FRBSF Weekly Letter

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Raising Reserve Requirements in Response to Asian Capital Inflow Surges

The magnitude of recent capital inflows into developing countries in the Pacific Basin has been staggering—$151 billion (net) from 1990 to 1993. In relative terms, the magnitudes are impressive as well—for example, in Thailand and Malaysia, capital inflows from 1990–1993 amounted to over 13 percent of each country's GDP.

But such huge inflows can be disruptive to a nation's economy for a variety of reasons. First, if the inflows suddenly shift to outflows, the country can face domestic liquidity problems. Second, the financial systems of developing nations may not be capable of efficiently managing these large inflows, leading to instability in the domestic banking system. Finally, the real domestic currency appreciation that often accompanies these capital inflows can lead to undesirable resource reallocation by harming the competitiveness of a nation's exports.

This *Weekly* examines the response of several Asian countries to recent capital inflow surges. In particular, we analyze a nonstandard tool used for dealing with these capital inflows, government intervention through increases in commercial bank reserve requirements.

Sterilizing through open market operations

Governments in Asia's developing countries have responded to capital inflows with aggressive attempts at sterilization. In a broad sense, sterilization can be interpreted as any policy whose goal is to reduce the real effects of the capital inflow surge, particularly the associated pressures for real exchange rate appreciation and inflation. Achieving this goal requires reducing the relative demand for domestic currency.

In the most common method of sterilization, the central bank reduces the demand for domestic money by using open market operations to sell its reserves of domestic assets, such as domestic government bonds, for the incoming foreign assets. This intervention "sterilizes" the capital inflow surge, in the sense that the nominal exchange rate level is maintained without a change in the domestic money supply. In 1993, one-third of the $100 billion in net capital inflows into member nations of the APEC (Asia Pacific Economic Cooperation) forum was absorbed by central banks as foreign currency reserves. By the end of 1993, the stock of foreign reserves of the Asian region equaled $261 billion, far exceeding the combined total of all the developing nations and nations in transition in the rest of the world.

If a capital inflow episode lasts some time, however, governments can run into problems with prolonged sterilized intervention via the open market. First, this means of sterilization requires governments to purchase low-yielding foreign securities despite the fact that they often are paying high interest rates on external debt. These "quasi-fiscal costs" can be substantial—in some Latin American countries, for example, they have been estimated to amount to up to one-half percent of GDP. Second, by preventing a decrease in the interest rate differential between domestic and foreign assets, sterilized intervention fails to eradicate the conditions that led to the capital inflow (see Calvo, et al., 1993 or Glick and Moreno,

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1995). This may explain why the share of capital inflows sterilized through open market sales of reserves in Asia has declined over time (Khan and Reinhart 1994).

Using the banking sector to sterilize

As nations become dissatisfied with either the costs or the effectiveness of sterilized intervention through open market operations, they turn towards other, less standard sterilization instruments. In Southeast Asia, one popular alternative to open market sterilization has been increasing commercial bank reserve requirements. This policy attempts to limit the impact of foreign capital inflows by reducing the magnitude of capital that flows into the banking sector. The reasoning behind this policy is that since banking institutions play a critical role as financial intermediaries in developing countries in Asia, a significant portion of the capital that flows into these countries either enters directly into, or finds its way into, the developing country's banking system.

Policymakers also may have particular interest in limiting the activities of the banking sector during capital inflow surges. Large and volatile capital flows can contribute to bank problems by causing large swings in bank liquidity. Calvo, et al., (1993) discuss the possibility of capital inflows leading to "improper intermediation," resulting from improperly priced government deposit insurance, among other things. The authors argue that "...in the short run, it may be more practical simply to preclude banks from intermediating much of the new capital inflow by increasing required reserve ratios." They argue that by limiting the investments of banks in markets prone to speculative bubbles, such as real estate and equity markets, the country's banking system will be less exposed when the bubble bursts.

However, placing the burden of sterilizing the capital inflow surge on the commercial banking sector is not a costless policy. Since reserves do not earn market rates of return, an increase in reserve requirements distorts the share of intermediation handled by the banking sector. Moreover, raising reserve requirements may not effectively address capital inflows that are intermediated outside the banking system—that is, in the bond and equity markets, both of which have been growing rapidly in these countries over the previous decade, or the informal lending or "curb markets" prevalent in many Asian developing countries. Raising reserve requirements puts banks at a competitive disadvantage relative to these nonbank institutions and leads to disintermediation.

The Asian experience

Spiegel (1995) develops a simple model to analyze the implications of enhanced capital inflows on the domestic credit markets of the recipient countries by introducing an explicit banking sector into a standard open-economy macro model. The model demonstrates that the effectiveness of sterilization policies specifically targeted at the banking sector depends on the ability of the nonbank sector to play a substitute role for intermediation. The greater is the degree to which foreign investors can substitute nonbank for banking sector investments, the lesser is the ability of the recipient country's government to mitigate the impact of capital inflows through the use of reserve requirements.

During the inflow period 1986–1993, Spiegel identifies three countries that increased reserve requirements in an effort to mitigate the impact of these capital inflows: Korea, Malaysia, and the Philippines. As a cursory measure of the effectiveness of its reserve requirement sterilization policy, it is useful to examine the capital inflow surge and the real exchange rate experience of each of these nations.

Korea responded to its capital inflows through a number of policies. Korea used "money stabilization bonds" to sterilize foreign capital inflows through open market operations. The quantity of these bonds outstanding increased from 9.6 percent of M2 in 1986 to 21 percent of M2 in 1992. In addition, Korea raised reserve requirements on demand and time deposits to 11.5 percent and increased the degree of regulation on the banking sector. Because of Korea's extensive nonbank financial sector, this policy shifted assets out of commercial banks: The share of deposits held by banks, which had been 70 percent in the 1970s, fell to 36 percent in 1992. Korea also experienced a large real exchange rate appreciation —over 18 percent—in 1988 and 1989.

Malaysia also pursued an aggressive policy of sterilization, both through increased reserve requirements as well as through other means. Malaysia sold central bank securities, increasing the value of government deposits by 72 percent from 1989 to 1993. In addition, Malaysia transferred the assets of its pension fund, the Employee Provident Fund, to the central bank,

which raised the value of federal and local deposits at the central bank from 3 to 19 percent of total deposits from 1989 to 1992.

Reserve requirements were raised three times, from 6.5 percent to 7.5 percent in 1991, to 8.5 percent in 1993, and to 11.5 percent in 1994. Much of the impact of reserve requirement increases was passed on to depositors, as the margin between borrowing and lending rates increased from 3.8 percent to 4.7 percent. The financial industry also became subject to more extensive regulation. In 1993, Bank Negara Malaysia placed limits on banks' foreign liabilities. Foreign financial accounts in Malaysia had to be deposited in special central bank accounts which did not pay interest and were subject to reserve requirements, effectively placing a tax on nonresident deposits. Despite Malaysia's aggressive response to capital inflows, the share of assets in the commercial banking sector showed a net increase over the period. As opposed to Korea, Malaysia's real exchange rate appreciation was relatively moderate.

The Philippines responded to its capital inflow surge with a myriad of instruments, including high reserve requirements. Reserve requirements have been very high, averaging 22 percent between 1987 and 1992. In addition, the Philippines responded by reducing requests for loan rescheduling, lifting restrictions on repatriation of foreign investments, and allowing outward investment to increase. Finally, the Philippines also used sterilized intervention to increase the demand for foreign exchange. From 1991 to 1994, the Central Bank purchased US$6.6 billion. Despite its increases in reserve requirements, the share of assets controlled by the commercial banking sector in the Philippines also grew dramatically over the period. Moreover, the Philippines actually showed a net real exchange rate depreciation over the period.

Of the three countries, Korea stands out as the one with the most developed nonbank financial market. Consequently, we would expect that increases in reserve requirements would result in more disintermediation in Korea, as investors shifted their assets to other forms of investments, with relatively little impact in terms of stemming the real exchange rate appreciation that typically comes with a surge in capital inflows. Holding all else equal, our model predicts that reserve requirements should be less effective as an instrument for lessening the impact of capital inflow surges on the real side of the economy in Korea because of substitute avenues of intermediation.

The evidence appears to bear this prediction out. Of the three countries, Korea was the only one that experienced a decline in the share of assets controlled by the banking sector over the period. Moreover, while Korea experienced a large real exchange rate appreciation during its capital inflow period, the real exchange rate appreciation experienced by Malaysia was moderate, while the Philippines showed a real exchange rate depreciation. Consequently, the evidence suggests that reserve requirement increases are more effective at sterilization the more limited are a country's financial alternatives.

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References

Calvo, Guillermo A., Leonardo Leiderman, and Carmen Reinhart. 1993. "Capital Inflows and Real Exchange Rate Appreciation in Latin America." *IMF Staff Papers* (March) pp. 108–151.

Glick, Reuven, and Ramon Moreno. 1995. "Responses to Capital Inflows in Malaysia and Thailand." *FRBSF Weekly Letter* 95-14 (April).

Khan, Mohsin S., and Carmen M. Reinhart. 1994. "Macroeconomic Management in Maturing Economies: The Response to Capital Inflows." Mimeo. International Monetary Fund (March).

Spiegel, Mark M. 1995. "Sterilization of Capital Inflows through the Banking Sector: Evidence from Asia." Federal Reserve Bank of San Francisco *Economic Review* 3 (forthcoming).

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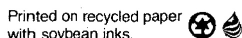

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