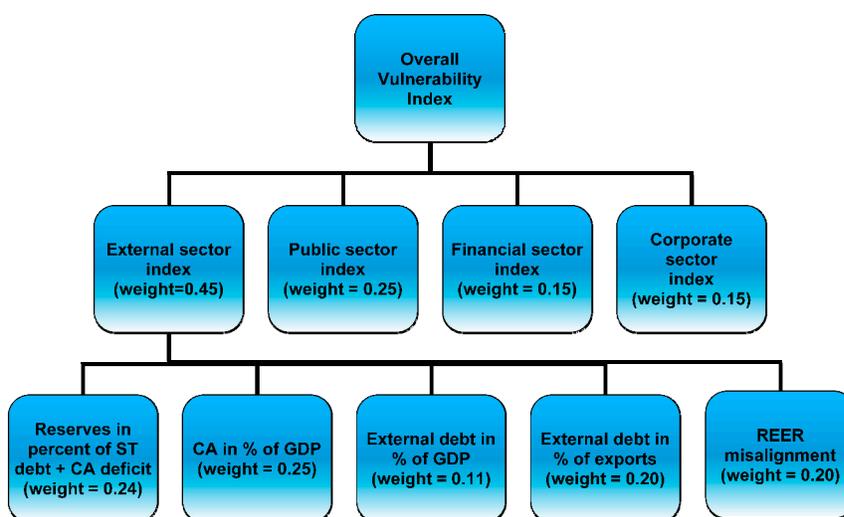
66. **The crisis has also demonstrated the benefits of sound policy frameworks.** Countries with flexible exchange rates (especially inflation targeters) were less constrained in their ability to loosen monetary policy than other EMs, and those with lower levels of public debt had greater space for fiscal loosening. The benefits of improved frameworks need to be safeguarded with prudent policies as the crisis draws to a close. In low vulnerability EMs (a number of which are also inflation targeters), central banks need to carefully consider their responses to rising inflation. While the causes include rising global energy prices as well as closing output gaps, action may be required to ensure that inflationary expectations remain well anchored.

### Box 1. Assessments of Underlying Vulnerabilities in Emerging Market Countries

**Underpinning the analysis in this paper are staff assessments of pre-crisis vulnerabilities.** These measures were developed—for emerging market countries with access to international capital markets—in the aftermath of the capital account crises of the late 1990s to inform surveillance and staff assessments of crisis probabilities. Since the establishment of the exercise in 2001, the methodology has been updated. These assessments, conducted semi-annually, comprise cross-country analysis of vulnerability indicators along with country-specific judgments.

**The assessment proceeds in several steps.** First, data on vulnerabilities—flow and stock measures derived from previous IMF studies as well as academic literature on empirical early warning system models—are compiled for external, fiscal, corporate, and financial sectors. Second, each indicator is compared against a database of realized capital account crises to derive thresholds that minimize combined percentages of missed calls and false alarms. These differences in discriminatory powers (minimum sum of errors) are then used to provide guidance on weights for each indicator in the index for each of the sectors; these are then further combined into an aggregate index using judgment-based sector weights (text figure). Analysis thus generated is vetted by area departments, with country-specific considerations used to generate final assessments.

**These indices provide a summary statistic of vulnerabilities.** High correlations among many of these variables preclude simultaneous inclusion in regression analyses; an index, therefore, provides a snapshot of these features allowing further statistical analysis. A paper prepared for the IMF Board in 2007, which updated the VEE methodology, generally uses the model-based external vulnerability index measure; indeed, it finds that external sector indicators perform the best in predicting past crises and allocates them the highest weight (45 percent) in constructing the overall vulnerability index.

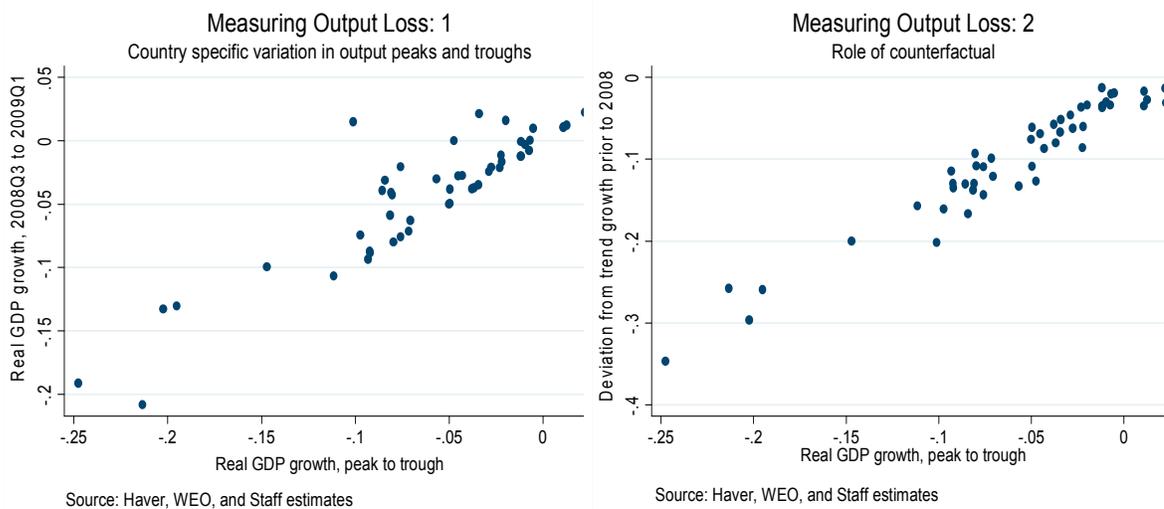


## Box 2. Alternative Ways to Measure Output Loss

The analysis was undertaken using four alternative measures of output loss:

- A simple gauge is how far output fell in the two quarters after the collapse of Lehman Brothers, measured by the percentage change in seasonally adjusted real GDP between 2008Q3 and 2009Q1. In this paper, we refer to that as “Growth 1.”
- A drawback of Growth 1 is that it does not consider where output might have been in the absence of a crisis. To gauge output loss in that (counterfactual) sense, a second growth measure (“Growth 2”) is calculated as the log difference between actual seasonally adjusted real GDP in 2009Q1 and a counterfactual projection for real GDP in 2009Q1 based on a linear trend estimated over 2003-2007.
- The above two measures implicitly assume each EM’s output peaked in 2008Q3 and toughed in 2009Q1. However, there is considerable heterogeneity in the timing of the crisis across countries and this timing would be accurate only for about half the sample. Therefore, a third measure was devised (“Growth 3”), which is the country-specific peak to trough percent change in seasonally adjusted real GDP.
- Finally, a fourth measure (“Growth 4”) was calculated that takes into account cross-country heterogeneity in both the counterfactual growth path and the timing of recovery. It was defined as the log difference between actual seasonally adjusted real GDP at the country’s trough, and projected real GDP based on a linear trend estimated over 2003–07.

The preferred measure in this paper is “growth 3”, which is based on the actual change in output and each country’s peak and trough. It is highly correlated with “growth 1” and “growth 4.” The results are robust to using either of these measures.



### Box 3. The Role of Trade Finance During the Crisis

**Emerging market trade was particularly hard hit in late 2008 and early 2009.** For many EMs, monthly merchandise export values fell more than 30 percent during the worst of the crisis, compared with previous annual growth rates of around 20 percent. Concurrently, EM sovereign spreads jumped from an average of around 200-300 basis points at end 2007 to over 700 basis points in late 2008 and early 2009, prompting questions about links between liquidity constraints and trade.

**Trade finance does not seem to have been the key contributor to the collapse in trade.** To assess changes in provision and pricing of trade finance during late 2008 and early 2009, the IMF conducted three surveys with BAFT/IFSA.<sup>1</sup> Based on responses to the surveys, the worry that the fall in exports was driven mainly by lack of trade finance seemed to be largely unfounded. While the cost of trade finance increased, with margins on letters of credit rising by an average of 40 basis points in 2008Q4 relative to 2007Q4, and a further 30 basis points in 2009Q2 relative to 2008Q4, the total value of trade finance generally fell by less than the decrease in exports (Table).<sup>2</sup> Thus, it appears that the share of trade covered by bank-intermediated trade finance grew during the period.

**International action to maintain high levels of trade finance liquidity may have helped to avert further negative effects.** In late 2008, national export credit agencies and multilateral development banks started to expand the availability of trade finance. In April 2009, the G-20 made a concerted effort to increase the availability of trade financing, with support for up to an extra US\$250 billion of trade over 2009-10, with emerging market members of the G-20 playing their part in that effort.<sup>3</sup> This capacity was later recommended to be increased to US\$400 billion, though it is unclear if it would have been utilized as financial market conditions normalized and market institutions became better able to supply the needs of exporters and importers.

#### Changes in Merchandise Exports and Trade Finance: By Groups of Countries

	(percent growth)			
	2008Q4 vs. 2007Q4		2009Q2 vs. 2008Q4	
	Goods Exports	Trade Finance	Goods Exports	Trade Finance
Industrial Countries	-12.3	-1.8	-13.7	-8.5
Sub-Sahara Africa	-12.3	-2.6	-12.4	-2.9
Emerging Europe	-16.1	-0.9	-11.3	-8.8
Southeast Europe/Central Asia	-7.8	-2.0	-30.7	-6.2
Emerging Asia incl. China and India	-0.8	-0.9	-17.7	0.2
Developing Asia	1.8	-5.4	2.0	-2.3
Middle East and the Maghreb	-26.0	1.2	6.2	-6.1
Latin America	-10.6	-3.0	-11.1	-13.5

Source: IMF/BAFT Trade Finance Survey, Haver Analytics.

<sup>1</sup> BAFT stands for the Bankers' Association for Finance and Trade, which subsequently merged with the International Financial Services Association (IFSA).

<sup>2</sup> Trade finance in these surveys refers to the following trade finance products offered by banks: Letters of Credit (LC) (including standby LCs and confirmed LCs), Export Credit Insurance, and short-term Export Working Capital.

<sup>3</sup> [http://www.g20.org/pub\\_communicues.aspx](http://www.g20.org/pub_communicues.aspx)

#### **Box 4. Trade Policy During the Crisis**

**A wholesale slide into protectionism—akin to that seen during the Great Depression—has been avoided during the current crisis:**

- While several countries have adjusted national tariff schedules during the crisis, the general trend of declining tariffs was not materially affected during the crisis (WTO, 2009).
- Nevertheless, the number of trade dispute filings, such as for antidumping, have increased in recent years, a trend that intensified during the crisis. The majority of such disputes are between EMs (almost three-quarters of new investigations in the second half of 2009), with Argentina and India accounting for a large share. Similarly, more than half of new investigations have been targeted against China. There has also been a corresponding increase in the number of import-restricting measures as a consequence of these disputes (Bown, 2010).

**While a sharp rise in protectionism has been avoided pressures could still emerge.** Political leaders have displayed heightened awareness during the crisis of the risks of protectionism which has led to enhanced monitoring of activities through unofficial as well as official channels (such as the WTO). These monitoring activities, and the engagement of multilateral rules and institutions bodies such as the WTO also helped.

### **Box 5. Was the Fiscal Policy Response in 2009 Different?**

**Two related approaches described below show that EMs' fiscal response to this crisis was more forceful than could have been predicted by historical reaction functions, and also more than in past crises.**

#### **Out-of-sample estimates from panel fixed effects regressions for 1990-2007**

A baseline regression was run for the period 1990–2007 to estimate a historical fiscal response function. Results indicate that an increase in lagged primary surplus of 1 percentage point of GDP increased “space” to accommodate by around 0.4 percentage points (column 1 of Box Table). Similarly, lower debt provided additional space. Historically, further fiscal accommodation was provided when needed more, such as during growth slowdowns.

The baseline regression was used to predict fiscal accommodation in 2009 by using the estimated coefficients and observed values for the independent variables. Actual fiscal accommodation in 2009 exceeded predicted accommodation in all regions. EMs in the Western Hemisphere and South Africa, the sole African EM in the sample, stand out in terms of their extra response. The model estimates that the average “extra” accommodation across EMs in 2009 amounted to some 2 percentage point of GDP, which could reflect *inter alia* the result of a globally coordinated response to the crisis.

#### **Interactive terms from panel fixed effects regressions for 1990-2009**

Interacting explanatory variables yielded additional information about 2009 in a fiscal reaction function that encompassed the entire sample period (1990–2009). Better past fiscal behavior—as represented by a lower level of public debt—enabled higher fiscal accommodation during the current crisis than in the past (column 2 of Box Table). The specification estimates an additional accommodation of some 3 percentage points of GDP among EMs during the year.

Further refining the regressions to distinguish also the past crises cases (as defined in Section II)—to explore whether past crises have behaved differently—also yielded interesting results (column 3 of Box Table). Countries with higher lagged primary balance surprisingly ran contractionary fiscal policy during past crisis. The procyclicality of fiscal policy in past crises is also underscored by the large *positive* coefficient on growth. Even in this refinement, the coefficients for 2009 remain broadly the same.

### Box 5. Was the Fiscal Policy Response in 2009 Different? (Concl.)

<b>Determinants of Change in Primary Deficit</b>			
<b>("+" Means Higher Accommodation)</b>			
	(1)	(2)	(3)
Primary balance (lagged)	0.41 *** (0.04)	0.46 *** (0.04)	0.47 *** (0.04)
Public debt (lagged)	-1.53 (1.33)	-2.31 * (1.26)	-2.34 * (1.28)
Growth	-12.14 ** (5.55)	-12.88 ** (4.97)	-12.95 ** (5.22)
Primary balance (lagged) * 2009		0.18 (0.13)	0.18 (0.13)
Public debt (lagged) * 2009		-3.06 ** (1.23)	-3.07 ** (1.24)
Growth in 2009		5.43 (7.71)	5.43 (7.83)
2009 Year dummy		3.26 *** (0.77)	3.25 *** (0.79)
Primary balance (lagged) * past crises			-0.89 ** (0.35)
Public debt (lagged) * past crises			-14.00 *** (2.43)
Growth in past crises			24.30 * (12.17)
Crisis dummy			2.98 *** (0.58)
Constant	1.45 * (0.76)	2.06 *** (0.70)	2.09 *** (0.72)
Observations	435	515	515
R-squared	0.24	0.39	0.40
Number of countries	49	48	48

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: WEO; Fund staff calculations.

## Annex. Country Sample

**This paper seeks to cover as wide a set of economies as possible, subject to data availability constraints.** With no strict *ex ante* qualification or exclusion criteria applied, the empirical analysis attempts to use the largest possible country sample. As a result, 57 economies are considered (see Annex Table 1). The sample includes some countries that are classified as Advanced Economies (AEs) in the World Economic Outlook, but which are included in either the S&P IFCI or the S&P Frontier BMI emerging market stock indices. Nonetheless, owing to the variety of series and sources used, countries enter various regressions to the extent that relevant data for a particular specification are available. Thus, country samples differ throughout the paper.

**Data sources:** The analysis is based on staff calculations using data from the Spring 2010 World Economic Outlook and from internal staff assessment of vulnerabilities. Additionally, public sources (BIS, CEIC, Haver, IFS, Moody's, and others) are used.

Annex Table 1: Country List

<b>Asia (11)</b>	<b>Emerging Europe and CIS (22)</b>
China	Albania
India	Belarus
Indonesia	Bosnia and Herzegovina
Korea	Bulgaria
Malaysia	Croatia
Mongolia	Czech Republic
Pakistan	Estonia
Philippines	Georgia
Sri Lanka	Hungary
Thailand	Kazakhstan
Vietnam	Latvia
	Lithuania
	Macedonia
	Montenegro
	Poland
	Romania
	Russia
	Serbia
	Slovak Republic
	Slovenia
	Turkey
	Ukraine
<b>Western Hemisphere (17)</b>	<b>Middle East and Africa (7)</b>
Argentina	Egypt
Bolivia	Israel
Brazil	Jordan
Chile	Lebanon
Colombia	Morocco
Costa Rica	South Africa
Dominican Republic	Tunisia
Ecuador	
El Salvador	
Guatemala	
Jamaica	
Mexico	
Panama	
Paraguay	
Peru	
Uruguay	
Venezuela	

## References

- Abiad, A., R. Balakrishnan, P. Koeva Brooks, D. Leigh, I. Tytell, 2009, "What's the Damage? Medium-term Output Dynamics after Banking Crises," IMF Working Paper No. 09/245 (Washington: International Monetary Fund).
- Aisen, A., and M. Franken, 2010, "Bank Credit during the 2008 Financial Crisis: A Cross-Country Comparison," IMF Working Paper No. 10/47 (Washington: International Monetary Fund).
- Bank for International Settlements, 2009a, *Quarterly Review-International Banking and Financial Market Developments* (Basel).
- Bank for International Settlements, 2009b, *Capital Flows and Emerging Market Economies*, CGFS Paper No. 33 (Basel).
- Berglöf, E., 2009, *Transition Report 2009: Transition in Crisis?* (London: European Bank for Reconstruction and Development).
- Berkmen, P., G. Gelos, R. Rennhack, and J. Walsh, 2009, "The Global Financial Crisis: Explaining Cross-Country Differences in the Output Impact," IMF Working Paper No.09/280 (Washington: International Monetary Fund).
- Blanchard, O., H. Faruqee, and M. Das, 2010, "The Initial Impact of the Crisis on Emerging Market Countries," *Brookings Papers on Economic Activity* (Washington: Brookings Institution).
- Bown, C., 2010, "Fourth Quarter 2009 Protectionism Data: Requests for New Trade Barriers Fall for First Time in Crisis; But Newly Imposed Barriers Increase," *A Monitoring Update to the Global Antidumping Database* (Washington: World Bank).
- Cecchetti, S., 2008, "Monetary Policy and the Financial Crisis of 2007–08," CEPR Policy Insight No. 21 (London: Center for Economic Policy Research).
- Cerra, V., and S. Saxena, 2008, "Growth Dynamics: The Myth of Economic Recovery," *American Economic Review*, vol. 98, no. 1, pp. 439-57.
- Freund, C., 2009, "The Trade Response to Global Downturns: Historical Evidence," Policy Research Working Paper Series No. 5015 (Washington: The World Bank).
- Ghosh, A., C. Christofides, J. Kim, L. Papi, U. Ramakrishnan, A. Thomas, J. Zalduendo, 2005, *The Design of IMF-Supported Programs*, IMF Occasional Paper No. 241 (Washington)

- Ghosh, A., M. Chamon, C. Crowe, J. Kim, and J. Ostry, 2009, "Coping with the Crisis: Policy Options for Emerging Market Countries," IMF Staff Position Note No. 2010/04 (Washington: International Monetary Fund).
- International Monetary Fund, 2009a, "The State of Public Finances Cross-Country Fiscal Monitor," Staff Position Note No.2009/25 (Washington).
- International Monetary Fund, 2009b, *Regional Economic Outlook, Europe: Securing Recovery* (Washington).
- International Monetary Fund, 2009c, *Regional Economic Outlook, Western Hemisphere: Crisis Averted-What's Next?* (Washington).
- International Monetary Fund, 2010a, *World Economic Outlook: Rebalancing Growth* (Washington).
- International Monetary Fund, 2010b, *Global Financial Stability Report: Meeting New Challenges to Stability and Building a Safer System* (Washington).
- Ishi, K., M. Stone, and E. Yehoue, 2009, "Unconventional Central Bank Measures for Emerging Economies," IMF Working Paper No. 09/226 (Washington: International Monetary Fund).
- Kamil, H., and K. Rai, 2010, "The Global Credit Crunch and Foreign Banks' Lending to Emerging Markets: Why Did Latin America Fare Better?" IMF Working Paper No.10/102 (Washington: International Monetary Fund).
- Kvintradze, E., 2010, "Russia's Output Collapse and Recovery: Evidence from the Post-Soviet Transition," IMF Working Paper No. 10/89 (Washington: International Monetary Fund).
- Ostry, J., A. Ghosh, K. Habermeier, M. Chamon, M. Qureshi, and D. Reinhart, 2010, "Capital Inflows: The Role of Controls," IMF Staff Position Note No. 2010/04 (Washington: International Monetary Fund).
- Ramakrishnan, U., and J. Zalduendo, 2006, "The Role of the IMF Support in Crisis Prevention," IMF Working Paper No. 06/75 (Washington: International Monetary Fund).
- Reinhart, C., and K. Rogoff, 2008, "This Time is Different: A Panoramic View of Eight Centuries of Financial Crises," NBER Working Paper No. 13882 (Cambridge: National Bureau of Economic Research).

- Rodrik, D., 2006, "The Social Cost of Foreign Exchange Reserves," NBER Working Paper No. 11952 (Cambridge: The National Bureau of Economic Research).
- Rose, A., and M. Spiegel, 2009a, "Cross-Country Causes and Consequences of the 2008 Crisis: Early Warning," NBER Working Paper No. 15357 (Cambridge: National Bureau of Economic Research).
- Rose, A., and M. Spiegel, 2009b, "Cross-Country Causes and Consequences of the 2008 Crisis: International Linkages and American Exposure," NBER Working Paper No. 15358 (Cambridge: National Bureau of Economic Research).
- Taylor, J., 2009, "The Financial Crisis and the Policy Responses: An Empirical Analysis of What Went Wrong," NBER Working Paper Series No. 14631 (Cambridge: National Bureau of Economic Research).
- Taylor, J., and J. Williams, 2008, "A Black Swan in the Money Market," NBER Working Paper Series No. 13943 (Cambridge: National Bureau of Economic Research).
- Tong, H., and S. Wei, 2009, "The Composition Matters: Capital Inflows and Liquidity Crunch During a Global Economic Crisis," NBER Working Paper No. 15207 (Cambridge: National Bureau of Economic Research).
- World Trade Organization, 2009, *World Tariff Profiles* (Geneva).
- Zettelmeyer, J., E. Berglöf, Y. Kormiyenko, and A. Plekhanov, 2009, "Understanding the Crisis in Emerging Europe" (London: European Bank for Reconstruction and Development).