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Sterilised foreign exchange interventions – theory and empirical experience

Most of the research in this field has been conducted on data for the largest currencies. The results appear to depend on the time period and data used. One major problem is that the access to intervention data is limited and researchers often have to rely on what information is known on the markets and on the central banks' balance sheets. According to current theory, sterilised interventions can affect the exchange rate through two different main channels; the portfolio-balance channel and the signalling channel.

The portfolio-balance channel
Sterilised interventions change the relative supply of domestic and foreign assets. If investors want to avoid risk (which is a common assumption), they will not be indifferent to the currency distribution in their portfolios. This means that domestic and foreign assets are not perfect substitutes. If the supply of domestic assets increases, a corresponding increase in demand is required to avoid a change in the price. This increase in demand can be achieved by the foreign interest rate falling or the domestic interest rate rising or through an adaptation of the exchange rate, in this case a weakening of the domestic currency. As short interest rates are determined on the money market and are affected by monetary policy, the adaptation needs to be through the exchange rate.

The literature on interventions from the 1980s and early 1990s was mainly based on the portfolio-balance channel. The majority of the research cannot prove any significant effects by interventions on the exchange rate. Rogoff (1984) and Lewis (1988) even find the reverse effect of what is expected. The studies that find a connection also indicate that this effect is very weak and transitory, for instance Gosh (1992). One reason for these negative results could be that in practice very large amounts are required to affect the relative supply of domestic and foreign assets. Bearing in mind the very large daily turnover on the foreign exchange market, central banks perhaps do not tend to have the capacity to make interventions of the magnitude required.

The signalling channel
One condition for the signalling channel to function is that the central bank taking action has information that is not available to the market participants. Sterilised interventions can then affect market participants' expectations of the exchange rate by "signalling" future monetary policy. A central bank can, for instance, signal a more restrictive future monetary policy by purchasing domestic currency. Expectations of a tighter monetary policy can in turn lead to market participants adapting their expectations of the future exchange rate, which is assumed to affect the actual exchange rate in the desired direction. At the same time, of course, one can wonder whether it would serve equally well to communicate future monetary policy in a speech, for instance. The counter argument is that the information can be considered more credible if the central bank makes an intervention. As the bank is investing its reserves, the signalling effect is significantly reinforced.

Many studies have found that sterilised interventions have a certain, albeit not very strong, significant effect on the exchange rate, for instance, Kaminsky and Lewis (1996). Lindberg (1994) came to the conclusion, in a study using Swedish data from the period with a fixed exchange rate regime, that sterilised interventions could have an effect through the signalling channel, but that this channel is fragile.

Effects on volatility
In recent years the literature has come to concentrate on the effect of the interventions on exchange rate volatility. Most studies examine the effects of the conditional volatility with the aid of GARCH models. The great majority of the literature, including Baillie and Humpage (1992), indicates that the interventions tend to increase volatility.

Hung (1997) studies the effects on exchange rate volatility via the noise-trading channel. A condition for interventions to have an effect on the exchange rate via this channel is that there are "noise traders" on the foreign exchange market, i.e. market participants who do not act on the basis of fundamental information[1]. Noise traders instead make forecasts by looking at the past behaviour of the exchange rate, for instance with the aid of technical analysis. A central bank can use sterilised interventions to induce noise traders to buy or sell currency. Even if an intervention only has a temporary effect, it can still lead to noise traders assuming that the trend has been broken and induce investors to take positions in line with the central bank's intentions. However, for this to work, the central bank needs to use covert interventions on a thin market. Hung's conclusion is that interventions affect volatility via the noise-trading channel, but that the effects depend on the time period studied and on what the central bank wishes to achieve through the interventions.

There are also a number of studies that have analysed the effects of interventions on implied volatility, i.e. the volatility that is implied in option prices. Bonser-Neal and Tanner (1996) find that the effect on implied volatility depends on the period of time being studied.

Aguilar and Nydahl (2000) study the Riksbank's interventions and their effects on volatility during the period 1993 to 1996. The volatility is modelled both as implied

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[1] Fundamental information here means variables usually included in exchange rate models, such as relative growth, etc.

volatility and using a GARCH model. However, the authors find no support for the theory that interventions systematically reduce volatility on the foreign exchange market. When the central bank intervenes "with the wind", i.e. reinforces a trend, volatility tends to decline. On the other hand, volatility tends to increase when the central bank intervenes "against the wind"; i.e. tries to break a trend.

Recent research
Recent years have seen the emergence of literature that studies interventions from a microstructure perspective. Evans and Lyons (2000) use high frequency and order flow data and their findings are that interventions have some affect on the exchange rate.

Galati and Melick (1999) have also studied interventions in a new way. They use pricing of currency options to see the effect of interventions on market uncertainty with regard to the future exchange rate by looking at implied probability distributions.

Summary
The academic literature in this field has often needed to be based on what information is available and not on more detailed information regarding the scope of the interventions and the motives behind them. The literature indicates that interventions do not affect the exchange rate through the portfolio-balance channel. On the other hand, there is evidence that interventions can in some cases have a minor effect via the signalling channel. It appears necessary for interventions to be an element of the monetary policy process and to signal future monetary policy in order for them to be able to succeed, see Humpage and Osterberg (2000). Broaddus and Goodfriend (1996) also consider that interventions have only a temporary effect unless they are followed up by monetary policy. They are also of the belief that interventions can lead to uncertainty regarding monetary policy and affect the credibility of the central bank.

The effect of interventions on exchange rate volatility thus appears dependent on the time period and on the central bank's objective with the interventions. The newer literature, which uses more advanced econometric and financial techniques, as well as more detailed data that has not previously been published, is also unable to provide an unequivocal picture of the effects of interventions.

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