The Cost-Benefit Approach to Reserve Adequacy: the Case of Chile

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BANCO CENTRAL DE CHILE

Introduction

Practical assessments of the level of reserves have been based on the examination of reserve adequacy indicators.

To minds trained in economics, it is natural to think of the adequate level of reserves as the one that makes the marginal benefits of holding reserves equal to its marginal costs.

This presentation describes part of the analysis on the appropriate level of reserves carried out at the Central Bank of Chile (CBCh) between 2001 and 2003.

Introduction

It shows that a Cost-Benefit analysis can be very useful to help organize thoughts and discussions, and even to explore quantitatively the effects of changing the level of reserves.

It also helps understand the CBCh´s decision to start in late 2003 a program which, as expected at the time, would reduce significantly its level of reserves.

It reflects my own views, not necessarily those of the Central Bank's Board.

Outline of remainder of the presentation

The Macroeconomic Context

Indicators of Reserve Adequacy

A Cost-Benefit Approach

The Reserves-Reduction Program

Concluding Remarks

The Macroeconomic Context

Since late 1980s, Chile developed significantly stronger fundamentals (Monetary, fiscal, trade agreements, political)

In the nineties, during the transition to low inflation, international reserves built up substantially.

After the flotation of the exchange rate in 1999, the question whether we had built up excess reserves intensified

Indicators of Reserve Adequacy

We first examined adequacy indicators across countries, finding that:

- Chile's reserve level appeared to be high when considering R/Imports, R/M2, and R/GDP.
- But relative to short term debt, the more relevant indicator for floaters with open capital accounts, seems consistent with average practice.

•However, the above analysis wasn't of much help, because of a huge disparities across countries.

Dispersion in reserve adequacy indicators

	R/GDP	R/M2	R/STD
All countries			
Median (1990-2002)	0.10	0.27	1.87
Standard dev.	1.47	0.47	94.80
Emerging Economies			
Median (1990-2002)	0.12	0.28	1.30
Standard dev.	0.08	0.19	1.41
Industrialized countries			
Median (1990-2002)	0.06	0.10	na
Standard dev.	0.05	0.08	na

Reserve Adequacy Indicators

With no international benchmark, the Guidotti rule (R/STD=1) would be an alternative.

However, there is no solid theoretical or empirical basis for such benchmark.

More generally, it is unlikely that R/STD is the only relevant parameter.

Need to understand differences across countries, including advanced economies.

Cost-Benefit Analysis

As an alternative approach, we explored the use of a marginal cost- benefit approach.

Consistent with an optimizing criterion and idiosyncratic characteristics.

We focused on assessing the effects of "marginal" decisions regarding the level of reserves

Cost-benefit analysis

Identifying and measuring the marginal cost of reserves was the simplest part.

We estimated as the difference between the expected return on reserves and the cost of financing them, from the perspective of the Central Bank.

With some caveats, the sovereign spread provided a reasonable order of magnitude.

Cost-Benefit Approach

Assessing the marginal benefit of reserves was harder.

Given our floating exchange rate regime, we focused on the precautionary argument for holding reserves.

Accordingly, we attempted to estimate the effect of a change on the level of reserves on the probability and cost of a crisis.

Also, we examined the extent to which a change in the level of reserves could affect financing costs.

Cost-Benefit Approach

Empirical studies show that the level of reserves (relative to STD or some other indicator) is significant in explain crisis probability, and sovereign spreads.

Can use those studies (typically nonlinear) and/or your own models, to obtain estimates for specific country conditions.

Although the estimates are too imprecise to sustain definite assessments, they allow to exploring the consequences of a reduction in reserves under alternative assumptions.

Reserves and crisis probability in Chile

Paper	US$1,000 mill. drop in reserves
Bussiere and Fratzcher (2002)	10 bp. (from 6.5% to 6.6%)
Kamin and Babson (1999)	9 bp.
Krueger et. al. (1998)	4 bp.
Radelet and Sachs (1998)	40 bp. (from 7% to 7.4%)
Berg and Patillo (1999)	6 bp. – 69 bp.
Milesi-Ferreti and Razin (1998)	24 bp. – 101 bp.
García and Soto (2004)	20 bp. (from 3.3% to 3.5%)

Reserves and sovereign spread

Paper	US$1.000 mill. drop in reserves
Arora y Cerisola (2001)	2 bp.
Cline y Barnes (1997)	10 bp.
Eichengreen y Mody (1998)	0,5 bp.
Min (1998)	0,04 bp.
Aguirre et al (2004)	1 bp.

Cost-Benefit Approach

For instance, consider:

- a reduction in reserves by 1 billion
- increases the pbb of currency crisis by 20 bp per year
- a cost of a currency crisis of 5% of GDP = 4 billion
- with a marginal cost of reserves of 100 bp per year

Then the reduction in reserves:

- reduces costs by 1billionx100bp = 10 million per year
- reduces benefits by 20bpx4billion = 8 million per year

Cost-Benefit Approach

The above is an illustrative example, which by no means was the specific basis for the decision made by the Central Bank to reduce reserves.

One could think of many extensions (for instance, endogenous spreads, cost of crisis, or short-term debt; effect of changes in financing costs on the rest of the economy, etc.)

However, illustrates the argument that, given conditions in Chile, the marginal benefit of reserves was somewhat below their marginal cost.

The BCCh Program to Reduce Reserves

From December 2003 to December 2006, the CBCh implemented a program to exchange its debt denominated in US$ dollars but paid in Chilean pesos with debt denominated and paid in US$ dollars. The resulting debt was redeemed at maturity, implying a total drain on the level of reserves of US$ 6.3 billion.

This program was justified on the basis that it would reduce the cost of the foreign currency position of the CBCh, in a context in which the economy had developed stronger fundamentals.

Concluding Remarks

There has been an increased concern about reserve adequacy worldwide.

Use of indicators may be helpful, but it is insufficient.

It is important to consider idiosyncratic elements, and to study and learn from the experience of advanced economies too.

A Cost-benefit approach can provide a useful way to examine options, organize thinking, and even may allow to explore quantitative effects.

For more details, see my Chapter in Age Bakker and Ingmar van Herpt (2007) book on Central Bank Reserve Management

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