

Sustaining Sterilization Policy

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Monetary policy is commonly understood as the operations of the Central Bank in bond and treasury bill markets in order to set the interest rate and thereby influence inflation and economic activity. Conventional wisdom has it that the *exchange rate* of an economy open to cross-border capital flows should be left to be determined by market forces in a so-called free float. The notion has some support *in theory* by the notion of a “trilemma,” referring to the inability of monetary authorities to influence exchange rate *and* interest rate, given an open capital account, and *in practice*, by many developing countries’ difficulties in maintaining over-valued exchange rates for prolonged periods in the past.

This policy brief shows that the trilemma holds only if the exchange rate is over-valued. Monetary policy space associated with under-valued exchange rates is of particular importance to developing countries that target real exchange rates in order to generate export-led growth, but still need flexibility with regard to the domestic interest rate.

We present two results: (1) The short-term sustainability of sterilization policy with an under-valued exchange rate improves, the lower the ratio of domestic Central Bank liabilities to foreign reserves. (2) The medium-term sustainability of sterilization policy – termed *permanence* here – with an under-valued exchange rate is guaranteed, if the change in foreign reserves relative to the stock of foreign reserves does not exceed an upper limit that rises with nominal GDP growth and returns to foreign reserves, but falls with the domestic interest (and inflation) rate.

First, suppose a country has a balance of payments deficit, implying that the country sells assets, either financial or real, in order to finance imports in excess of exports. In this situation, there is pressure on the domestic currency to depreciate, as the demand for foreign currency exceeds its supply – in the end, importers need to pay bills in foreign currency. If the monetary authorities maintain the initial value of a unit of domestic currency, either to keep a lid on import prices or to avoid capital outflows, the exchange rate becomes over-valued. In this case, the Central Bank can satisfy the excess demand and maintain the targeted exchange rate by selling foreign exchange for domestic currency, an intervention with a contractionary

monetary effect that would lead to an increase in the interest rate. The contractionary effect can be compensated – *sterilized* – through an expansionary monetary operation that preserves the targeted interest rate. Such a policy is obviously limited by the Central Bank’s initial stock of foreign reserves. Once reserves are running dangerously low, capital flight sets in, exacerbating excess demand for precious foreign exchange, eventually forcing monetary authorities to give up either the exchange rate or the interest rate.

Second, however, suppose a country has a balance of payments surplus, implying that the country is *buying foreign assets* with the proceeds of exports in excess of imports. In this situation, the domestic currency tends to appreciate, because foreign importers need domestic currency to pay their bills, and thus, there is excess demand for domestic currency. If the monetary authorities maintain the initial value of a unit of domestic currency in order to defend or increase the competitiveness of domestic exporters, the exchange rate becomes under-valued. To do so, the Central Bank now has to *buy* foreign currency, an intervention with an expansionary effect that would lower the interest rate. The Central Bank can *sterilize* the expansionary impact by selling domestic liabilities, decreasing the monetary base and pushing the interest rate back up to the targeted rate.

In this case, and in sharp contrast to the previous one, interventions do not face a “natural limit” analogous to the availability of reserves. For the overall policy to be sustainable, however, growth of liabilities cannot exceed growth of assets, because that would generate a Central Bank net debt with an unsustainable trend. Below, we outline how sterilization policy feeds into the assets and liabilities of the Central Bank, and the two conditions under which such a policy is sustainable *in the short run*.

To maintain the targeted interest rate and absorb the excess of monetary base, the Central Bank must generally increase the components of its liabilities for which it pays interest. (Note that the flow of interest payments the Central Bank pays for remunerated liabilities becomes another source of monetary base creation that has to be sterilized.) On the other hand, reserves are invested in assets that yield interest.

Furthermore, the value of foreign assets in domestic currency depends on changes in the exchange rate. Consequently, the growth rate of the stock of foreign currency assets, valued in domestic currency, depends on the interest rate yielded by the reserves and the exchange rate trend.

To summarize, (1) the domestic short-run interest rate reflects the financial cost of the remunerated liabilities owed by the Central Bank, and (2) the sum of the foreign short-run interest rate and the growth rate of the exchange rate represents the returns to international reserves held by the Central Bank. Consequently, sterilization policy is obviously sustainable *in the short run* if the interest rate on domestic liabilities is smaller than the sum of the international interest rate plus the growth rate of the exchange rate.

But this condition is not necessary for sustainability. Sterilization policy can be sustainable even when the local interest rate is higher, because the monetary base demanded by the market and issued by the Central Bank does not pay interest. The financial cost of the Central Bank's total liabilities is therefore smaller than the local interest rate. We define the degree of autonomy of monetary policy as the difference between the maximum local interest rate that allows the sustainability of the sterilization policy and the sum of the international interest rate plus the growth rate of the exchange rate.

We can calculate the maximum sustainable rate as the ratio of: (a) the sum of the foreign interest rate and the growth rate of the exchange rate to (b) the ratio between the stock of the Central Bank's remunerated liabilities and the stock of international reserves valued in domestic currency. If (b) is lower than unity, the maximum sustainable rate is higher than (a), and there is a positive degree of monetary autonomy. The result is very intuitive: The degree of autonomy is higher the lower (b) is, implying that the Central Bank sold few liabilities domestically in comparison to the amount of foreign reserves accumulated. Thus, sterilization policy is not only sustainable if returns to international reserves in the domestic currency are large relative to the domestic interest rate, but also if those reserves are large relative to domestic Central Bank remunerated debt.

Lastly, we explore the conditions that determine the *medium- and longer-term* sustainability of sterilization policy, which we call the *permanence* condition for sustainability. Continuous implementation of sterilization policy, together with economic growth and changes in bond markets, affect the maximum sustainable rate and the degree of monetary autonomy through time. We define the

degree of monetary autonomy as *permanent* if the ratio of remunerated liabilities to international reserves – (b) in the preceding paragraph – is constant or decreasing over time. If the ratio increases, the degree of autonomy tends to decrease, though it would not imply that the sterilization policy rapidly becomes unsustainable. The permanence condition so defined is quite strict, as it requires the degree of monetary autonomy existent at a point in time to remain stable or increase.

The permanence condition can be calculated as a constraint on the rate of accumulation of the Central Bank's international reserves. More precisely, it is denoted by the ratio of the flow of the Central Bank's purchases of foreign exchange and its stock of reserves. The maximum rate of reserve accumulation that preserves the permanence of the degree of monetary autonomy depends positively on nominal output growth, on the foreign interest rate and on the trend of the exchange rate, and negatively on the local interest rate.

Simple numerical examples with data observed in Argentina and other sets of plausible parameters suggest that developing countries' monetary policy autonomy is (1) *sustainable* and (2) *permanent* even with capital mobility in the sense that continued accumulation of foreign reserves does not pose a risk to either of the exchange or interest rate, and, by extension, the successful attainment of a particular path of export, output and price growth.

Lastly, if the permanence of monetary policy autonomy is threatened due to an excessively high rate of reserve accumulation in a context of free capital mobility, the sterilization policy can be accompanied by regulations on capital inflows that will reduce Central Bank purchases and preserve the permanence of the degree of monetary autonomy.

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