

An assessment of Chile's foreign reserve holdings

Several emerging market economies hold a strikingly high level of foreign reserves. Among them is Chile, whose reserves equaled about 22 percent of GDP at the end of 2003—about the same ratio as those of Asian emerging market economies and significantly higher than the Latin American average of 15 percent of GDP. Economists still have not developed a formula to determine a country's optimal level of reserves, but in a recent study, Marco Espinosa-Vega (Senior Economist, IMF Monetary and Financial Systems Department) and Mercedes Vera-Martin (Economist, IMF International Capital Markets Department) assess the appropriateness of Chile's reserves and find that they are above the levels that common benchmarks suggest would be adequate, and the optimal levels implied by an econometric model.

One reason a country accumulates foreign reserves is to help smooth out the impact on the economy of temporary shocks to its balance of payments. While such shocks could also be managed through domestic adjustment, this could induce large, undesirable output swings. Countries also hold foreign reserves to help avoid destabilizing exchange rate movements. Even countries with freely floating exchange rate regimes, such as Chile, at times intervene in the foreign exchange market to correct perceived excessive exchange rate volatility.

Measures of adequacy

How much is enough? It's an important question because there are opportunity costs of holding reserves. Espinosa-Vega and Vera-Martin estimate Chile's annual average cost of holding reserves at 0.3 to 0.5 percent of GDP for 2002–04. To determine a country's reserve adequacy, economists look at various measures related to its various likely foreign payments obligations—imports, short-term debt, and potential capital outflows. Espinosa-Vega and Vera-Martin compare Chile's outcome on these measures to commonly used benchmarks.

Reserves-to-imports. Traditionally, economists have tended to track the reserves-to-imports ratio as an indicator of reserve adequacy on the grounds that foreign exchange payments usually arise mainly from the import bill. A frequently used guideline is that reserves should be equivalent to at least three to four months of imports. Chile, with the equivalent of about nine months of imports, is well above that ratio. Its ratio is about the same as in Asian emerging market countries and more than twice as

high as in Australia and New Zealand—countries that, like Chile, have flexible exchange rates and where commodities play an important role.

Reserves-to-short-term external debt. The 1994 Mexican crisis and the 1997–98 Asian crises highlighted the problems associated with sudden stops in capital financing. Unable to continue to tap capital markets to finance their current account deficits, countries were faced with sharp current account adjustments and costly output contractions. By some accounts, Espinosa-Vega and Vera-Martin point out, these crises originated partly in excessive reliance on external short-term debt, and more emphasis has since been placed on measuring reserves as a ratio to a country's short-term external debt. Some suggest that the ratio of reserves to short-term debt (debt with maturities shorter than or equal to one year) should equal at least 1:1 so that the country's reserves are sufficient to pay off its debts falling due in the year ahead. Chile's ratio of reserves to short-term debt has consistently exceeded this benchmark (see chart, page 355).

Reserves-to-broad money. Espinosa-Vega and Vera-Martin point out that the possibility of a bank-run-induced crisis calls for a complementary indicator of the appropriate reserve level. A confidence crisis can translate into runs on bank deposits with a corresponding drop in the level of reserves and sharp exchange rate depreciation. To capture the vulnerability associated with a sudden reversal of confidence and capital flight, the ratio of reserves to broad money has been commonly used. Chile's gross reserves cover about 57 percent of broad money, a ratio higher than in Asian emerging market economies and close to the Latin American average.

Composite benchmark. Finally, compared with an adequacy benchmark range that takes into account short-term debt and risks of capital flight, Chile's reserves have been well above the estimated mid-point of the adequacy range since 1999 and a higher than the mid-point since 2002.

Toward a definition of optimum reserves

While the above-mentioned rules of thumb provide useful guidelines, they lack theoretical underpinning and contain several shortcomings, say Espinosa-Vega and Vera-Martin. The rules indicate an adequate level of reserves but do not provide any guidance on the optimal level of reserves. They usually consider only one source of vulnerability and ignore countries' idiosyncratic features that

could serve to dampen or exacerbate the need for adjustment in the event of a shock. And they fail to distinguish among policies or institutions across countries, or consider the cost of holding reserves explicitly.

Recent empirical literature based on the buffer stock model—which says that central banks should choose a level of reserves to balance the macroeconomic adjustment costs incurred in the absence of reserves with the opportunity cost of holding reserves—has tried to compensate for some of the shortcomings of the rules of thumb reviewed above, by considering simultaneously some potentially key explanatory variables. These include economic size, current and capital account vulnerabilities, exchange rate flexibility, and the carrying cost of reserves. (For a similar analysis applied to reserves in Asia, see *World Economic Outlook*, September 2003, pp. 78–92.)

The relationship between these variables and reserves is postulated as follows:

- **Economic size.** International transactions increase with the size of an economy, and reserves are thus expected to increase with real GDP per capita and population.

- **Balance of payments vulnerability.** The more open an economy's capital account, the more vulnerable it tends to be to sudden stops of capital flows and, therefore, the higher the desired level of reserves. Similarly, the higher the ratio of imports to GDP, the more vulnerable the current account.

- **Exchange rate flexibility.** The greater the flexibility in the exchange rate regime, the lower the need to support the currency and the more likely the exchange rate will serve as a shock absorber, thus reducing the need to accumulate reserves.

- **Carrying cost of reserves.** Higher costs of holding reserves should induce lower holdings of reserves.

Espinosa-Vega and Vera-Martin estimated what this empirical model would suggest the optimal reserve holdings for Chile should be. Their results—which they say should be interpreted with caution—suggest that the optimal reserve level for Chile is below actual reserve holdings. A possible explanation for this finding, Espinosa-Vega and Vera-Martin conjecture, may be that the model fails to include other equally important considerations in the estimation, such as precautionary motives for reserve holdings. In this regard, Chile belongs to a region that has repeatedly experienced financial and economic crises, and although Chile has not recently been prone to contagion, its geographical location may be viewed as justifying higher reserve holdings.

Alternative mechanisms

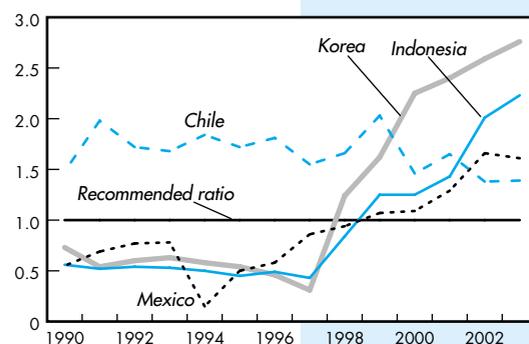
Espinosa-Vega and Vera-Martin note that while reserve accumulation remains a country's main buffer against external shocks, other mechanisms—such as contingent credit lines and bilateral swap arrangements—could also provide additional liquidity at time of stress. Among the alternative financial instruments available to Chile—and other countries, of course—are private contingent credit lines (PCCLs). PCCLs, voluntary market mechanisms supplied by a pool of private banks, provide access to liquidity in times of stress. Such facilities are complementary to a country's official reserves and may reduce the overall carrying costs due to lower financial costs. The limited ability of banks to

hedge their country exposures may, however, be an important obstacle to a broader use of PCCLs. Banks may be reluctant to provide contingent financing because it would increase their exposure to a country after economic conditions have deteriorated and access to new financing has been lost.

Countries can also arrange bilateral swap arrangements to provide liquidity in times of need, but the effectiveness of these mechanisms has not yet been tested. Under swap arrangements, member central banks are allowed to swap their currencies for major currencies for short periods and for amounts predefined at the time of the contract. A country with liquidity needs can borrow foreign currency from another country and use the funds to buy its own currency. The swift availability of liquidity is designed to help limit currency speculation and counter investors' herding behavior. However, it is too soon to draw conclusions about the effectiveness of swap arrangements, as they are relatively new to emerging market economies and it is unclear how they would operate in the presence of common regional external shocks. In the meantime, the IMF is studying a number of complementary and alternative mechanisms to PCCLs and swap arrangements that could better help countries fend off external shocks. ■

Chile's reserves: a comparison with other countries

(share of reserves to short-term debt)



Data: Bank for International Settlements

Copies of IMF Country Report No. 04/292 and "Chile: Selected Issues" are available for \$15.00 each from IMF Publications Services. See page 350 for ordering information. The full text of the report is also available on the IMF's website (www.imf.org).