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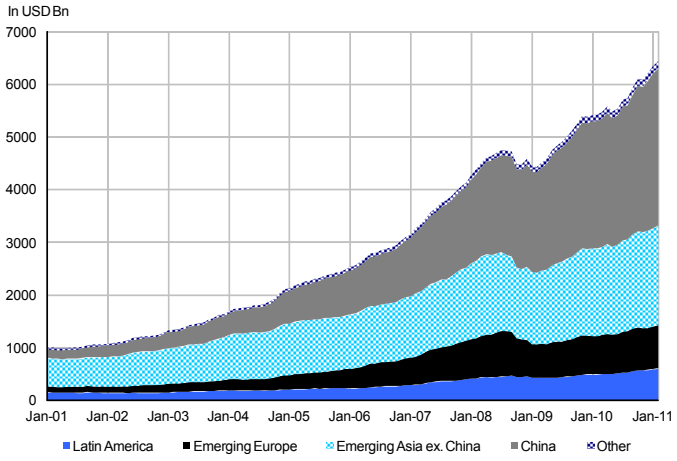
Emerging countries' foreign exchange reserves and accumulation strategies

- The emerging countries' net foreign assets have been expanding faster than those of the developed countries, since 2004, thanks to larger trade surpluses and capital inflows than previously. Today they represent two thirds of world foreign exchange reserves. China and the other emerging Asian economies, with fairly rigid exchange regimes, hold the bulk of these reserves.
- These reserves have enabled the countries that have accumulated them to withstand the crisis rather better than the developed countries. This protective effect probably stems more from the confidence born of holding large reserves than from their actual use.
- Capital flows to the emerging countries dropped by more than USD 1,000 billion during the crisis. Some countries were relatively less affected. If all countries had been affected as much as those hardest-hit, this drop would have been twice as large. The emerging countries may consider to protecting themselves against this risk. With the return of capital flows to these countries in spring 2009, the accumulation of currency reserves resumed, including in countries with sufficient reserves during the crisis.
- However, the accumulation of "excessive" currency reserves can be costly, collectively, when the price for this is durably undervalued exchange rates, helping to sustain global imbalances. But it comes at a cost to individual emerging countries as well. This accumulation can be limited in a variety of ways, namely: (i) improved financial safety nets, (ii) better regulation of capital flows to curb their instability, and (iii) more flexible exchange rates in a greater number of emerging countries.
- If the emerging countries were to go on rapidly accumulating reserves, they would probably seek higher returns, which could lead to a diversification of reserves with a heavier emphasis on riskier assets such as equities and corporate bonds, or assets denominated in other currencies (yen, euro, yuan or real, for example).

Emerging countries' foreign exchange reserves, January 2001-January 2011



Source: Reuters.

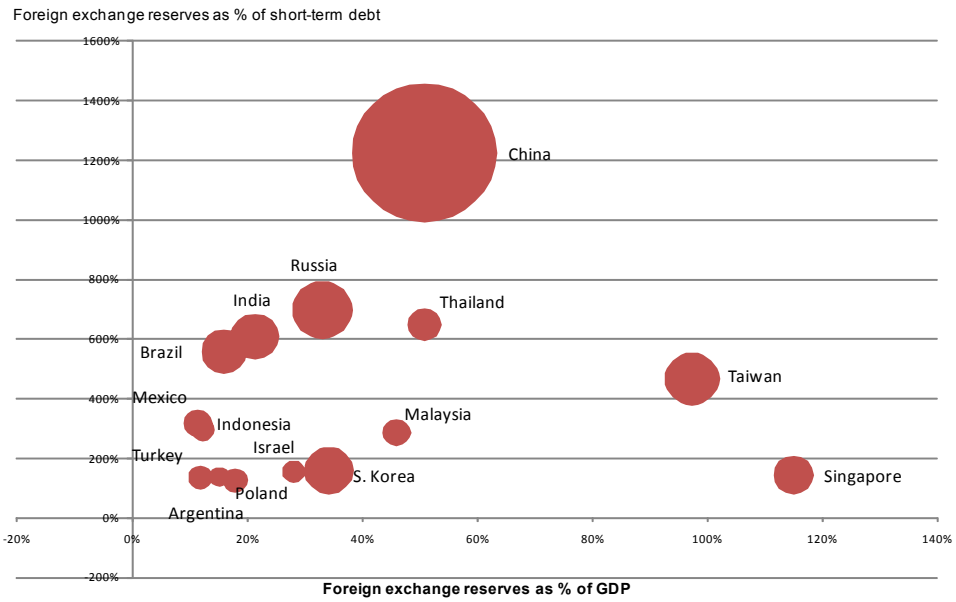
MINISTÈRE DE L'ÉCONOMIE
DES FINANCES ET DE L'INDUSTRIE

1. The emerging countries have accumulated sizeable foreign exchange reserves since 2004, due to their trade surpluses and hefty capital inflows

1.1 The emerging countries hold the bulk of the world's currency reserves

The emerging countries have accumulated considerable foreign exchange reserves since 2004, and these now represent nearly two thirds of global reserves (around USD 6,400 billion out of a total of almost USD 9,500 billion at the end of February 2011)[1]. Asian countries account for the bulk of this accumulation of reserves, which now largely cover most of these countries' short-term debt (see Chart 1), which was never previously the case.

Chart 1: Relative size of the leading emerging countries' foreign exchange reserves and coverage of short-term debt



Sources: World Bank, International Monetary Fund (IMF), DG Trésor calculations.

Interpretation: bubble size represents a country's foreign exchange reserves as a percentage of global reserves, e.g. 30% for China and 1.2% for Malaysia.

1.2 The emerging countries are accumulating foreign exchange reserves because of their trade surpluses and large capital inflows

The emerging countries have expanded their reserves on the back of their growing trade surpluses and hefty capital inflows (see Chart 2). Their aggregate trade surplus has ballooned since 2000 due not only to China's swelling surplus, but also to those of the other major emerging countries or regions (i.e. Asia, Russia and, to a lesser extent, Brazil[2]). For commodities exporters, this phenomenon was driven by very strong global prices and may also have been fuelled by undervalued exchange rates in other countries, since the choice of exchange rate regime has an impact on the accumulation of foreign exchange reserves. When the exchange rate parity is too high, the trade balance goes into deficit (as in emerging Europe before the crisis) and foreign exchange reserves do not rise; when this parity is too low, on the other hand (as in Asia Pacific), the resulting trade surplus boosts foreign exchange reserves.

The other contributing factor to rising foreign exchange reserves, namely capital inflows, has proved distinctly less regular in the recent period. Significant capital inflows began to emerge in the second half of 2004, then surged in 2007, in the first half of 2008, and in the last three quarters of 2009[3], but the financial crisis triggered massive outflows in late 2008 and early 2009[4].

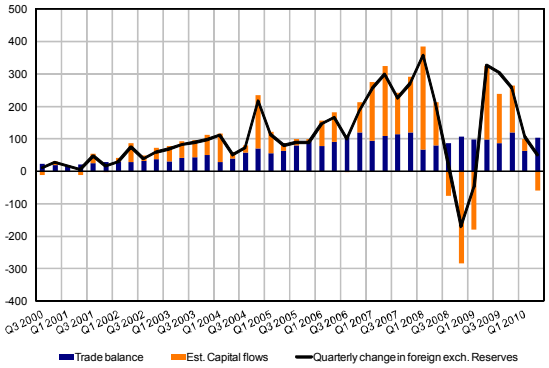
(1) In addition to their Central Bank reserves, several countries have set up sovereign wealth funds (SWF). Most of these SWFs are funded through the national budget (as in the case of Russia) and thus serve as stabilization funds for use in times of crisis. In some cases, as in that of China, the SWF allows the country to diversify the ways in which it invests its foreign exchange reserves into riskier assets.

(2) Brazil has run a trade surplus since 2001. The position has deteriorated since 2008, when the previous current account surplus turned negative.

(3) These capital inflows mainly took the form of foreign direct investment (FDI) until 2006, with short-term flows (portfolio and other investments) coming slightly to the fore, especially in China, thereafter. The post-global crisis profile differs somewhat in that short-term flows now largely predominate.

(4) See on this theme, Berthaud F. and Colliac S. (2010), "Which emerging countries have experienced a sudden stop of capital inflows during the recent crisis?", *Trésor-Economics* no. 76, July 2010.

Chart 2: Breakdown of the growth in foreign exchange reserves in the emerging countries



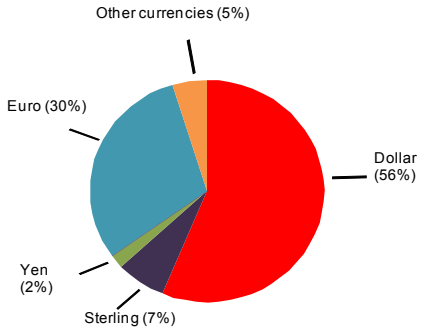
Source: World Bank, IMF, Datastream, DG Trésor calculations.

Trade surpluses have been the main driver of accumulating foreign exchange reserves in Russia and the Gulf, whereas in emerging Europe and Brazil this accumulation stemmed primarily from capital inflows. In emerging Asia, both trade surpluses and capital inflows contributed.

Countries are more cautious when capital inflows are the main driver of rising reserves. This is because capital flows can quickly reverse in a crisis, whereas trade surpluses are slower to change direction. In 2008, foreign exchange reserves fell faster in countries where capital flows were the main factor behind their growth, thereby aggravating the crisis of confidence affecting them. Consequently these countries (emerging Asia and Brazil) were somewhat reluctant to use these foreign exchange reserves to cushion the crisis, preferring to sustain very sharp depreciation of their currency, which proved very short-lived.

These foreign exchange reserves are mainly invested in government bonds and denominated in a handful of leading currencies classified as reserve currencies (see Chart 3). These are international currencies considered to be a good store of value, i.e. ones unlikely to suffer a sharp fall as a result of high inflation. Among these, the US dollar remains the predominant reserve currency, although its share has dropped from 67% 10 years ago to 56% at the end of 2010. The euro's share rose from 20 to 30% between 1999 and 2002, but it has remained flat since then.

Chart 3: Breakdown of emerging countries' foreign exchange reserves by reserve currency at end-2010



Source: IMF (COFER Database: this database does not contain information on the composition of the reserves of reporting central banks, which corresponds to around 2/5th of the foreign exchange reserves of the emerging countries), DG Trésor calculations.

2. Foreign exchange reserves are thought to have provided a semi-protection to the emerging countries during the crisis

Foreign exchange reserves can be viewed as a financial safety net for countries holding them. This is because they can be used as a source of liquidity in a crisis, in the same way as international assistance such as IMF assistance or currency swap agreements[5] between central banks. The difference between foreign exchange reserves and external assistance is that the former provide self-insurance against a liquidity squeeze, while the latter represent a bi- or multi-lateral insurance policy that may not be available when needed.

2.1 Countries with larger foreign exchange reserves suffered a relatively smaller contraction of GDP during the crisis

The 2008/2009 crisis was more serious in those emerging countries that had close trade relations with the developed countries, and also in those with lower foreign exchange reserves. Consequently, the drop in GDP between Q3 2008 and Q1 2009 (at the time of the crisis) was steeper in countries with a high level of trade openness and low currency reserves relative to short-term debt.

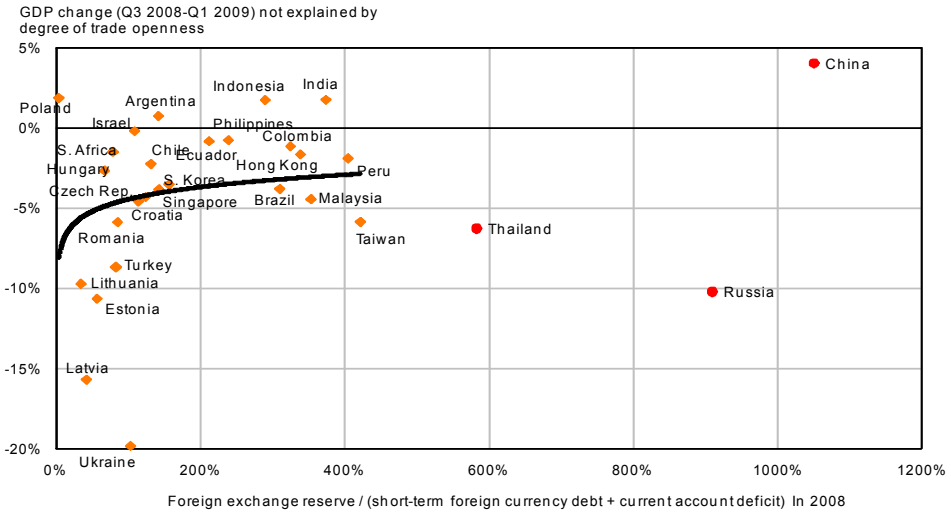
Foreign exchange reserves do indeed appear to have played a partially protective role during the recent crisis. Beyond a certain level of reserves, however, incremental foreign exchange reserves appear to afford only marginally greater protection (see Chart 4). By generally accepted convention, foreign exchange reserves are supposed to cover one year of an economy's foreign exchange financing requirements. These financing needs are represented by short-term debt and by the current account deficit (where appropriate). Beyond these needs, a safety margin is required, but this depends on the probability and scale of a capital outflow. To judge from Chart 4, it looks as if this margin would not justify holding reserves representing more than 200% of a country's financing needs[6]:

- during the crisis, for a given degree of trade openness, countries holding foreign exchange reserves representing more than 200% of their financing needs did not suffer much less than those holding around 200%;
- below that level, on the other hand, reserves appear to have provided a relative degree of protection to the countries holding them. Risk premiums and exchange rate volatility increased sharply for countries with lower reserves (in emerging Europe above all) and their economic activity suffered a greater decline.

(5) Currency swaps consist in a simultaneous spot purchase (or sale) and a forward sale (or purchase) of a foreign currency.

(6) The IMF comes to a similar conclusion: (2010), "How Did Emerging Markets Cope in the Crisis?", Policy Paper, June 15, 2010.

Graphique 4 : Relationship between net foreign exchange reserves on the eve of the crisis and GDP decline observed during the crisis[7]



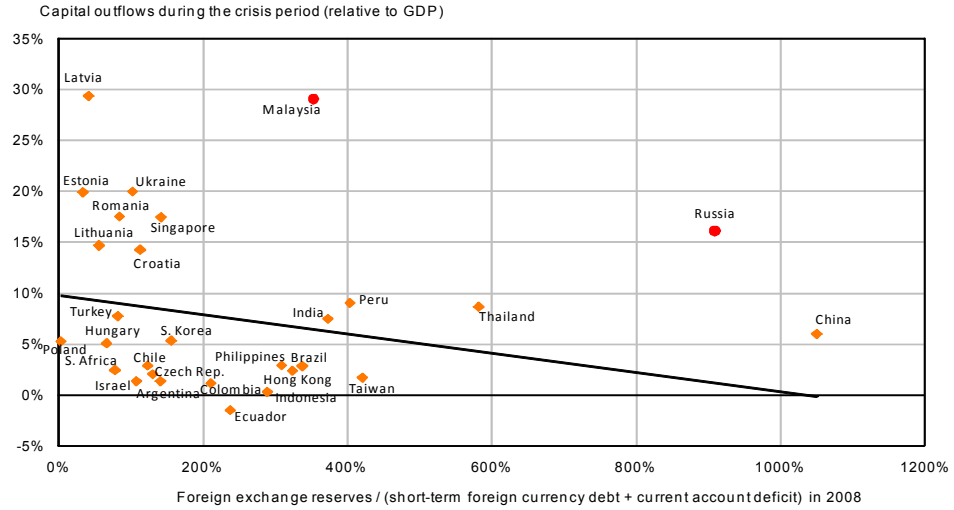
Sources: World Bank, Global Insight, Datastream, DG Trésor calculations.

Interpretation: Peru's foreign exchange reserves represented 4 times the country's foreign exchange financing needs (short-term debt + current account deficit) on the eve of the crisis. GDP dropped by 2% during the crisis, excluding international trade contraction-related effects. The curve (estimated with a log function) shows that the marginal benefit from holding greater foreign exchange reserves diminishes. China, Thailand and Russia are not included in this curve because their reserves exceed their foreign exchange financing needs by too wide a margin.

2.2 Emerging countries with low foreign exchange reserves before the crisis experienced larger capital outflows and tended to draw more heavily on their currency reserves

Countries with low foreign exchange reserves relative to their short-term debt are often countries with a structural current account deficit. Capital inflows allow these countries to finance their deficit but not to accumulate foreign exchange reserves. Once these capital inflows are interrupted, the risk of a crisis rises sharply, with a possible crisis of confidence leading to difficulties in financing the country's current account deficit, lower reserves and potential capital outflows (see Chart 5[8]).

Chart 5: Link between foreign exchange reserves net of foreign exchange debt and capital outflows



Sources: World Bank, Global Insight, Datastream, DG Trésor calculations.

Interpretation: Brazil's foreign exchange reserves represented 310% of short-term foreign exchange debt and current account deficit. Also for Brazil, capital outflows[9] represented 3% of GDP during the crisis period, i.e. between October 2008 and February 2009.

(7) The ordinate shows how GDP would have performed in the absence of trade contraction-related effects. The equation connecting the variables considered is: Variation (GDP) = –2.54 + 0.052.Net reserves–0.044.Degree of openness. The change in GDP not explained by the degree of trade openness is thus obtained as follows: Variation (GDP) – (–0.044.Degree of trade openness).

(8) Russia (crisis of confidence) and Malaysia (which responded to the 1997 crisis by introducing controls on capital outflows) are two special cases.

(9) Capital outflows are estimated according to the same method as that used in Trésor Economics no. 76 "Which emerging countries have experienced a sudden stop of capital inflows during the recent crisis?", which-for those countries that suffered this halt- serves to date the period during which capital outflows came to a sudden halt. This is the period used to calculate the capital outflows for this type of country. For the other countries, the period used is from October 2008 to February 2009, during which all of the emerging countries experienced capital outflows (including those for which this did not trigger a sudden halt).

Two lessons can be drawn from the recent crisis:

- countries with the lowest levels of foreign exchange reserves have no option but to use them. The crisis confirmed that low foreign exchange reserves relative to short-term debt are liable to precipitate a loss of confidence once a crisis occurs, because creditors are less inclined to roll over the country's debts, and because the central bank lacks sufficient foreign exchange reserves to defend the exchange rate parity. The resulting deterioration of agents' expectations, including those of residents, triggers hefty capital outflows;
- countries with comfortable foreign exchange reserves are even better protected against a crisis of confidence if they do not draw on their foreign exchange reserves. In the recent crisis, it emerged that a steep fall in foreign exchange reserves stigmatised the countries concerned, amplifying the capital outflows; this applied equally to countries whose foreign exchange reserves looked sufficient to avoid a liquidity crisis[10], such as South Korea. This negative signal may have prompted countries with large foreign exchange reserves not to draw on them and to accept a temporary depreciation of their currency.

3. A stress test shows that, in the worst case, capital outflows could be almost double what was observed during the crisis, which could serve as an incentive to emerging countries to accumulate still larger precautionary reserves

The crisis has prompted a revision of the conventions customarily used to calculate the adequate level of foreign exchange reserves for a country. Formerly, the consensus view was that foreign exchange reserves ought, essentially, to cover short-term debt. However, the large number of sudden disruptions to capital inflows to the emerging countries since the beginning of the 1990s suggests rather that a central bank ought to boost its foreign exchange reserves in order to protect against the risk of capital outflows, and to quantify the probability of their occurrence and their scale.

This is a complex exercise, since it depends on estimates and creates uncertainty as to what ought to be the optimum level of foreign exchange reserves for each country. One possibility might be to consider that a central bank seeks to build up sufficient reserves to cover both short-term debt and the worst contraction of capital flows to which the country might be exposed. The latter may be calculated in two ways. The first takes as its benchmark the global crisis of 2008-2009, while the second looks at a stress test in which each country seeks to protect against capital outflows as large, as a percentage of GDP, as the largest of those experienced by countries in its geographic area[11].

We may consider that a country's foreign exchange reserves guarantee it 100% self-insurance if its holdings cover both short-term debt and potential capital outflows. Table 1 presents an evaluation by broad geographical region. When there are surplus reserves, this means that the foreign exchange reserves offer total self-insurance.

Table 1: Comparison of emerging countries' foreign exchange reserves with different grounds for self insurance (in USD Bn)[a]

	Foreign exchange reserves before the crisis=(1)	Capital outflows during the recent crisis=(2)	Short-term debt=(3)	Surplus reserves (1st calculation) =(1)−(2)−(3)	Stress test on capital outflows=(4)	Surplus reserves (2nd calculation) =(1)−(4)−(3)
China	1 908	262	175	1 471	262	1 471
Emerging countries ex. China	2 868	880	1 403	585	1 714	−249
Emerging Europe	876	484	291	101	594	−9
- of which Russia	543	270	57	216	270	216
- of which ex. Russia	333	214	234	−116	325	−226
Emerging Asia ex. China	1 455	297	938	220	975	−458
Latin America	437	92	116	229	110	210
- of which Brazil	206	45	36	125	45	125
- of which ex. Brazil	232	47	81	104	65	86
Other emerging countries	100	8	58	35	35	8

a. Capital outflows are estimated according to the same method as that used by Berthaud F. and Colliac S. (2010), "Which emerging countries have experienced a sudden stop of capital inflows during the recent crisis?", in Trésor Economics no. 76, which serves to date-for those countries that suffered this halt-the period during which capital outflows came to a sudden halt. This is the period used to calculate the capital outflows for this type of country. For the other countries, the period used is from October 2008 to February 2009, during which all of the emerging countries experienced capital outflows (including those for which this did not trigger a sudden halt).

Sources: World Bank, Global Insight, Datastream, Joint debt tables, DG Trésor calculations.

(10) Aizenman J. and Sun Y. (2010), "The Financial Crisis and Sizable International Reserves Depletion: From 'Fear of Floating' to 'Fear of losing International Reserves'?", mimeo.

(11) Only countries of a significant size can be taken as a benchmark.

There is a dichotomy between China, where most of the surplus reserves are concentrated, and the other emerging countries. The situation is more ambiguous for the latter:

- in the recent crisis, most of the emerging countries appeared to have sufficient foreign exchange reserves, emerging Europe (excluding Russia) being the exception, which is why the IMF granted the greatest number of stand-by arrangements to this region;
- the stress test on capital outflows nevertheless shows that many emerging countries could consider that their foreign exchange reserves would not afford total self-insurance in potentially serious future crises. This is the situation with emerging Europe (excluding Russia) and emerging Asia (excluding China). Central banks in these regions might also be tempted to accumulate larger foreign exchange reserves:
  - the sum of the foreign exchange reserves needs of countries whose authorities might view these as insufficient is thought to be nearly USD 600 billion. If this estimate is correct, the emerging countries would have an incentive to accumulate larger foreign exchange reserves in the near future;
  - the policy pursued recently by Indonesia confirms this desire to accumulate reserves. At the beginning of 2010 it announced its intention to accumulate USD 100 billion in foreign exchange reserves between now and 2014. However, this country's reasons for wanting to build up its reserves are apparently unrelated to its own experience during the recent crisis, since its capital outflows were limited and its short-term debt is low. On the other hand, Indonesia's foreign exchange reserves were lower than those of the other Southeast Asian countries. These reserves would be insufficient to cope with capital outflows on the scale experienced by Malaysia (representing some 29% of GDP).

4. The likely continued accumulation of foreign exchange reserves by the emerging countries raises some challenges

4.1 Emerging countries' foreign exchange reserves could continue to grow strongly

Some emerging countries may wish to go on accumulating foreign exchange reserves. They are all the more likely to do so given that their trade surpluses and capital inflows since the end of the crisis have practically reverted to their pre-crisis levels. Consequently, their foreign exchange reserves had already grown from USD 4,700 billion at the end of the crisis (at the end of Q1 2009) to nearly USD 6,500 billion at end-2010. In the longer run, the IMF projects that, with accumulation behaviour similar to today's, the emerging countries' foreign exchange reserves would increase from 50% of the United States' present GDP to nearly 700% by 2035.

4.2 This further growth in reserves could spur the emerging countries to seek higher yields and hence diversify their reserve assets

If these IMF projections materialise, the emerging countries' foreign exchange reserves can be expected to exceed their needs by a significant margin, from a precautionary standpoint notably (including on the basis of the previously established stress test). Yet holding foreign exchange reserves represents an opportunity cost, since they are invested in the developed countries' government bonds-which produce low returns relative to other types of asset or investment in the country. Emerging countries may therefore be tempted to diversify their reserves more widely, particularly reserves in excess of their precautionary holdings. This diversification could take a number of forms:

- diversifying the currencies in which reserves are held out of the dollar and into the currencies of other developed countries;
- broadening the range of currencies in which reserves are held to include those of the major emerging countries whose debt appears to be most sustainable, including Brazil, South Korea and China[12];
- broadening the range of currencies in which reserves are held to include riskier, less liquid assets, such as equities, in order to boost yields on the surplus reserves that the central bank considers it could afford to forgo in the event of a liquidity crisis[13].

A process of diversification appears to be at work already, since (see Chart 3, above) the share of currencies other than the dollar, the euro, sterling and the yen represented 5% of the emerging countries' foreign exchange reserves at the end of 2010, versus 2% at the beginning of 2009.

Available information is patchy, but it looks as if these other currencies could be those of developed countries such as Canada and Australia, and partly those of emerging countries such as South Korea and, to a lesser extent, China.

4.3 Any further growth in foreign exchange reserves is undesirable, however

The drawbacks of an over-accumulation of foreign exchange reserves outweigh the benefits:

- individually: when foreign exchange reserves become too large, any further increase would afford no greater protection (see Chart 4). The opportunity costs-the fact of holding these reserves in low-yielding assets instead of investing in profitable projects, and the sterilisation of these reserves-predominate;
- collectively: the increase in these reserves, while not costly as such, may reflect insufficient exchange rate flexibility on the part of the emerging countries, which raises global problems.

(12) The introduction of currency swaps by the Chinese central bank makes it possible for other central bank to hold yuan.
(13) Statement by the Hong Kong Monetary Authority (which is not a true central bank but a currency board).

These policies are reflected in undervalued exchange rates in certain countries, leading to high trade surpluses that in turn help to perpetuate global imbalances. This lack of flexibility also encourages portfolio capital flows to seize the carry trade opportunities[14] that it facilitates. These inherently unstable flows increase the risk of a crisis via a sudden reversal of capital flows[15]. Consequently, if a country pursues a policy of maintaining a persistently undervalued exchange rate in order to build up foreign exchange reserves rapidly, this can have a cost for the global economy.

Two complementary ways to limit this accumulation of foreign exchange reserves would be:

- to improve multilateral financial safety nets (FSN) (see Box 1), whose current shortcomings encourage emerging countries to prefer to self-insure;
- for the emerging countries to increase their exchange rate flexibility in order to create greater uncertainty, thereby making it more complicated to engage in carry trade strategies.

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Cyril REBILLARD

Box 1: **Financial safety nets**

A financial safety net or FSN refers to any resource that could be used in a crisis or in a liquidity squeeze. Strictly speaking, then, foreign exchange reserves can be viewed as a FSN, which each country can build up unilaterally. FSNs can also be bilateral, as is the case with currency swap arrangements between central banks. However, access to this type of resource depends on the quality of the relationship between each emerging country and the leading central banks capable of offering this kind of arrangement, e.g. the Federal Reserve (Fed), European Central Bank (ECB), the Bank of Japan (BoJ) and the People's Bank of China (the Chinese central bank). Finally, FSNs can be multilateral, as in the case of assistance provided by the international financial institutions, the IMF foremost among them. FSNs are granted on the basis of precise criteria, while the terms must be sufficiently tough to avoid the risk of moral hazard, i.e. to avoid a situation in which the prospect of further financial assistance leads a country to adopt looser economic policies.

When the financial crisis began, the multilateral FSNs were insufficient in terms of both the financial resources they were able to mobilise and the array of instruments available to them. The first difficulty was removed in spring 2009, when the IMF's resources were tripled to USD 750 billion. At that time, the IMF had only the stand-by arrangement to draw on in order to meet the financing needs of countries in crisis. Since this was the only instrument available and was therefore also offered to countries whose macroeconomic management had failed, it has always been viewed as carrying a stigma. Consequently, a new instrument, the flexible credit line, or FCL, was created in spring 2009. This is granted solely to countries running sound macroeconomic policies (i.e. solid public finances, inflation under control, and a healthy banking system, notably).

Only three countries (Mexico, Colombia and Poland) have resorted to this instrument in the recent crisis, however, and even while doing so they have continued to increase their foreign exchange reserves. The mixed success of the FLC stems in particular from the fact that the ratings agencies, to which the emerging countries attach great importance, do not treat liquidity available through FCLs on a par with reserves. In view of the instrument's usefulness and its insufficient utilisation, the IMF reformed the FCL in September 2010.

This reform lengthens the period during which a country can draw on the FCL and eliminates certain limits on access to IMF resources for countries resorting to it.

An additional instrument, the precautionary credit line or PCL, was also introduced at the same time. This is intended for countries that do not meet the criteria for access to the FCL, due to inherent weaknesses but whose economic situation is solid[a].

a. Click on the following links for further details of the instruments available to the IMF (stand-by arrangement, flexible credit line, and precautionary credit line): http://www.imf.org/external/np/exr/facts/sba.htm (for the IMF stand-by arrangement), www.imf.org/external/np/exr/facts/pcl.htm (for the precautionary credit line, PCL) and http://www.imf.org/external/np/exr/facts/fcl.htm (for the flexible credit line, FCL).

(14) "Carry trade" here refers to any strategy consisting in borrowing in a low-interest currency to purchase assets (bonds or equities) in another currency, often those of an emerging country.

(15) See Berthaud F., Bouveret A. and Colliac S. for more on this subject, "'Regulating' emerging markets capital inflows"?, *Trésor-Economics* no. 85, April 2011.

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