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Reserve Accumulation: Implications for Global Capital Flows and Financial Markets

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Many central banks—particularly those in Japan and the emerging Asian nations—have been building up their holdings of foreign currency assets. These holdings, known as foreign exchange reserves, may help countries stabilize their currencies, but they can also lead to investment losses for the central banks. The large share of dollar assets among reserve holdings has made foreign central banks important players in U.S. financial markets.

Central bank holdings of foreign currency assets, particularly foreign government securities, have risen sharply in recent years. Known as *foreign exchange reserves*, these holdings reached \$3.0 trillion at the end of 2003, up roughly \$600 billion from 2002 and more than double their level in 1995.

With this buildup, foreign currency assets are assuming a much more important role in central bank balance sheets and, consequently, in monetary policy operations.¹ More broadly, the scale of central banks' recent reserve purchases has made these institutions key players in setting the pattern of capital flows across national borders. Indeed, for a number of countries, central bank reserve purchases have at times become the main vehicle for investment abroad.

In this edition of *Current Issues*, we examine the accumulation of foreign currency reserve assets and explore its implications for monetary policy, global financial markets, and the U.S. economy. We begin by documenting the geographical pattern of reserve purchases and show that most of the recent purchases have come from Japan and a

number of developing countries, most notably countries in Emerging Asia.²

We then consider the benefits and costs accruing to a country from reserve purchases. On the benefit side, reserve purchases allow a country to insure itself against a destabilizing run on its domestic currency and, more generally, can help stabilize the value of that currency over time. On the cost side, reserve purchases generally result in lost interest income for the central bank and expose it to potentially large capital losses should the domestic currency eventually strengthen against reserve currencies.

In the article's last section, we consider how the sharp increase in central bank purchases of U.S. assets has affected the U.S. economy and financial markets. We conclude that a decline in dollar reserve purchases from recent heavy levels would remove one source of support for U.S. asset prices, which might then have to fall to attract a compensating increase in purchases by foreign private investors. Adjustment could also come, of course, through higher U.S. saving (that is, lower consumption) or reduced

U.S. investment—developments that would lessen the U.S. economy's substantial need for foreign financing.

Reserve Assets and Central Bank Balance Sheets

A simplified central bank balance sheet provides a useful framework for understanding the role of foreign exchange reserves in monetary management. The asset side of the balance sheet includes domestic currency assets, generally domestic government securities, and foreign currency assets, generally foreign government securities. The liability side includes private bank and government deposits at the central bank and domestic currency in circulation. Taken together, these liabilities constitute a country's *monetary base*. The liability side can also include securities issued in the central bank's own name. Moving such securities to the asset side of the central bank's sheet by subtracting them from domestic asset holdings yields the following accounting identity:

$$\text{monetary base} = \text{net domestic assets} + \text{foreign exchange reserves}.$$

This accounting identity reveals that central banks can control the monetary base by managing holdings of domestic and foreign currency assets.³ For example, a purchase of reserve assets translates into an increase in the monetary base. The intuition behind this accounting identity is straightforward: when the central bank buys foreign currency securities from the private sector, it makes payment either by issuing domestic currency or, if the seller is a domestic private bank, by crediting its account at the central bank.

Properly managing the monetary base is important for controlling inflation. As we shall see, inflation concerns sometimes prompt central banks to neutralize the impact of reserve purchases on the monetary base through a matching reduction in net domestic assets—an operation known as *sterilization*.

Reserve Purchases across Currencies and Countries

Almost all foreign exchange reserves are held in five currencies: the U.S. dollar, the euro, the Japanese yen, the British pound, and the Swiss franc. Dollar reserve holdings are by far the largest, accounting for roughly 70 percent of the total at end-2003 (BIS 2004; IMF 2004). Euro reserve holdings are next in line, representing about 20 percent of the total. The dollar commands a high share in global reserves because the deep and highly liquid market for U.S. Treasury and agency securities is very attractive to reserve managers.

Significantly, the predominance of dollar reserve holdings has made foreign central banks important players in U.S. financial markets. Indeed, at end-2003, central bank holdings of dollar assets, at roughly \$2.1 trillion, were equivalent to more than half of marketable Treasury debt outstanding.

Central banks in Asia have accounted for the bulk of recent global reserve growth (Table 1). Of the roughly \$1.2 trillion increase in global reserves from the end of 1999 to the end of 2003, \$582 billion reflects purchases by developing countries in Asia and another \$375 billion reflects purchases by Japan. Together, Asian central banks account for almost 80 percent of the increase in global reserves over the period. The pace of Asian reserve purchases accelerated in 2003: in that year, central banks in Emerging Asia purchased \$274 billion in reserves, almost twice the 2002 figure, and the Japanese authorities purchased \$189 billion in reserves, roughly four times the 2002 figure. Non-Asian countries that have built up their reserve holdings markedly since 1999 include Brazil, Mexico, and Russia.

Reserves and the Allocation of Global Capital Flows

Central bank reserve purchases have been large enough in recent years to be a key factor in determining the allocation of global capital flows. As an accounting identity, the net flow of capital out of a country is equal to domestic saving minus domestic investment; it is also equal to a country's current account balance.⁴ A country that saves more than it needs for domestic investment sends its surplus saving abroad to purchase foreign assets. In contrast, a country with a saving shortfall, such as the United States, can maintain a higher level of investment spending by borrowing from abroad. For the world as a whole, global saving must equal global investment, with positive gaps between saving and investment in some countries matching negative gaps elsewhere.

The recent pattern of global capital flows is illustrated in the figure at the top of page 3. In 2003, Asia was the source

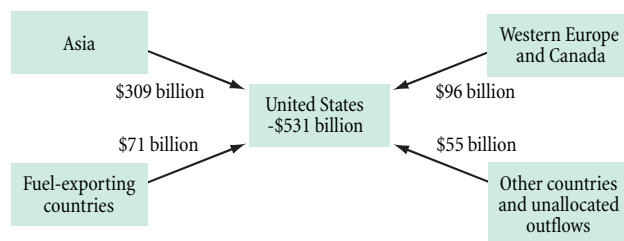
Table 1
Global Reserve Stocks
Billions of U.S. Dollars

	1999	2003	Change
Global	1,781	3,014	1,232
Developed countries	772	1,194	382
Japan	278	653	375
Euro area	228	188	-40
Developing countries	1,059	1,910	851
Africa	41	91	49
Asia	656	1,238	582
Europe	108	250	142
Middle East	103	140	37
Western Hemisphere	151	191	40

Source: International Monetary Fund.

Notes: The figures are year-end values. Because of rounding, the figures in column 3 may not equal the difference between the figures in columns 2 and 1.

Global Capital Flows, 2003



Source: International Monetary Fund.

of substantial net capital outflows, amounting to roughly \$309 billion. (We use current account balances to measure capital outflows.) Western Europe and Canada were also net suppliers of saving to the rest of the world in 2003, providing a total of \$96 billion. Other sizable outflows—on the order of \$71 billion—came from the oil-exporting countries.

The grouping “other countries and unallocated outflows” represents, for the most part, the failure of the sum of all individual countries’ current account balances to add up to zero. In theory, such an outcome should not be possible: the combined surpluses and deficits of the rest of the world should equal the U.S. deficit. Although the U.S. official data could slightly overstate the U.S. current account deficit, the bulk of the discrepancy likely reflects underreported current account surpluses in, and capital outflows from, other countries. Thus, the United States is now absorbing more than the recorded net saving of the rest of the world combined.

For a country with surplus saving, the corresponding net capital outflow can be channeled either through private investors or public sector investors, generally national central banks. Yet in Asia in 2003, private investors, on net, chose to direct funds *into* the region—despite its saving surplus (Chart 1, solid line). As a result, Asian central banks were not only channeling the region’s saving surplus abroad, but were also recycling substantial net inflows of private capital. These unusual investment patterns explain why reserve purchases in Emerging Asia—at \$274 billion—exceeded the region’s saving surplus of \$168 billion and, similarly, why reserve purchases of \$189 billion in Japan exceeded the country’s \$136 billion saving surplus. (Chart 1 combines the data for Emerging Asia and Japan.)

Outside Asia, saving surpluses were channeled mainly by private investors. Of the total capital outflow from non-Asian countries of \$222 billion, less than one-fourth took the form of central bank reserve purchases.

Motives for Reserve Purchases

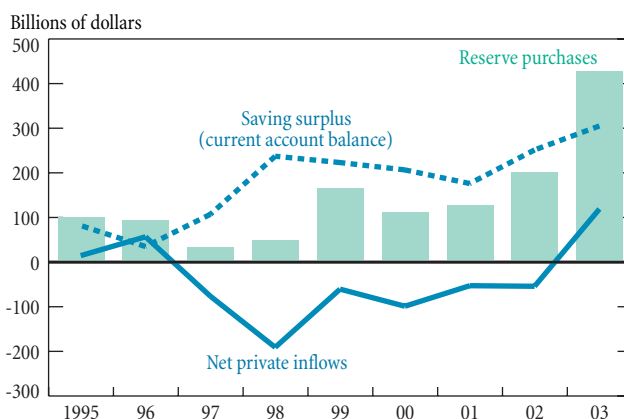
There are clear differences between the objectives of private and public sector investors. For private investors, the objective is straightforward: to maximize expected returns relative to perceived risk. For example, a Japanese investor will consider yield differentials, expected exchange rate changes, and potential exchange rate volatility in deciding whether to purchase foreign or domestic government securities.

In contrast, national central banks buy and sell foreign assets for policy reasons that go beyond trying to maximize risk-adjusted returns. The banks’ two main policy objectives are tied to coping with often volatile private capital flows.

Self-insurance. A central bank might acquire foreign currency assets to have resources to weather potential currency market turbulence. At such times, investors rush to convert domestic currency assets into dollars or other reserve currencies. The attempt to satisfy this demand by drawing down the central bank’s reserve holdings can sharply reduce these holdings, redoubling the incentive for investors to buy foreign assets before the domestic currency weakens. A large stockpile of reserve assets can serve as a public demonstration of a commitment to exchange rate stability, helping to forestall any sell-off of the domestic currency.⁵

For several countries, the self-insurance motive probably explains a good portion of the buildup in reserves since the late 1990s. Mexico, Korea, and Russia, for example, all suffered destabilizing runs on their currencies during financial crises in the middle or late years of the decade. For Asia, however, self-insurance has likely been a less important motive for reserve accumulation during the past two to three

Chart 1
Balance of Payments Flows in Asia



Sources: International Monetary Fund; CEIC Data Company; Japanese Ministry of Finance.

Notes: Net private inflows are measured as a residual and thus include omissions. The data are for Japan, China, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand.

years. A common measure of an economy's degree of protection against a currency crisis is the ratio of reserves to short-term foreign currency debt (debt maturing within a year). A ratio of 1.0 or above is often considered a high degree of protection. Yet all major Asian central banks now have reserve coverage that exceeds 1.5 and often goes far higher. Asian central banks also carry ample crisis protection under the more exacting standards for reserve adequacy favored by some authors.⁶

Countering private flows. Central banks also buy reserves to “lean against the wind” when private capital inflows or outflows threaten to bring unwelcome changes in the value of the domestic currency. In particular, when private investors are putting upward pressure on the currency by buying domestic currency assets, the central bank can attempt to contain that pressure by selling domestic assets and buying foreign currency reserves.⁷ Similarly, when private capital outflows threaten to weaken the currency, the central bank can sell reserves and buy domestic assets.

In 2003, most countries in Asia ran sizable current account surpluses, and many also received substantial net private capital inflows. If regional central banks had not offset these foreign exchange inflows with official outflows—that is, reserve purchases—Asian currencies would have strengthened, reducing the competitiveness of Asian firms in world markets. How much stronger the currencies in the region might have been absent recent large reserve purchases is unclear.

Central banks may also take traditional investment considerations into account when managing their reserve portfolios. As reserve holdings have grown in scale, reserve managers increasingly appear to be distinguishing between a liquidity portfolio, designed to offset exchange rate pressures, and an investment portfolio. A trend toward more active reserve management is also evident in the increased use of outside managers.⁸

Impact on Local Financial Markets

While the motives for central banks' purchases of foreign assets may vary, the effect on domestic financial markets is the same. As noted earlier, reserve purchases directly increase the monetary base, injecting liquidity into the economy. This liquidity injection in turn puts downward pressure on domestic interest rates.

In many cases, central banks may not want reserve purchases to feed through into the monetary base. For example, the authorities might believe that the domestic banking system is not stable enough to manage the extra liquidity. Moreover, increased liquidity could lead over time to economic overheating and a buildup of inflationary pressures.

When such considerations predominate, the central bank will opt to sterilize its reserve purchase through an offsetting drawdown in its net domestic assets. Generally, central banks conduct sterilization by selling domestic government securities out of their portfolio or by issuing domestic currency securities in their own name (for example, central bank bills). The result is to drain the cash injected into the economy by the reserve purchase, leaving the monetary base unchanged. Table 2 provides a simple example of how sterilized reserve purchases alter the balance sheets of the central bank and domestic private investors.

Sterilized reserve purchases will still have an effect on domestic financial markets because they alter the mix of financial instruments held by the private sector. In particular, they result in higher private holdings of domestic public sector securities (whether issued by a country's treasury or central bank) and reduced private holdings of reserve currency securities. To the extent that domestic and reserve currency securities are imperfect substitutes—that is, differ in their risk and liquidity characteristics, and hence in their expected returns—the effect will be to raise relative yields on domestic securities.⁹

Table 2

Hypothetical Sterilized Reserve Purchase

	Central Bank				Private Sector		
	Assets		Liabilities		Assets	Liabilities	
Stage 1:	U.S. Treasury bill	+\$1	Domestic currency	+DC100	U.S. Treasury bill	-\$1	—
Unsterilized					Domestic currency	+DC100	—
Stage 2:	Domestic treasury bill	-DC100	Domestic currency	-DC100	Domestic treasury bill	+DC100	—
Sterilized					Domestic currency	-DC100	—

Notes: In our example, we set the exchange rate at DC (domestic currency) 100/\$1. In stage 1, the central bank buys a U.S. Treasury bill for \$1 by issuing 100 units of domestic currency to the private sector. The purchase is unsterilized because currency in circulation (part of the monetary base) rises by an amount equivalent to the reserve purchase. In stage 2, the central bank sells a domestic government treasury bill out of its portfolio to the domestic private sector for DC100. The reserve purchase has now been sterilized because the currency issued has been retired from circulation. Alternatively, the central bank could have retired the currency by selling a security issued in its own name. In either case, at the end of stage 2, the domestic private sector holds \$1 less in U.S. Treasuries and DC100 more in domestic public sector debt.

In Asia, most central banks have sterilized the bulk of reserve purchases. Taiwan represents a particularly dramatic example. From end-1999 to end-2003, the net foreign assets of that country's monetary authorities rose 35 percentage points relative to GDP (Table 3). Yet the authorities' net domestic assets fell 35 percentage points relative to GDP. As a result, the monetary base-to-GDP ratio remained unchanged. A similar pattern holds for most other countries in the region.

Japan, and to a lesser extent China, are exceptions to this pattern. Reserve purchases in Japan have gone de facto unsterilized: from end-2000 to end-2003, net foreign assets rose 6.4 percentage points relative to GDP, while net domestic assets rose 0.7 percentage point.¹⁰ Over the same period, China has conducted limited sterilization: net foreign assets increased 9.2 percentage points relative to GDP, while net domestic assets have fallen 4.3 percentage points, roughly half that amount. The reason for this policy choice is that both countries have been struggling with deflation—Japan since the mid-1990s and China from 1998 until early 2003. For these countries, allowing reserve purchases to pass through to the monetary base—if only in part in China—has contributed to pursuing both currency and inflation objectives.

More recently, however, the authorities in China have become concerned about excessive credit growth and potential economic overheating (IMF 2004, chap. 1). As a result, the pace of sterilization has picked up, with the central bank issuing new liabilities in order to limit growth of the monetary base.

Table 3
Change in Asian Central Bank Balance Sheets, 2000 to 2003
Percentage Point Change Relative to GDP

Country or Region	Net Foreign Assets	Net Domestic Assets	Monetary Base
China	9.2	-4.3	4.9
Hong Kong	8.8	-1.5	7.3
India	8.9	-8.1	0.8
Japan	6.4	0.7	7.1
Korea	6.1	-5.3	0.8
Singapore	15.4	-14.0	1.4
Taiwan	34.8	-34.8	0.0
ASEAN 4	3.6	-4.0	-0.4

Sources: International Monetary Fund; Bank of Japan.

Notes: The figures in columns 1 and 2 may not sum to the figures in column 3 because of rounding. Each change is calculated by comparing the figure for the latest available month in 2003 with the figure for the same month in 2000. ASEAN 4 refers to four members of the Association of Southeast Asian Nations: Indonesia, Malaysia, the Philippines, and Thailand.

Costs and Risks of Accumulating Reserves

Sterilized reserve purchases face no clearly defined limit since the central bank can allow its net domestic assets to fall below zero by issuing new liabilities. However, sterilized reserve purchases generally come at a fiscal cost. In particular, they involve purchasing relatively low-yield foreign assets while issuing relatively high-yield domestic liabilities (or selling off relatively high-yield domestic assets). As sterilization continues, these fiscal costs rise. Moreover, the authorities may have to offer ever-higher interest rates in order to induce domestic investors to continue adding central bank securities to their portfolios.

The magnitude of the fiscal burden depends on the gap between domestic and reserve currency interest rates.¹¹ At present, this burden is manageable because the gap with dollar rates for government securities is relatively small in most Asian countries and negative in Japan.

Reserve purchases also expose a central bank to foreign exchange risk. If the domestic currency eventually appreciates against the dollar or other reserve currencies, the central bank's foreign assets lose value in domestic currency terms. The capital loss is then passed on to the national treasury in the form of reduced domestic currency receipts of both interest and principal on its foreign exchange holdings. In this situation, the government would face the choice of higher taxes or lower spending to make up for the capital loss. Alternatively, the authorities could print additional money to recoup the capital loss, at the cost of higher inflation.

The risk exposure for Asian central banks is already significant. Given reserve holdings at the end of 2003, a 10 percent appreciation of the Singapore dollar against the U.S. dollar and other reserve currencies would result in a domestic currency capital loss of more than 10 percent of GDP. Similarly, in Taiwan, a 10 percent domestic currency appreciation would produce a capital loss of roughly 8 percent of GDP. Although China and Korea would fare somewhat better in such circumstances, they could nevertheless experience a capital loss of almost 3 percent of GDP.

Effects on U.S. Financial Markets

The flow of private and public funds from the rest of the world into the United States helps determine the value of the dollar and asset prices in U.S. financial markets. Foreign private investors weigh expected returns and perceived risk in choosing how much to spend on U.S. assets; central banks, as we have seen, have additional policy motives for their spending decisions.

In recent years, foreign central banks' dollar reserve purchases have accounted for a large share of the capital flowing

in for the acquisition of U.S. assets. According to estimates by the Bank for International Settlements (BIS), dollar reserve purchases in 2003 came to \$441 billion. These purchases financed 83 percent of the U.S. current account deficit, with private investors financing the remainder. (For a discussion of the differences in the dollar reserve data compiled by the BIS and the U.S. statistical authorities, see the appendix to this article.¹²) Over a longer period—from 1995 through 2003—dollar reserve purchases financed almost half of the cumulative U.S. current account deficit (Chart 2).

The geographic sources of the dollar reserve purchases cannot be known with certainty, since comprehensive data are not available by region.¹³ Nevertheless, a rough estimate can be made by assuming that the share of global reserve purchases going to dollar assets—88 percent in 2003—applies to all regions. Under this assumption, central banks in Asia were by far the biggest buyers of U.S. assets, financing some 71 percent of the 2003 U.S. current account deficit. Central banks elsewhere would have financed another 12 percent of the deficit. Within Asia, the largest dollar reserve purchases likely came from Japan, China, and Taiwan, with India and Korea also making sizable purchases.

The impact of these purchases on the U.S. economy is difficult to quantify. Absent this inflow of official capital, U.S. asset prices would have to fall in order to attract additional private inflows.¹⁴ Lower U.S. asset prices would attract additional private inflows by raising the rate of return associated with any given income stream. (For fixed-income assets, lower asset prices mean higher interest rates.) A weaker dollar would also be a likely part of the adjustment process, attracting additional private inflows by making U.S. assets

cheaper in foreign currency terms.¹⁵ Finally, higher U.S. interest rates would help reduce the U.S. economy's need for foreign capital by encouraging saving (equivalently, discouraging consumption) and reducing investment spending.

Unfortunately, we have no clear basis for knowing what the mix might be between lower U.S. asset prices, a weaker dollar, higher U.S. saving, and lower U.S. investment if dollar reserve purchases were to decline. At unchanged U.S. saving and investment rates, however, the drop in U.S. asset prices and the dollar would have to be sufficient to induce foreign private investors to almost double their net accumulation of U.S. assets in 2002, and to increase it by a factor of almost six in 2003. In general, the greater the degree to which investors regard U.S. and foreign assets as good substitutes, the smaller the drop in U.S. asset prices and the dollar would need to be.¹⁶

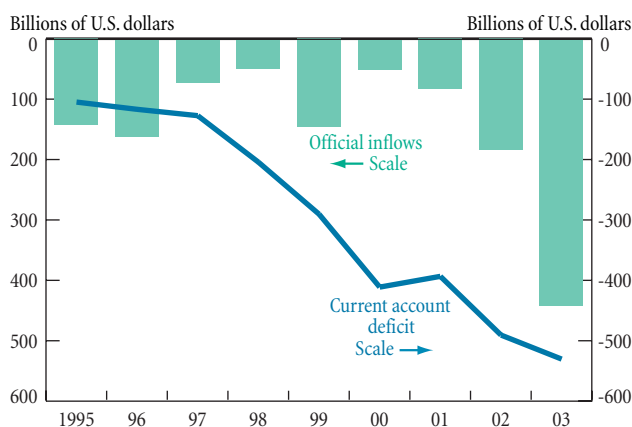
Conclusion

This article has considered the impact of central bank reserve purchases on local and global financial markets. The issue has attracted considerable attention recently since much of the foreign capital flowing into the United States has come from foreign central banks. The flows from these institutions have compensated for a decline in foreign private purchases of U.S. assets, allowing the U.S. current account deficit to be financed at prevailing asset prices and exchange rates. Continued large U.S. current account deficits raise the risk that foreign investors could eventually require some combination of lower U.S. asset prices, higher U.S. interest rates, and a weaker dollar as compensation for adding to their stock of claims on the United States.

Notes

1. For simplicity, we use the term “central bank” in place of the more comprehensive term, “monetary authorities.” Some actions taken by national treasuries can also affect monetary aggregates.
2. Emerging Asia is here defined as China, Hong Kong, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand.
3. Our simplified central bank balance sheet assumes that the central bank has no foreign currency liabilities, and that it has zero net worth. Technically, our equation should read: *monetary base* = *net domestic assets* + *net foreign assets* – *net worth*.
4. For a more detailed discussion, see Higgins and Klitgaard (1998).
5. See Bussiere and Mulder (1999).
6. See, for example, de Beaufort Wijnholds and Kapteyn (2001). By their measure, all major Asian central banks carry adequate crisis protection.
7. Most economists believe that reserve purchases or sales affect exchange rates mainly through their impact on the domestic money supply. The reason that the money supply affects the exchange rate is straightforward: if the local money is more abundant, it will be cheaper in terms of other currencies. There is a large and inconclusive literature on whether *sterilized* reserve

Chart 2
U.S. Current Account Deficit and Official Inflows



Sources: Bank for International Settlements, for official inflows; U.S. Department of Commerce, Bureau of Economic Analysis, for current account deficit.

transactions—where the impact on the money supply is neutralized by an offsetting change in the central bank's net domestic assets—have any material impact on exchange rates. It is generally agreed, however, that sterilized reserve transactions will have a larger impact on the exchange rate when local and foreign assets are not close substitutes, and when legal restrictions prevent investors from moving easily between local and foreign assets.

8. According to a recent study by the International Monetary Fund (2003), fourteen of twenty central banks surveyed now rely on private fund managers to allocate at least some of their reserve holdings.

9. If reserve and domestic currency securities were perfect substitutes, local investors would not require higher yields on domestic securities to shift their portfolios toward domestic securities.

10. Reserve purchases in Japan are made by the country's Ministry of Finance, which funds them by issuing short-term securities. In this way, *individual* reserve purchases are automatically sterilized. However, the Bank of Japan, under its policy of quantitative easing, has been aggressively increasing the country's monetary base by purchasing domestic government securities. While reserve purchases have roughly matched the increase in the monetary base, at least through early 2004, there has been no explicit, coordinated policy of leaving reserve purchases unsterilized.

11. For simplicity, we draw a perhaps overly sharp distinction between the costs and risks of reserve accumulation. Ex ante, sterilization costs are given by the interest rate cost of carry, adjusted for risk and *expected* exchange rate changes. Ex post, sterilization costs are given by the cost of carry, adjusted for realized defaults and *actual* exchange rate changes. See Kletzer and Spiegel (1998).

12. The appendix is included in the online version of this article, available at <http://www.newyorkfed.org/research/current_issues/ci10-10.html>. From the mid-1990s on, the BIS data show substantially larger dollar reserve holdings and reserve purchases than do the U.S. data. The discrepancy reflects the fact that the U.S. data are based on surveys of, and transactions reported by, financial institutions residing in the United States. As a result, they miss custodial holdings of dollar securities for foreign central banks by foreign private financial institutions, and sales of dollar securities to foreign central banks involving foreign brokers. The data maintained by the BIS are more comprehensive, incorporating information on offshore dollar reserve purchases and holdings reported to it by central banks worldwide.

13. See Sobol (1998) and the online appendix to our article.

14. Reserve purchases by Asian nations—most notably Japan—accelerated in the first quarter of 2004. (We do not have a dollar/non-dollar breakdown.) However, during the next several months, reserve purchases by Japan dropped nearly to zero, and reserve purchases by central banks in Emerging Asia outside China slowed substantially. This development may reflect an easing of market pressures on Asian currencies to appreciate: Japan and much of Emerging Asia

recorded substantial net private capital inflows in the first quarter, but (with the notable exception of China) net private outflows in the second quarter.

15. A decline in the dollar reduces both the foreign currency price of U.S. assets and the foreign currency value of the associated income stream. Thus, a decline in the dollar, considered by itself, raises expected returns on U.S. assets only if foreign investors believe that it will be at least partly reversed.

16. Most economists believe that the required adjustment in the dollar and in U.S. asset prices would be relatively small (see, for example, Greenspan [2004]). However, a minority argues that the required adjustment would be sizable (see, for example, Dooley, Folkerts-Landau, and Garber [2004]).

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Appendix: Measuring Foreign Central Bank Holdings of U.S. Dollar Assets

The reported magnitude of dollar reserve holdings varies with the data source. The U.S. statistical authorities report \$1,341 billion in holdings of dollar assets by foreign official institutions at the end of 2003 and purchases of \$249 billion during the year (see chart).^a But data provided to the Bank for International Settlements (BIS) by foreign authorities point to official holdings of U.S. dollar assets of \$2,093 billion at end-2003, with purchases totaling \$441 billion during the year.^b

What accounts for the wide gap between the reserve figures offered by the U.S. authorities and the BIS? A key part of the explanation is that the U.S. authorities cannot easily track transactions in dollar assets conducted offshore. The BIS dollar reserve data, by contrast, are based on balance sheet information provided by central banks worldwide and thus provide a more comprehensive account of global dollar reserve holdings.^c

The U.S. data on U.S. liabilities to foreign official institutions are based on surveys of foreign holdings of U.S. securities, which are updated by adding newly reported transactions to the survey figures.^d Benchmark surveys conducted every five years are collected from U.S. custodians (including brokers and dealers) that hold \$100 million or more of U.S. securities on behalf of foreign residents and U.S. security issuers that issued \$100 million or more of securities directly to foreign residents. Annual surveys of the largest institutions—accounting for about 90 percent of the market value of foreign holdings—are used to update the benchmark figures. (Annual figures for smaller institutions are estimated.) The transactions data feature a monthly reporting panel composed of some 250 banks, security dealers, and other institutions that execute trades directly with foreign residents. Reporting is mandatory if monthly transactions exceed \$50 million.

Custodial relationships are an important source of the mismatch between the U.S. and BIS reserve data. In particular, the benchmark surveys capture only the *first foreign holder* of a U.S. security. If the first foreign holder is a foreign monetary authority, the security will be counted as a U.S. reserve liability. However, the first foreign holder could be a private financial institution holding the security as a custodian for a foreign central bank. The U.S. statistical authorities have no way of knowing that a foreign central bank is the ultimate beneficial owner of the security.

A similar uncertainty arises with the monthly transactions data. In particular, the U.S. data capture only the first link in what may be a chain of transactions. For example, a foreign broker might purchase a U.S. security, only to resell it to a

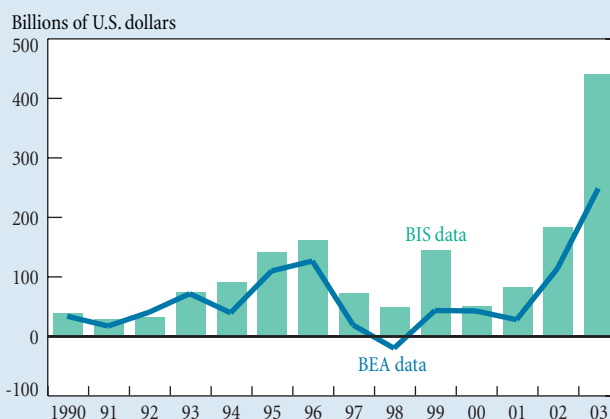
foreign central bank. The U.S. statistical authorities cannot track the latter transaction. To make the problem worse, a growing volume of transactions in U.S. securities now occurs through non-U.S. clearinghouses.

In this connection, it is interesting to note that the gap between the U.S. and BIS data on the pace of dollar reserve accumulation began to widen after the early 1990s. This trend likely reflects a shift toward more active reserve management, involving increased reliance on private fund managers—including non-U.S. fund managers—as custodians. That would of course channel an increased share of reserve-related transactions through private brokers (including non-U.S. brokers).

Another source of the discrepancy between the U.S. and BIS data is that the U.S. data do not cover foreign monetary authorities' holdings of offshore dollar bank deposits. According to the BIS, foreign monetary authorities at end-2003 held \$244 billion in dollar deposits at financial institutions residing outside the United States. Finally, foreign monetary authorities likely have some holdings of dollar securities issued by non-U.S. entities, including international organizations. There are no data on such holdings.

Unfortunately, there may be little that the U.S. authorities can do to address the limitations of the data, given their lack of regulatory sway over foreign financial institutions. A key drawback of the BIS data is that they are released only annually, and with a six-month lag.

Foreign Purchases of Dollar Reserve Assets



Sources: Bank for International Settlements (BIS); U.S. Department of Commerce, Bureau of Economic Analysis (BEA).

^aData on U.S. liabilities to foreign official institutions are drawn from U.S. Department of the Treasury, *U.S. Treasury Bulletin*, September 2004, Table IFS-2. Data on official purchases of dollar assets are drawn from U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, September 2004, Table F. The U.S. data on “foreign official institutions” include a small fraction of assets held by institutions other than central banks.

^bThe BIS data are reported in Bank for International Settlements, *Annual Report*, various years.

^cOne limitation of the BIS data, however, is that the currency composition of a small portion of reserve assets is not specified by reporting central banks. The BIS estimates the dollar share of these unspecified holdings.

^dDetails are provided in U.S. Department of the Treasury, *Report on Foreign Portfolio Holdings of U.S. Securities as of June 30, 2003*, available at <<http://www.ustreas.gov/tic/shl2003r.pdf>>.