Active defense of the currency under dirty floating: Higher interest rates versus foreign exchange market intervention*

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Abstract

To fight currency depreciation and prevent an inflation-devaluation spiral, central banks typically raise short-term interest rates and/or intervene in foreign exchange markets to prop up the domestic currency. This paper will develop a theoretical model to assess: (i) the relative effectiveness of higher interest rates and intervention in appreciating the domestic currency; (ii) the optimal (i.e, welfare-maximing) policy mix in the presence of some constraint on monetary policy; and (iii) how the optimal policy mix is affected by the structure of the economy and different types of shocks.

1 Motivation

- In response to a depreciating currency, the first line of defense for central banks is to raise some short-term interest rate under their control. The idea is that, by making domestic assets more attractive, higher interest rates should strengthen the currency. This was, for instance, the

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standard IMF prescription for monetary policy in the recent programs in East Asia. In effect, as discussed in Ghosh and Phillips (1999), the essential task of monetary policy in the IMF programs in Indonesia, Korea, and Thailand was to prevent a further slide in the currency and thus cut short a vicious circle of depreciation and inflation. Some critics – most notably Jeff Sachs and Joe Stiglitz – have strongly disagree with this policy. In fact, Sachs and Radelet (1998) even question whether high interest rates will indeed lead to a stronger currency.

- At the same time, central banks do not limit themselves to raising interest rates to defend the domestic currency in times of turbulence. Typically they also intervene in foreign exchange markets by selling international reserves. In practice, therefore, a high interest rate defense of the currency is often part of a broader monetary policy framework which also includes some – not necessarily constant – amount of intervention over time. The IMF program in Indonesia, for example, explicitly allowed for significant intervention by setting a substantially lower target for international reserves relative to the program's central scenario. In the cases of Thailand and Korea, intervention was also part of the picture but limited by a lower stock of international reserves and an informal understanding that, by and large, higher interest rates would be the main means of achieving currency stability. Clearly, there was thus a policy decision to be made on the extent to which higher interest rates and/or intervention would be used to prevent further currency depreciation.

- In this light, three important policy questions arise:

  - What is the relative effectiveness of higher interest rates and intervention in strengthening the domestic currency?
  - If both policies help in strengthening the currency, what is the optimal policy mix?
  - What are the main factors that determine the optimal policy mix?

- The main purpose of this paper will be to develop a model which can provide answers to the three questions above.[1]

[1]This paper is therefore related to an an incipient theoretical literature that analyzes

2 Stylized facts

This section will come up with some stylized facts regarding the extent to which central bank intervene and/or raise interest rates to support the domestic currency. The idea would be to look at several countries (in particular, the East Asian countries in the aftermath of the Thai crises) during periods of turbulence, compute the extent of intervention and use of higher interest rates, and check whether there were any obvious factors that affected the decision to follow one policy or the other (i.e., the level of international reserves, the state of fundamentals, the fear of the contractionary effect of higher interest rates, etc.).

3 Basic model

We will develop an optimizing model with the following features:

- Small open economy perfectly integrated with world markets in both goods and capital markets.
- Representative household consumes a non-storable good, supplies labor, and uses bank deposits to carry out transactions.
- Commercial banks play a non-trivial role (a la Bernanke-Blinder) by lending to firms, which need bank credit as working capital.
- Interest rate policy is introduced into the picture by essentially assuming that the monetary authority pays interest on part of the money supply. In such a set up, policymakers have two independent instruments: (i) the total money supply and (ii) a (domestic) interest rate.
- All else equal, higher interest rates appreciate the domestic currency (by leading to a higher money demand), but at the cost of an output contraction and fiscal costs (in the form a higher public debt service).
- Intervention policy will be defined as the monetary authority's ability to vary the stock of international reserves.

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the active use of interest rates to defend an exchange rate peg (see Drazen (1999a,b), Flood and Garber (2000) and Lahiri and Vegh (2000b)) or strenghthen the currency under a pure floating (Lahiri and Vegh (2000a)).

Benchmark case: An equivalence proposition Suppose that there is some underlying bad fundamental (say, current or prospective fiscal deficits). Given this constraint, we will show that in the benchmark case (i.e., in the absence of output and/or fiscal costs), it is optimal to raise interest rates and/or intervene to appreciate the currency. Furthermore, we plan to show that policymakers can achieve the welfare maximizing equilibrium by *either* raising the domestic interest rate *or* intervening in the foreign exchange market (i.e., selling international reserves). This case should provide a useful benchmark for the relevant case in which there are either output costs or fiscal costs.

4 Main results

Relative to the benchmark case, let us now open the output cost channel and the fiscal cost channel. Suppose that policymakers face some constraint on monetary policy, in the sense that the rate of monetary growth must be positive due to some current or prospective fiscal deficits. In this context, we ask three main questions.

- Are both policies (higher interest rates and intervention) equally effective in achieving a more appreciated level of the domestic currency?

  Given that higher interest rates and intervention have a different impact on the economy; it could well be the case that beyond a certain point higher interest rates lead to a depreciation of the currency (due to the fiscal cost and ensuing higher inflation), whereas intervention always leads to a more appreciated currency.

- What is the optimal mix of higher interest rates and intervention?

  The idea is that there will be an "interior solution" in which the monetary authority will find it optimal to use *both* higher interest rates and intervention to achieve the (constrained) social optimum. This conjecture is based on the following. There will be a range of parameters for which both policies will tend to appreciate the domestic currency. Higher interest rates, however, directly affect the supply of bank credit to the private sector as they induce commercial banks to lend more to the government. Intervention, on the other hand, does not directly affect the supply of bank credit so the output costs should be smaller.

But there is a cost to intervening in the sense that the central bank has a finite stock of international reserves. So for a given benefit (in terms of an appreciated currency), there should be a trade-off between the output costs of higher interest rates and the reserve costs of foreign exchange market intervention.

- How does the optimal policy mix change for different parameter configurations?

  We plan to simulate the model to evaluate how the optimal policy mix varies in response to changes in key parameters. In particular, we conjecture that the optimal policy mix will be more biased towards intervention (i) the more dependent firms are on bank credit and (ii) the larger the level of current or prospective fiscal deficits. We will also investigate how the optimal mix is affected by the duration of temporary shocks.

4.1 Extensions of the basic model

Once the basic machinery described above is in place, we plan to check some extensions of the model. In particular:

- **Sterilized versus non-sterilized intervention**. Conventional wisdom holds that sterilized intervention is much less effective than non-sterilized intervention. In the basic model, we are thinking about non-sterilized intervention. Hence, we would like to check whether in the case of sterilized intervention the effectiveness of intervention is lessened. If true, this would tilt the optimal policy mix towards higher interest rates. On the other hand, sterilized intervention is likely to alleviate the output contraction (by preventing the money stock from falling during turbulent times), which should reduce the costs of intervening.

- **Nature of shocks**. One rationale provided by the IMF (in addition to the obvious constraint imposed by the stock of international reserves) for also resorting to foreign exchange market intervention in Indonesia was the perception that "Indonesia was suffering more from adverse contagion effects and structural weakness rather than from traditional macroeconomic imbalances that might require further real depreciation" (Ghosh and Phillips, p. 37). The implication seems to be that

if macroeconomic fundamentals do not seem to require a real depreciation, then intervention is superior to higher interest rates. We will try to evaluate this hypothesis by considering shocks other than bad fundamentals (say, temporary shocks to money demand) and analyzing whether this affects the optimal policy mix.

- **Relation to the optimal choice of exchange rate regimes**. We plan to relate our analysis to the optimal choice of an exchange rate regime. Clearly, if, for some parameter configuration, it is not optimal to intervene, we would be saying that a pure float is optimal. If heavy intervention is optimal, then something akin to a (soft) peg may be optimal. The optimal policy mix may also depend on different types of shocks (monetary versus real).

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