# Foreign Reserve Management

by

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Discussion by

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## Context

Two basic motivations for holding reserves:

1. Precautionary motive – Obstfeld, Shambaugh and Taylor (2012), Bianchi, Hatchondo and Martinez (2018)

2. To enable sterilized intervention as an instrument to influence exchange rates: Fanelli and Straub (2017); Chang (2018); Amador, Bianchi, Bocola and Perri (2018).

This paper fits into the second category, and is closely related to the authors' previous paper.

## Can Sterilized Intervention be Effective?

1. In traditional literature, relies on a portfolio balance effect, where influencing supply of privately held bonds affects risk premiums. That effect may not be large.

2. Sterilized intervention may need to have a large influence on private bond holdings.

3. In any case, if private agents are unconstrained, a Ricardian equivalence theorem says they can, and will, undo the effects. That is, private households incorporate the central bank balance sheet onto their own. Backus and Kehoe (1989).

## Financial Constraints

1. When private agents face financial constraints, they may not be able to "undo" the actions of the central bank.

2. This may be particularly important when central bank interventions are large relative to the market (as in small emerging markets. Or Switzerland (but not Japan in 2004, 35 trillion yen.)

3. Related to the "intermediary asset pricing" view of excess returns (He and Krishnamurthy (2018).)

4. See related papers by Cespedes, Chang and Velasco (2017) and Chang (2018)

Previous Paper

The analysis in this paper is quite abstract (so far), but the authors' previous paper anchors things in a concrete example.

Suppose both the SOE and the large ROW are at the ZLB for riskless nominal bonds in each one's currency.

Suppose the SOE also has set an exchange rate policy such that $\frac{e_2(s)}{e_1}$ falls at least in some states $s$.

Swiss case: $e_1$ is fixed, but markets expect an appreciation.

Emerging market case: Temporary depreciation making $e_1 \uparrow$

## This paper

Central bank can buy or sell a portfolio of state contingent bonds. There are nominal state contingent bonds in each currency. They do not have to earn the same rate of return – borrowing limits may prevent arbitrage.

The analysis takes as given the nominal interest rate, $i$ ($i = 0$, for example) and the path of exchange rates that has been chosen: $e_1$ and $e_2(s) \ \ \forall s$.

The nominal interest rate is defined as $1 + i = \frac{1}{\sum p(s)}$, where the $p(s)$ are the nominal price of claim on a unit of SOE currency in state $s$.

## Deviations from "UIP"

Because of credit limits, pure arbitrage opportunities may exist. Let $q(s)$ be the foreign currency price of a claim to a unit of foreign currency in state $s$.

The interesting analysis occurs when we have:

$$\frac{\kappa(s)}{q(s)} \equiv \frac{e_1}{e_2(s)\,p(s)} - \frac{1}{q(s)} > 0 \text{ for some states } s$$

In states where this occurs, the home bond pays a higher rate of return. This is what we will tend to see if we are at the ZLB in both countries but $e_2(s)/e_1 < 0$.

## Foreign Investors

Foreign investors (risk neutral, actuarially "fair" foreign claims prices) will load up long on the one home state contingent bond with the highest excess return. They will use all their resources to invest in that bond – including selling claims on other states.

## Home households

They will short the foreign contingent claims up to their borrowing limit in every state in which the foreign bond pays a lower rate of return.

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## Objectives of Central Bank

There are two competing objectives of the central bank:

1. On the one hand, they would like to ease the distortion caused by the ZLB, which gives the economy too little consumption in period 1 relative to period 2.

2. On the other hand, they don't want the foreign investors to earn a lot of arbitrage profits. These are just pure deadweight loss for the home country.

## Case 1

Suppose the foreign investor has very limited resources, so the central bank is not so concerned about the deadweight loss from arbitrage profits.

Then, in effect, the central bank wants to choose a portfolio that pays off well when SOE output is high and badly when SOE output is low.

That seems weird. But with complete markets, there is no intra-temporal distortion in consumption, unless the central bank induces one. Here they want to induce such a distortion. Why? Because it makes saving less attractive, borrowing more attractive. It reduces the intertemporal distortion.

## Questions

1. This seems difficult to implement. The central bank's actions affect both $p(s)$ and $c_2(s)$, so choosing the portfolio of state contingent claims might be tricky.

2. More to the point, in the real world, central banks don't trade in state contingent claims. What is the practical advice for the portfolio of reserves?

3. Might there not be better ways to relieve the intertemporal distortion? (QE that lowers prices of long-term bonds; forward guidance; taxing saving including cash (Goodfriend).)

## More questions

4. For this to be effective, it seems like the households really would need to internalize the central bank balance sheet. Is there evidence that this channel is effective?

5. This mechanism relies on the household risk aversion – concavity of utility – to induce the intertemporal redistribution of consumption. Quantitatively, how large is this effect?

6. In the end, how do we weigh this effect against the precautionary motives for holding reserves, and what is the optimal composition of reserves when the precautionary motive is strong? Again, a quantitative answer would be helpful.

## Case 2

In this case, the investor has deep pockets, and the central bank wants to minimize the arbitrage profits the investor makes.
Recall:

$$\frac{\kappa(s)}{q(s)} \equiv \frac{e_1}{e_2(s)\,p(s)} - \frac{1}{q(s)} > 0$$

Central bank wants to make the maximum $\kappa(s)$ small, since the investor sinks everything into the s.c. claim with the highest $\kappa(s)$.

Recall, the central bank takes $\sum p(s)$, $e_1$ and $e_2(s)$ as given.

The solution is to make all the $\kappa(s) > 0$ equal to each other.

## Thoughts

The concern about making the largest $\kappa(s)$ as small as possible seems to depend a lot on the assumption that s.c. claims are traded, that the investor is risk neutral, and that foreign state-contingent claims prices are actuarially fair.

Then, there are literally arbitrage profits and the investor wants to put everything in the state with the highest profits.

How would this look in the real world? Even if there were a set of assets that spanned the space of returns on contingent claims, the investor would have to be pretty smart to construct a portfolio that guaranteed himself arbitrage profits.

## One More Comment

The whole exercise took the exchange rate policy as given. The exchange rate policy, presumably, is trying to achieve some objective.

When the central bank chooses the optimal portfolio to trade off objectives 1 and 2 above, does this also impact the goals of the exchange rate policy? In other words, might the exchange rate plan be affected by the portfolio choice?

For example, the exchange rate plan might have been chosen to stimulate aggregate demand, but that goal is partly achieved by the optimal reserve portfolio.

## Final Thoughts

If I were answering this question, I might have specified the economy, and a “realistic” set of assets that are traded, then had the central bank choose its level of intervention, and its portfolio of reserves, and its exchange rate plan to maximize welfare.

So it would be helpful to clarify the advantages of the approach taken in this paper.

Also, in the end, along the lines I mentioned, some assessment of the quantitative effects of the foreign reserve management policy advocated here would be useful.