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Foreign exchange reserve accumulation in emerging markets: what are the domestic implications?[1]

This paper discusses some of the domestic implications of the recent large-scale use of foreign exchange intervention by emerging market economies to resist currency appreciation. Over the past five years, many countries have adopted an accommodating monetary policy while intervening. Despite the prolonged period of low interest rates that resulted, various other forces have kept inflation under control and so eased one policy dilemma for central banks. Nevertheless, large and prolonged reserve accumulation can still create risks other than near-term inflation. These include: high intervention costs; monetary imbalances; overheated credit and asset markets; and very liquid and perhaps distorted banking systems.

JEL classification: E52, E58, F31, F41.

The accumulation of foreign exchange reserves by emerging market economies has continued on an unprecedented scale for several years. The latest working assumptions of the IMF are for further substantial accumulation both this year and next.[2] The general objective of this policy has been to resist or delay currency appreciation. How effective such a policy can be (and for how long) has been much debated. Contrary to the received wisdom for larger economies, whose financial markets are highly integrated with global capital markets, there is some evidence that sterilised intervention is more effective in influencing the exchange rate in emerging market economies.[3] This issue is, however, not the main focus of this special feature. Rather, the question explored here is how prolonged reserve accumulation poses risks for the domestic economy that could eventually discourage further intervention.

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[2] According to the IMF *World Economic Outlook*, reserves of developing countries are projected to increase by a further $584 billion in 2006 and $562 billion in 2007 (IMF (2006)).

[3] See Disyatat and Galati (2005) and Mihaljek (2005).

The financing of the prolonged and substantial accumulation of foreign exchange reserves has implications for the balance sheets of the central bank, the banking system and, indeed, the private sector. Major shifts in balance sheet variables can eventually have significant macroeconomic effects which depend both on how the associated risk exposures are managed and on how intervention is financed. One possibility is that balance sheet effects might reduce the effectiveness of sterilisation, with possible inflationary implications. Another set of potential problems includes the high costs of intervention, unsustainable increases in credit and asset prices, and an increasingly inefficient financial system.[4] Overheating pressures and the high costs of intervention during the early 1990s, for instance, led many Latin American countries to abandon such intervention.[5]

It is important to note that the economic cycle has played an important role in allowing recent levels of intervention to be sustained. Many countries accumulating reserves over the past few years have faced conditions of substantial excess capacity and low inflation, which meant that policy rates could be eased in the face of upward pressure on the currency. In these circumstances, reserve accumulation did not create the dilemma policymakers faced in earlier high inflation episodes when they had to choose between their inflation objective and their exchange rate objective.

The first section of this special feature reviews the scale of reserve accumulation against some standard measures of the size of the economy and the financial system. The second section examines how far intervention has been sterilised. The final section considers whether some unwelcome side effects of even fully sterilised intervention could at some point force a reconsideration of the policy of heavy reserve accumulation.

An overview of recent reserve accumulation

Recent scale of intervention unprecedented

Table 1 compares recent reserve accumulation across the major regions with two previous episodes in the early and mid-1990s. As the table shows, the scale of recent reserve accumulation has continued much longer than in the earlier episodes. Between 2000 and 2005, emerging market economies accumulated reserves at an annual rate of $250 billion (or 3.5% of their annual combined GDP). This was almost five times higher than the level seen in the early 1990s. As a ratio to GDP, such accumulation has been particularly rapid in China, Korea, India, Malaysia, Russia and Taiwan (China). In Latin America and central Europe, reserve accumulation has been fairly modest, rising as a percentage of GDP only in Argentina, the Czech Republic, Mexico and Venezuela over the past five years. Many oil-exporting Middle East economies have also seen a large increase in their reserves.

[4] For an analysis of these issues, see Mohanty and Turner (2005) and International Relations Committee Task Force (2006).

[5] See Reinhart and Reinhart (1999) and Griffith-Jones et al (2001).

Balance of payments in emerging markets[1]

	Current account balance			Net capital inflows[2]			Reserves			
							Change			Stock
	1990–93	1995–96	2000–05	1990–93	1995–96	2000–05	1990–93	1995–96	2000–05	July 2006[7]
Asia	6	–64	899	160	230	211	119	110	1,178	2,025
China	20	9	347	35	79	291	4	53	664	941
India	–17	–12	–5	20	16	95	7	0	99	156
Korea	–14	–32	82	20	41	51	5	8	136	225
Taiwan, China	39	16	117	–29	–21	30	10	–4	147	260
Other Asia[3]	–22	–45	358	114	115	–239	93	53	132	442
Latin America[4]	–85	–68	–26	138	105	106	71	49	83	244
Central Europe[5]	–2	–11	–102	6	34	134	16	21	39	99
Russia	1	18	290	9	–26	–31	10	7	167	243
Middle East[6]	–90	6	383	111	9	–302	–3	8	50	89
Total	–170	–119	1,445	423	351	117	214	195	1,517	2,701

[1] Cumulative sum for the period, in billions of US dollars. Aggregates are the sum of the economies. [2] Financial account, NIEs. [3] Hong Kong SAR, Indonesia, Malaysia, the Philippines, Singapore, Taiwan (China) and Thailand. [4] Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. [5] The Czech Republic, Hungary and Poland. [6] Kuwait, Libya, Oman, Qatar and Saudi Arabia. [7] Or latest available.

Sources: IMF, Balance of Payments Statistics; IMF, *World Economic Outlook*; Datastream. Table 1

The upward pressure on exchange rates, which intervention sought to counter, has generally reflected large current account surpluses. In the previous episodes, by contrast, it mainly reflected substantial net private capital inflows. There are, nevertheless, important exceptions. In China, Korea and Taiwan (China), the appreciation pressure has recently been driven as much by capital inflows as by current account surpluses. Net capital inflows have remained much larger than the current account deficit in India. This also remains true for most of Latin America and central and eastern Europe, with the notable exception of Russia, where current account surpluses have been boosted by increased oil prices.

While capital inflows – particularly portfolio inflows – have often been seen as temporary (perhaps justifying intervention), current account surpluses tend to endure and have persistent effects on the exchange rate. Moreover, there has been a tendency among investors and currency traders to identify persistent current account surpluses with an appreciation of the long-run equilibrium exchange rate. Resisting this may cause even larger capital inflows, potentially perpetuating a vicious circle of increased appreciation pressure and yet more intervention.

To what extent has intervention been sterilised?

Intervention has major impact on central bank balance sheets

Rapid reserve accumulation has significant implications for a central bank's balance sheet. Table 2 presents a stylised version of a monetary authority's balance sheet. Its assets consist of foreign currency and domestic assets; its liabilities comprise currency, bank reserves (taken together as monetary liabilities), its own securities, other liabilities (taken together as non-monetary liabilities) and equity capital. Of these, currency is largely determined by the

A central bank's balance sheet

Assets	Liabilities
Net foreign assets Net domestic assets	Monetary liabilities • Currency • Bank reserves Non-monetary liabilities • Central bank securities • Others Equity capital

Table 2

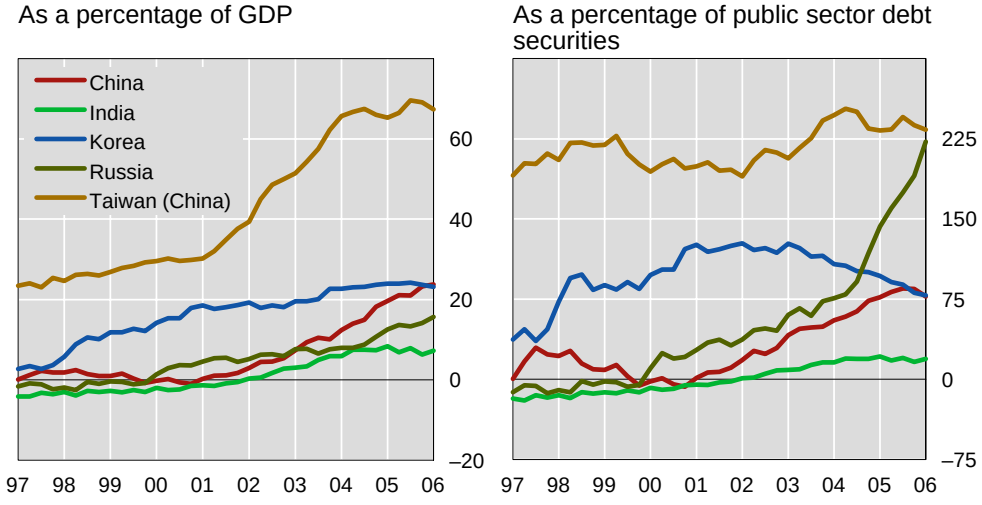
public's demand for cash balances. Equity capital represents government transfers to the central bank (plus accumulated profits and losses). The remaining liabilities are within the control of the central bank.

An injection of equity capital in order to finance reserve accumulation would not result in monetary expansion, provided that the government did not finance this by drawing on deposits or using an overdraft facility at the central bank. Without increased equity capital, and assuming other things (ie the demand for cash) equal, the accumulation of reserves requires financing in some form. One simple measure of such a financing need is the excess of foreign currency reserves over currency in circulation. Up until the late 1990s, such a financing gap was either small or negative in many developing countries. In other words, forex reserve assets and currency in circulation were of a similar order of magnitude. However, the gap has widened appreciably over the past five years as a percentage of GDP in many emerging market economies, especially in Asia (Graph 1). In many countries, such a gap is also large in relation to the stock of public debt securities.

Impact on monetary policy

As intervention takes place, the central bank can finance this gap by issuing domestic monetary liabilities (typically commercial bank monetary reserves). Should these increased monetary reserves be allowed to put

Foreign reserves net of currency



Sources: Datastream; national data; BIS calculations.

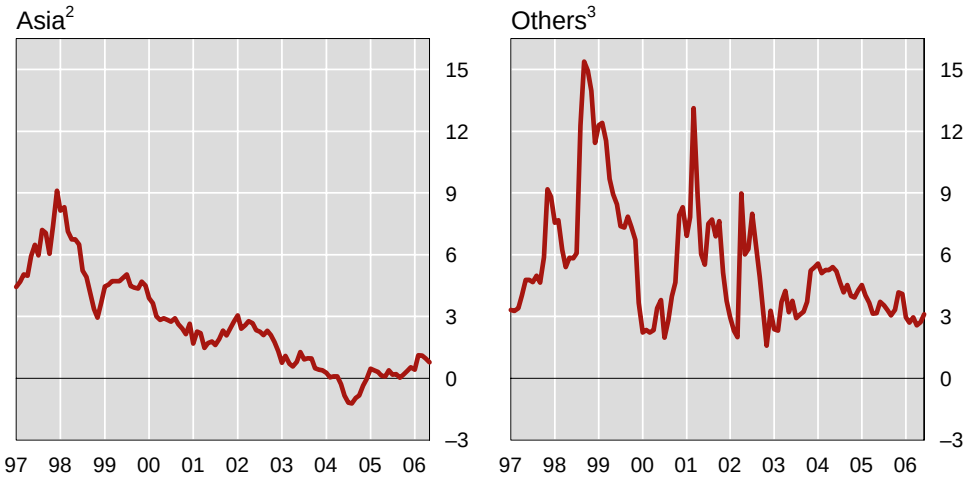
Graph 1

downward pressure on the short-term interest rate (unsterilised intervention), bank credit would tend to expand and inflationary pressures would eventually mount. If central banks have a target for the short-term rate (usually the policy rate), they would attempt to offset increases in bank reserves through changes in other balance sheet items (usually selling domestic assets or issuing their own securities) over which they have control (sterilised intervention).

Monetary policy eased in a context of low inflation

What have been the monetary implications of intervention? An analysis of changes in the balance sheet quantities in Table 2 suggests that, during the period from January 2000 to May 2006, changes in net domestic credit and non-monetary liabilities offset between 85 and 95% of changes in net foreign assets in India, Korea, Malaysia, Singapore and Taiwan (China), and over 70% and 60%, respectively, in the case of China and Russia.[6] During much of the time central banks were building reserves, they also sought to deliberately ease monetary policy in an environment of low inflation and large excess capacity. As Graph 2 shows, real short-term interest rates have fallen more sharply over the past few years in Asia than elsewhere. This also remains the case in other countries accumulating large amounts of reserves (eg Russia). In other words, many central banks may have used reserve accumulation opportunistically to expand the monetary base to support their choice of a more accommodative policy stance.[7] This low inflation context meant that

Real short-term interest rates[1]



[1] Deflated by consumer prices; simple averages. [2] China, India, Korea, Malaysia, Singapore, Taiwan (China) and Thailand. [3] Argentina, Brazil, Chile, Mexico, South Africa and Turkey.

Sources: Datastream; national data; BIS calculations. Graph 2

[6] Estimated using the following equation: $\Delta DC_t = \alpha_0 + \alpha_1 \Delta NFA_t + \alpha_2 \Delta DC_{t-1} + \varepsilon_t$, where *DC* is net domestic credit in the central bank balance sheet adjusted for central bank securities and other non-monetary liabilities and *NFA* is net foreign assets. The model was estimated using seasonally adjusted data from January 2000 to May 2006.

[7] For example, the People's Bank of China (PBC) has used flexible open market operations to sterilise its forex intervention to various degrees. For instance, during the first half of 2005, with inflation remaining low, the PBC injected base money of 1 trillion renminbi through foreign exchange purchases and withdrew 761 billion renminbi through open market operations, resulting in net base money expansion. However, it has intensified its sterilised

reconciling central banks' exchange rate and inflation objectives was easier than it would have been in other circumstances.

While inflation has remained low …

An important question therefore is whether inflation will remain low in emerging market economies. In China, inflation has been volatile but reached a peak of 5% in mid-2004, and subsequently receded. In India, the headline inflation rate has also fluctuated widely, between 8% in mid-2004 and 3% in mid-2005. Although inflation rates have risen in the past two years in Malaysia, Saudi Arabia, Taiwan (China) and Thailand, they are still within the limits of the central banks' inflation objectives. In contrast, reserve accumulation in Argentina, Russia and Venezuela has been associated with a relatively high rate of inflation (10–13% over the past two years).

… pressures seem to have been mounting

Low inflation to date might be partly structural, reflecting forces such as increased cross-border product and factor market integration as well as structural reforms strengthening competition in non-tradable products.[8] The concern would be that these structural forces might recede or eventually be overwhelmed by the inflationary pressures arising from expansionary monetary conditions. Growth since 2002 has reduced excess capacity in the global economy, and commodity prices have risen strongly across the board. In such circumstances, central banks may have to raise interest rates and allow their currencies to appreciate at a faster rate than in the past.

Challenges from sterilised intervention

Fully sterilising reserve accumulation can be challenging. Even when fully sterilised, intervention can have other unwelcome implications that can limit its usefulness as a policy instrument. This section discusses four possible and unwelcome implications.

(i) The fiscal costs of intervention

An earlier presumption was that intervention by central banks, in countries where local interest rates were well above international levels, entailed large carrying costs, and it was often these rising costs which led to policy reversals in the past. During the capital inflows episode of the early 1990s, the annual costs of intervention were estimated to have risen between 0.25 and 0.5% of GDP in several Latin American countries (Khan and Reinhart (1994)). By weakening fiscal positions, this also cast doubts on central banks' anti-inflation credibility (Calvo (1991)).[9]

operations since the second half of that year to tighten monetary conditions in the face of growing overheating pressures; see PBC (2005).

[8] On this debate, see Borio and Filardo (2006), IMF (2006) and Yellen (2006).

[9] In thin and imperfect financial markets, sterilised intervention often drives up interest rates on securities used for sterilised intervention; see Frankel (1993) and Turner (1991). In a recent speech, the Deputy Governor of the Reserve Bank of India said that large-scale sterilisation operations raise domestic interest rates, resulting in a "trap of even greater capital flows"; see Mohan (2006).

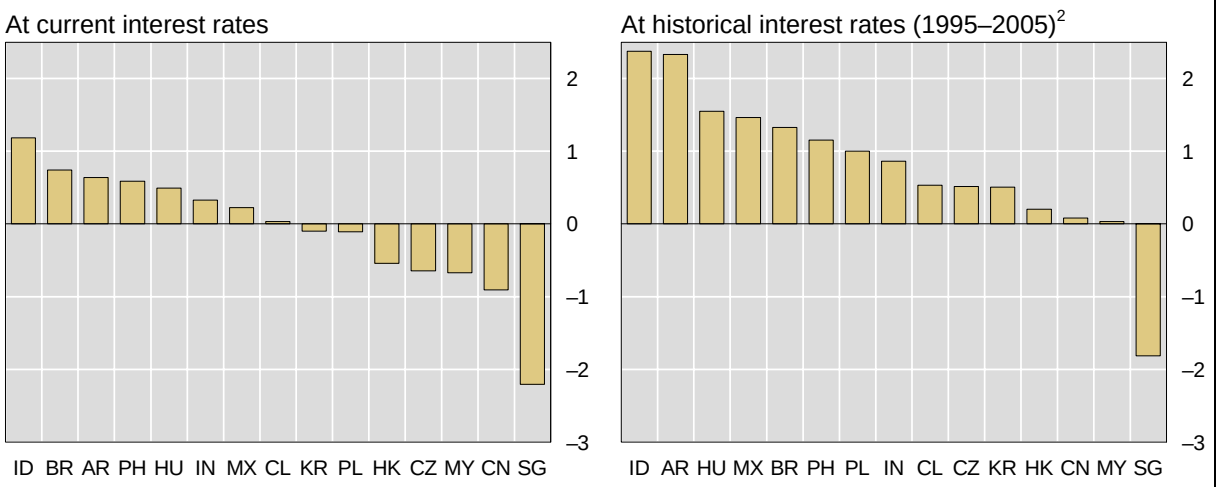
Carrying costs remain low but could rise …

Graph 3 provides rough estimates of carrying costs as a percentage of GDP, based on one-year interest rate differentials between domestic currency bonds and US Treasury securities at the end of June 2006.[10] As the left-hand panel of the graph shows, carrying costs are negative in a number of countries at current interest rates. In China, for instance, the one-year interest rate in June 2006 was less than half the comparable US Treasury bond rate. Hence the central bank is earning a positive carry.

Nevertheless, carrying costs are inherently cyclical, and interest rates are currently unusually low. One estimate of how sensitive carrying costs might be to a future rise in interest rates in countries accumulating reserves is shown in the right-hand panel of Graph 3, which indicates that costs would rise significantly should interest rates return to their average levels of the past 10 years. In this scenario, however, carrying costs would still remain low in some countries having large stocks of reserves – particularly China.[11] In addition, these hypothetical cost calculations do not capture capital gains or losses from changes in bond prices. The steady decline in long-term yields in international markets since 2001 has generated capital gains for central banks with long-term foreign currency assets but domestic short-term liabilities. Again, however, this seems more likely to reverse than to continue.

Carrying costs[1]

As a percentage of GDP



AR = Argentina; BR = Brazil; CL = Chile; CN = China; CZ = Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PH = Philippines; PL = Poland; SG = Singapore.

[1] Calculated as the spread between the domestic and the US one-year Treasury bill rate, applied to the total outstanding stock of foreign exchange reserves in domestic currency. [2] Average for the period.

Sources: IMF, International Financial Statistics; national data. Graph 3

[10] This is only an approximation. In practice, carrying costs depend on the difference between the average return on central bank liabilities and that earned by foreign currency assets.

[11] Recently, several authors have reported higher intervention costs based on alternative estimates of the opportunity cost. For instance, Rodrik (2006) shows that there is a "social cost" to reserve accumulation to the extent that the private sector borrows at a higher rate than what the central bank earns on its foreign currency assets. Similarly, Summers (2006) suggests higher costs based on the forgone return on infrastructure projects.

… and there may be valuation losses

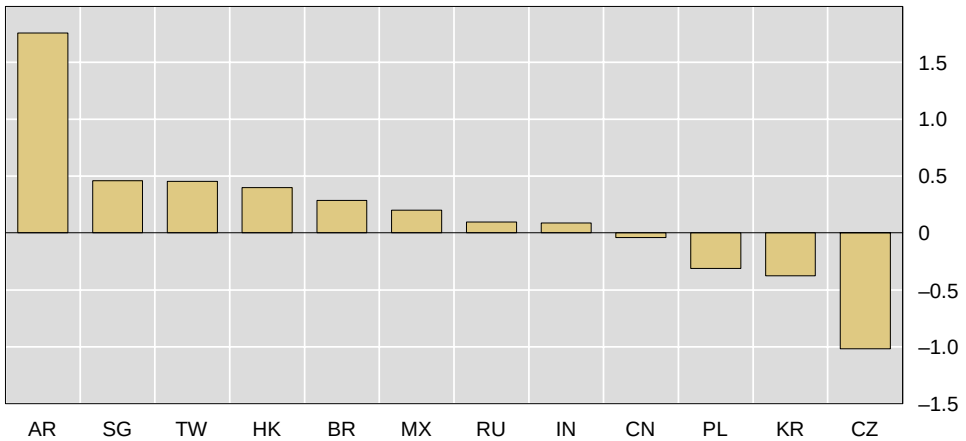
Another concern associated with a large portfolio of foreign currency assets is that it exposes the central bank to potential valuation losses from currency appreciation. As a reference point, Graph 4 provides estimates of annual valuation changes as a percentage of GDP between 2000 and 2005. The estimates are obtained by applying actual exchange rate changes to an estimated currency composition of reserves. In the absence of individual country data on the currency composition of reserves, the share of each currency was estimated by applying regional averages published by the IMF since 2000 (Lim (2006)). According to this database, the dollar's share in total reserve holdings in the so-called dollar area countries (Asia and the western hemisphere) fell from 78% at the end of 2000 to 75% by the third quarter of 2005, and that of the euro increased from 14% to 18%. In non-dollar area countries (Europe), the dollar's share fell from 35% to 32% and the euro's share increased from 50% to 57%.[12]

Graph 4 shows that countries that have had large currency appreciations against their major anchor currencies (from the viewpoint of their investment basket) have suffered significant valuation losses. In contrast, and despite their large reserves, such losses appear to have been moderate so far in Asia – but only because most Asian currencies have not appreciated significantly against the dollar.

It is debatable how far valuation losses might matter for the sustainability of intervention policy. The direct economic consequences might be limited. Valuation losses do not reduce the central bank's ability to intervene (ie to sell local currency to limit further appreciation), nor do they reduce the purchasing power of its foreign currency reserves in terms of foreign goods. To the extent

Valuation changes in foreign exchange reserves, 2000–05[1]

Average annual change, as a percentage of GDP



AR = Argentina; BR = Brazil; CN = China; CZ = Czech Republic; HK = Hong Kong SAR; IN = India; KR = Korea; MX = Mexico; PL = Poland; RU = Russia; SG = Singapore; TW = Taiwan (China).

[1] Assuming shares of foreign exchange reserves as reported in Table 2 of Lim (2006).

Sources: IMF, International Financial Statistics; national data. Graph 4

[12] See also Wooldridge (2006) in this issue.

that the private sector and the government are net borrowers in foreign currency, appreciation reduces their net debt burden. Valuation losses might matter, however, if they were to undermine a central bank's credibility or independence.

(ii) Future monetary imbalances

The long-term effectiveness of sterilised intervention in dealing with excess liquidity depends on the instruments used for sterilisation and which sector ends up holding such paper. Large-scale reserve accumulation typically raises the underlying liquidity position of the banking system. This can be partly neutralised by selling long-term government bonds to banks. If such bonds are then sold to non-banks, sterilisation can be thought to be reasonably complete: households or non-bank firms lower their holding of monetary assets and increase that of non-monetary assets such as government bonds.

Over the past five years, sterilised intervention has been associated with large issuance of central bank or government paper. In China, Korea and Taiwan (China), the stock of outstanding central bank securities rose rapidly to constitute 15%, 20% and 30% of GDP, respectively, at the end of June 2006. In most countries, sterilisation instruments have tended to be of short-term maturity. Most securities issued by the People's Bank of China and the Reserve Bank of India (largely government bonds under the monetary stabilisation scheme) have maturities of less than one year. In Korea, at the end of 2004, over 80% of outstanding monetary stabilisation bonds had a duration of three years or less. The maturity of other interest bearing instruments such as foreign exchange swaps and remunerated deposit facilities is generally much shorter, ranging from a few days to a few months.[13]

Debt securities often issued short-term ….

Banks, but not the non-bank private sector, have been the primary counterparty to the expansion of central bank and government securities. In China, for instance, over 80% of central bank securities were held by banks at the end of 2005. In India, banks held about 65% of domestic credit in government securities at the end of 2004. To the extent that banks with such liquid assets feel better placed to expand credit, the restraining influence of sterilised intervention on monetary growth could prove temporary.[14] Another challenge is that a large stock of sterilisation securities and other forms of interest bearing non-monetary liabilities increases the interest payment liabilities of central banks, requiring further issuance of securities.[15]

… and held by banks, with liquid balance sheets

[13] See Ho and McCauley (2006) for a discussion on various types of short-term money market instruments used by central banks in emerging markets for draining excess liquidity and their impact on monetary conditions.

[14] See Kumhof (2004), who provides a formal model for examining the effectiveness of sterilisation using short-term bonds. He shows that increases in short-term bonds with monetary characteristics do lead to increased demand.

[15] Another impact of large issuance of central bank securities is that it leads to market fragmentation in countries with similar government bonds, with adverse implications for liquidity and trading in domestic bond markets; see McCauley (2003).

A large stock of short-term liabilities could also expose central banks to future interest rate fluctuations similar to the government running a large debt rollover risk (for instance, risks of underfunding at the auction without lowering the price of securities substantially). One of the major factors that have helped the smooth absorption of sterilisation securities in recent years has been the strong demand for risk-free assets by banks. If this were to reverse, sustaining sterilised intervention through large-scale debt issuance could become more difficult and more costly. Last year, for example, the Bank of Korea (2005) expressed concerns about rising interest costs implied by the growing reliance on monetary stabilisation bonds.

Interest rate exposures

(iii) Financial sector imbalances

Intervention to prevent a rise in the exchange rate can accentuate macroeconomic and financial imbalances. There are several possible channels for this. As discussed above, increased bank lending resulting from partial or ineffective sterilisation could finance excessive investment in certain sectors such as property markets. Such effects could also be associated with a persistently low inflation and low interest rate environment (White (2006)). Another possible channel is that expectations of future currency appreciation could attract large short-term capital inflows, pushing up equity prices. Such an effect could be reinforced by perception of a one-way currency bet, leading to increased currency substitution and unhedged foreign currency borrowing.

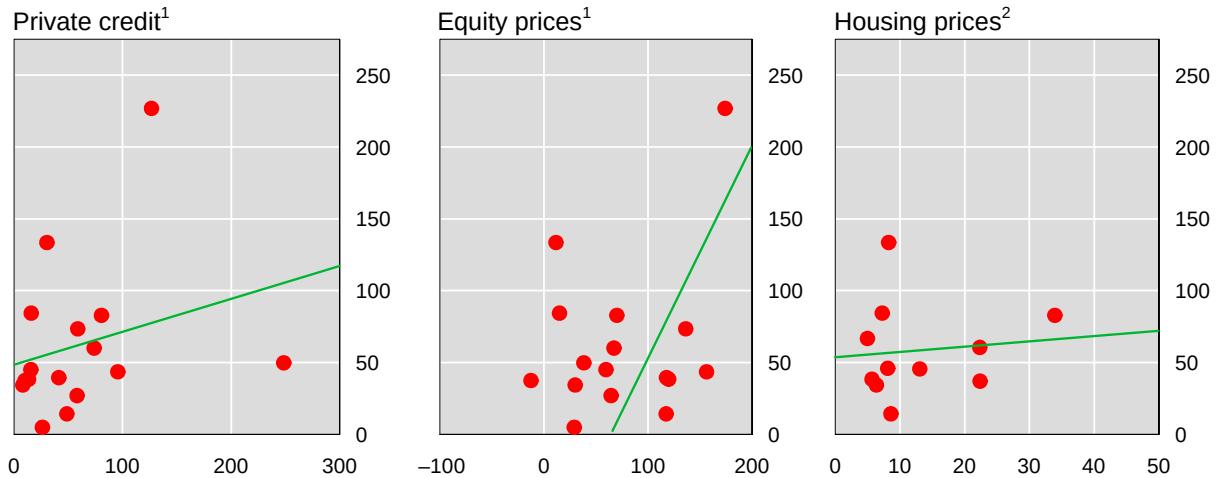
Prolonged intervention may stimulate bank lending ….

The significance of each of these channels is difficult to determine as bank credit and capital inflows can be influenced by many factors. Nevertheless, reserve accumulation in a number of countries has been associated with easier financing conditions (Graph 5). Bank credit to the private sector has been rising strongly in several countries, which have been building up large reserve

… and ultimately lead to overheated credit and asset markets

Foreign reserve accumulation and financial conditions

Changes, in per cent, from end-2003 to latest figure available



[1] Argentina, Brazil, China, the Czech Republic, Hong Kong SAR, Hungary, India, Korea, Malaysia, Mexico, Poland, Saudi Arabia, Singapore, Thailand, Russia and Venezuela. [2] Argentina, Brazil, China, the Czech Republic, Hungary, India, Korea, Malaysia, Mexico, Poland, Saudi Arabia, Singapore, Russia and Venezuela.

Sources: IMF, International Financial Statistics; Datastream; national data. Graph 5

holdings. Such expansion has been accompanied by particularly sharp increases in lending to the residential property sector. The exposure of the banking system to this sector (as a ratio of banks' total loans) rose rapidly in India from a very low level in 1999 to 10% by 2004. Corresponding increases were from 10% to 33% in Korea, and from 7% to 10% in Thailand. Another indicator of easier financing conditions has been the association of large-scale reserve accumulation with rapid growth in equity prices.

There are no simple indicators to show how far exchange rates might have become misaligned, or the extent to which investor expectations about future exchange rate movements might have been influenced, by continued sterilised intervention. Nevertheless, real exchange rates have not risen significantly in many countries with large and persistent current account surpluses. In some cases, real effective exchange rates are actually below what they were at the beginning of the decade, when current account surpluses were small. For instance, as of June 2006, the real effective exchange rates of China, Malaysia, Singapore and Taiwan (China) were 5–10% below the average base of 2000–02 and that of India remained broadly unchanged. In Saudi Arabia, the real exchange rate has depreciated by over 20%. In contrast, Korea and Russia have seen real appreciations of over 20% and 45%, respectively, during this period.

Graph 6 plots the difference, in per cent, between the one-year-ahead consensus exchange rate forecasts and the forward exchange rate implied by the interest rate differentials versus the US dollar for eight of the countries that have intervened heavily in recent years. Positive values indicate that consensus exchange rate forecasts predict excess returns on holdings in the domestic currency. With only a few exceptions, exchange rate forecasts have favoured unhedged long domestic currency exposures, consistent with the view that the currencies of countries engaged in sterilised intervention have been viewed as undervalued by many market participants.

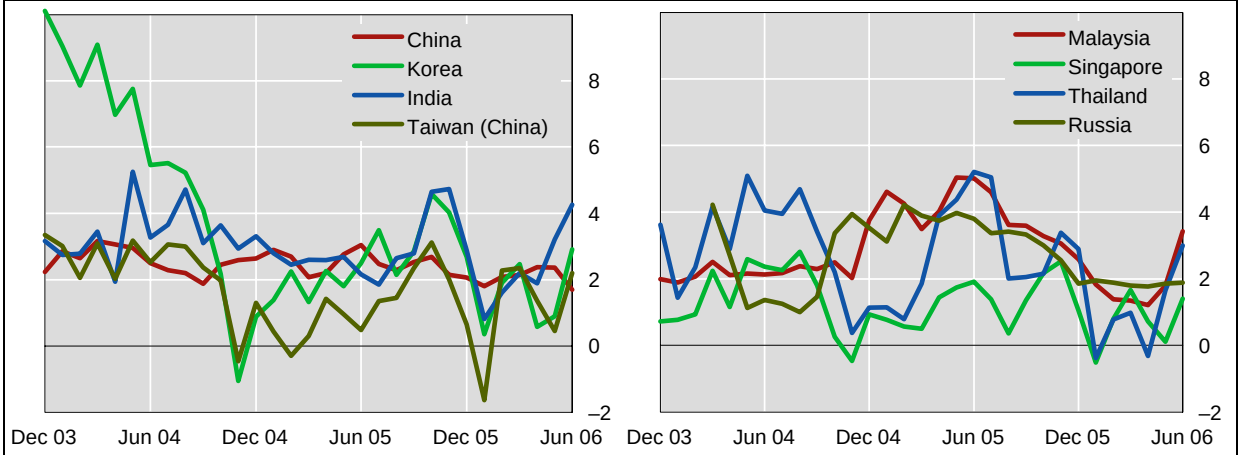
(iv) Implications for financial intermediation

Intervention could make financial intermediation less efficient ...

The difficulties experienced in sterilising large-scale intervention can lead to recourse to non-market instruments to drain excess liquidity, which may have adverse implications for the financial system. During the early 1990s, for example, in many East Asian economies large amounts of public financial institutions' deposits were transferred from the banking system to the central bank, often at below market interest rates. Malaysia sharply raised reserve requirements, while Indonesia imposed a 15% tax on interest payments by banks and introduced direct credit control measures. The drawbacks of such non-market instruments are well known. Reserve requirements effectively tax the banking system, and thus encourage financial disintermediation, while direct credit controls compromise the efficiency of resource allocation.

... through increased use of non-market instruments ...

Return on domestic currency holdings implied by consensus forecasts[1]



[1] Calculated as the difference, in per cent, between the one-year-ahead consensus exchange rate forecasts and the one-year forward exchange rate implied by the interest rate differentials between local currency and US interest rates.

Sources: IMF, International Financial Statistics; © Consensus Economics; national data. Graph 6

Use of non-market instruments has been limited so far in the current episode of reserve accumulation. China raised reserve requirements by 1.5 percentage points between September 2003 and April 2004, and another 1 percentage point in July 2006. These measures were supplemented by direct lending restrictions on banks in early 2004 and again in recent months to check rapid credit growth.[16] India has also used reserve requirements selectively (in September and October 2004) to control monetary growth. One reason for reduced reliance on non-market instruments in many countries has been the recent development of a domestic bond market, which has made sterilisation easier.

… and by altering banks' behaviour

There are several other channels through which reserve accumulation can affect the efficiency of financial intermediation, although it is difficult to be sure about their significance in the current episode. For instance, prolonged sterilised intervention could alter the behaviour of banks: easy profits from large holdings of treasury securities could weaken pressures on banks to become more efficient.[17] Moreover, large-scale issuance of sterilisation-related debts might also hamper the development of a private bond market, as a large supply of risk-free government and central bank paper crowds out private sector issuance. In contrast, in countries where the stock of initial public debt securities is relatively low, the issuance of sterilisation-related debt could actually help develop a domestic bond market.

[16] Goldstein and Lardy (2006) argue that an undervalued exchange rate in China leads to frequent reliance by the central bank on quantitative credit control measures. This not only slows down the development of a credit culture but also reduces the profitability of the banking system.

[17] In India, very large holding of government securities by banks presents a complicated challenge given that it exposes them to future interest rate risks; see Reddy (2005).

Conclusion

The scale and persistence of recent reserve accumulation are unprecedented. That such accumulation has continued for several years apparently without major adverse effects on inflation has come as a surprise. Should, however, inflation risks rise, the underlying policy dilemma posed by reserve accumulation might become more evident. Intervention over many years has had a major impact on balance sheets. Aggregate credit has already begun to expand rapidly in some countries, and financial sector imbalances are gradually building up. Continued intervention also creates risks for efficient financial intermediation.

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