

Annex: Foreign Exchange Reserve Accumulation – Recent Developments and Adequacy Measures¹

Global foreign currency reserves rose sharply in the years prior to the global economic crisis, and continued to rise in the early months after the onset of the financial crisis, peaking at \$7.15 trillion in July 2008. Between July 2008 and February 2009, during the height of the crisis, foreign currency reserves fell by 5.8 percent, largely as a result of efforts by emerging markets and some advanced economies to stem currency depreciation.² Since February 2009, foreign currency reserves have resumed their rapid upward rise, reaching \$8.1 trillion at the end of 2009. This annex examines recent developments in the reserve holdings of the 17 foreign economies discussed in this Report. Further, it examines the adequacy of reserves in these economies based on standard indicators. Since early 2009, many of the 17 economies have been rapidly re-accumulating reserves, so that holdings in all but 7 exceeded their pre-crisis levels by the end of 2009. Further, reserves of nearly all the emerging market economies exceed standard adequacy benchmarks, and none of the emerging market economies falls short of the benchmarks.

Reserve Accumulation

As Figure 1 indicates, these 17 economies account for the bulk of global foreign currency reserves (75 percent as of December 2009). The reserves of these economies as a group also declined between July 2008 and February 2009, but at a less rapid rate (4.1 percent) than global reserves.

Table 1 shows the monthly growth rate in foreign currency reserves for each of the 17 economies in three recent periods: January 2005-July 2008, July 2008-February 2009, and February 2009-December 2009. In the first period, all 17 economies accumulated reserves, except Switzerland.³ Brazil, Russia, and Saudi Arabia accumulated reserves at a rate of more than 3 percent a month. In dollar terms, the largest accumulator, China, was adding an average of \$29 billion a month in foreign currency reserves; far more than Russia, Saudi Arabia, and Brazil, which were adding \$8.5 billion, \$7.4 billion, and \$3.2 billion a month on average, respectively.

During the height of the global economic and financial crisis reserves declined in 12 of the 17 economies. In the five economies where reserves continued to rise, they did so at a much slower pace than in the pre-crisis period. In part, this shift reflected weakening current account positions and faltering capital inflows during the crisis period. The decline in reserve accumulation also resulted, in some cases, from governments selling reserves to prevent a rapid depreciation of their currency. Some governments used a portion of their reserves to fund

¹ This annex was prepared by Patricia Pollard; see also Russell Green and Tom Torgerson, “Are High Foreign Exchange Reserves in Emerging Markets a Blessing or a Burden?” Department of the Treasury: Office of International Affairs, Occasional Paper No. 6, March, 2007.

² The appreciation of the dollar during the July 2008 to February 2009 period also had an effect in reducing the reported value of foreign currency reserves, by reducing the dollar value of reserves held in other currencies.

³ An increase in reserves does not imply that a central bank was actively adding to its stock of reserves. In some cases the increase may have resulted from investment returns on the reserve portfolio. Since central banks tend to hold most of their reserves in highly liquid, government securities, these can only explain small increases in reserves.

stimulus programs, and some drew down reserves for both purposes. In percentage terms, the largest declines in reserves occurred in Russia and Malaysia. Russian reserves also declined the most in dollar terms – \$120.1 billion over the 7-month period.

Between February and December 2009, all 17 economies, with the exception of Norway, Saudi Arabia, and Venezuela rebuilt reserves. Switzerland accumulated reserves at a rate of 7.8 percent a month, more than double the rate of accumulation in any other of the 17 economies, and in stark contrast to its loss of reserves in the pre-crisis period. Switzerland's reserve accumulation stemmed from its intervention policy adopted in March 2009 to prevent a rapid appreciation of the Swiss franc against the euro and safeguard its recovery, as discussed in the main text of this Report.

In dollar terms, China's reserves increased by \$487.1 billion between February and December 2009, more than six times the rise of any other economy, as it continued to intervene heavily to hold the RMB pegged to the U.S. dollar. This increase was more than the stock of foreign currency reserves held by any other economy except Japan. Korea was the next largest accumulator of foreign currency reserves in dollar terms, adding \$73.3 billion to its holdings. Korea's reserves had declined by \$64 billion between March and November 2008, as it sold foreign exchange in the face of heavy downward pressure on the won.

Although the foreign currency reserves of most of the 17 economies stood at record levels by the end of 2009, reserves in seven economies (Russia, India, Euro area, Malaysia, Mexico, Norway, and the United Kingdom) remained below pre-crisis levels.

For most of the emerging market economies, the growth in reserves between February and December 2009 was associated with an appreciation of the nominal effective exchange rate, as shown in Figure 2. For a few countries, most notably China, the increase in reserves was associated with a decline in the nominal effective exchange rate, indicating that reserve accumulation may have been used to prevent exchange rate appreciation.

Reserve Adequacy

Governments accumulate reserves for a variety of reasons. A small amount of foreign currency reserves may be needed for day-to-day transactions including debt repayments, payments to international organizations, and payments for imports. The latter may be most important for low income countries. Countries with pegged exchange rates need to hold reserves to offset downward pressure on their currencies. Even economies with flexible exchange rates hold some reserves in order to intervene in foreign exchange markets to prevent a disorderly depreciation of their currency. Governments also hold reserves to provide a defense against substantial and rapid capital outflows that could cause a loss of investor confidence and a currency crisis. This self-insurance motive has received the most attention in recent years and is often seen as one reason for the increase in global reserves since the financial crises of the late 1990s.

Although there is no single measure of the amount of reserves a country should hold as insurance against a currency crisis, three benchmarks are typically used to provide a rough guide to adequacy: reserves to short-term external debt; reserves to a broad measure of money (typically M2); and, reserves to imports.

The three benchmarks are:

- ***Reserves sufficient to cover external debt coming due within 12 months.*** This benchmark is the most preferred measure for measuring risk of a capital account crisis. During a financial crisis countries have found that they are unable to rollover short-term debt.
- ***Reserves equal to 5-20 per cent of M2.*** Reserves in this range are considered adequate to support confidence in the value of local currency and reduce the risk of capital flight. This benchmark is most relevant to countries with managed exchange rates.
- ***Reserves sufficient to cover 3 to 4 months of imports.*** The reserves to imports ratio is considered most relevant to low income countries exposed to current account shocks and lacking significant access to capital markets.

Measures of reserve adequacy for most advanced economies stand in stark contrast to those for the emerging market economies (Table 2). With highly developed financial markets, the advanced economies, as a group, see little need to hold reserves to reduce the risk of a capital account crisis, or signal their credit worthiness to lenders. Central banks of these economies also provide swap lines to each other to deal with temporary illiquidity as occurred in late 2008. Only Japan has reserves in excess of the adequacy benchmarks across all categories.

At the end of 2009, all of the emerging market economies in the sample had reserves in excess of the benchmarks for import coverage and short-term debt. Most had reserves above the benchmark for coverage of the money supply. Saudi Arabia and China had both the highest ratio of reserves to imports, with enough reserves to cover imports for more than two years, and by far the highest ratio of reserves relative to short-term external debt.⁴ China's reserves could cover the short-term debt of all 12 emerging market economies in the table, and still be above the benchmark for adequacy.

The data indicate that not only are the absolute levels of foreign currency reserves rising rapidly, but generally so too are the reserves relative to short-term external debt, monetary aggregates, and imports. Even the countries that rank highest in terms of these standard indicators of reserve adequacy built up reserves through most of 2009. Additional research into adequacy measures could help refine our knowledge of these reserve metrics. The IMF, for example, is particularly well-suited to pursue this line of research. Even allowing for a high degree of uncertainty around the benchmarks, these results indicate that the need to rebuild reserve levels to provide insurance against capital crises does not provide an adequate explanation for the strong rise in reserves in 2009.

⁴ Most of Saudi Arabia's reserves are held to smooth consumption during oil cycles and provide for long term income needs.

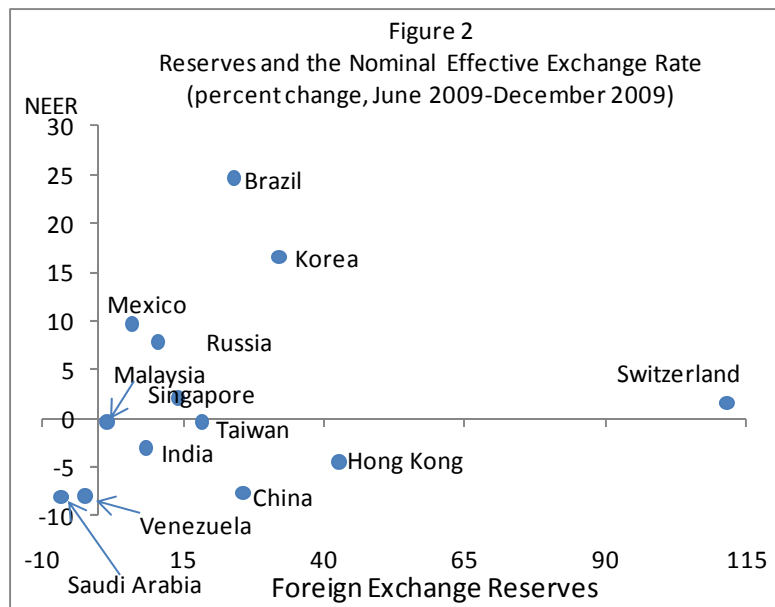
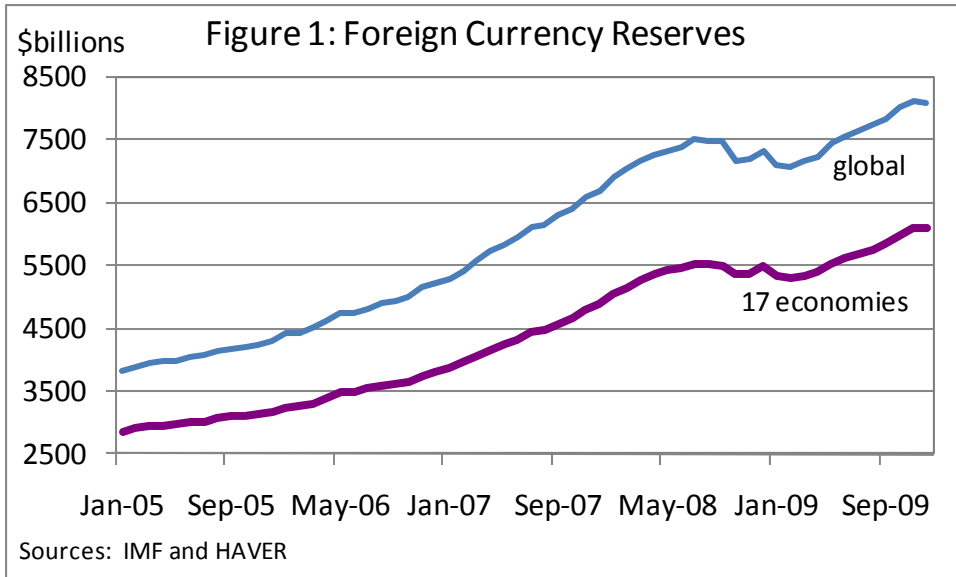


Table 1: Foreign Currency Reserves				
	Monthly percentage increase			Reserves Dec 2009 (\$ billions)
	Jan 2005- Jul 2008	Jul 2008- Feb 2009	Feb 2009- Dec 2009	
China	2.62	0.51	2.30	2,399
Japan	0.41	0.05	0.17	997
Russia	3.62	-4.23	1.57	399
Saudi Arabia	3.53	0.74	-0.68	397
Taiwan	0.43	0.16	1.70	348
Korea	0.52	-2.91	2.82	265
India	2.10	-3.02	0.80	259
Brazil	3.13	-0.26	2.18	229
Euro Area	0.43	-2.38	0.46	195
Singapore	1.08	-0.69	1.21	187
Mexico	0.94	-0.87	0.57	94
Switzerland	-0.39	-0.65	7.76	91
Malaysia	1.46	-4.67	0.13	86
Norway	0.27	-0.04	-0.64	46
Canada	0.70	0.04	0.42	43
United Kingdom	0.73	-2.61	0.42	38
Venezuela	0.60	-3.64	-0.24	17
17 economies	1.58	-0.61	1.42	6,091
Global	1.61	-0.86	1.58	8,097

Table 2: Measures of Reserve Adequacy						
	Months of Import Coverage		As a Percent of M2		As a Percent of Short-term Debt	
	2007	2009	2007	2009	2007	2009
Advanced Economies						
Canada	1.2	1.6	5.2	4.8	14.3	16.2
Euro Area	1.2	1.3	1.9	1.6	3.3	3.4
Japan	18.3	21.8	146.8	122.9	225.0	185.7
Norway	9.0	8.0	22.7	17.3	34.7	35.6
Switzerland	3.4	7.4	11.2	15.2	7.5	22.5
United Kingdom	0.9	0.9	1.5	1.2	1.6	1.6
Emerging Markets						
Brazil	16.3	21.5	37.3	35.0	265.8	320.4
China	19.2	28.7	27.5	26.7	1249.0	1790.6
India	14.0	12.6	102.3	n.a.	339.5	318.3
Korea	8.8	9.9	19.2	19.7	176.0	188.7
Malaysia	7.8	8.4	39.4	29.9	421.2	467.2
Mexico	3.7	4.8	17.5	18.5	256.2	252.9
Russia	20.9	25.1	71.5	77.0	408.1	522.6
Saudi Arabia	31.7	68.4	171.0	176.3	1066.5	1376.7
Singapore	7.4	9.1	78.7	71.0	126.2	147.9
Taiwan	14.9	24.1	336.6	378.1	730.2	941.1
Venezuela	6.8	n.a.	33.2	n.a.	347.1	n.a.
Notes: Adequacy Ranges: Imports--2 to 4 months, M2--5 to 20 percent, Short-term debt--100 percent. Short-term debt includes all debt with a remaining maturity of one-year or less. Numbers bolded in red are above the adequacy benchmark.						