Central bank interventions and exchange rate band regimes

B. Gabriela Mundaca [*]

Research Department, Norges Bank (Central Bank of Norway), Box 1179, Sentrum N-0107, Oslo 1, Norway

Abstract

This paper presents an endogenous switching regression model for the exchange rate process where the switch is defined by the central bank criteria functions for intervening. We study the signal effect of interventions on the exchange rate using Norwegian daily data on official interventions. We first find that interventions seemed to have been more effective in moving the exchange rate in the expected ('desired') direction in the regime when the exchange rate was kept away from the edges of the band. This type of intervention regime also reduces significantly the conditional volatility of the exchange rate. Thus, when the exchange rate was near the weakest edge of the currency band, its conditional variance was significantly larger than when it was moving around its central parity. Finally, we show that in order to obtain consistent estimates, intervention variables cannot enter as exogenous variables in the conditional mean (or conditional variance) of the exchange rate. © 2001 Elsevier Science Ltd. All rights reserved.

1. Introduction

There is still considerable scepticism among economists and policy-makers as to whether sterilized interventions can have any significant effect on the exchange rate. Moreover, the effect of sterilized interventions on the exchange rate has not yet been firmly established in the academic environment.

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* Tel.: +47-223-16074; fax: +47-224-24062.

E-mail address: gabriela.mundaca@norges-bank.no (B.G. Mundaca).

In the literature, one distinguishes between sterilized interventions, whose monetary effects are neutralized by offsetting domestic liquidity measures, and nonsterilized interventions, which alter money supplies and therefore involve the joint exercise of monetary policy and exchange-market policy. The issue of how the exchange rate is affected by sterilized interventions is controversial since these interventions are not supposed to alter the countries' relative supplies of domestic and foreign currency in the same way as non-sterilized interventions. In theory, sterilized interventions may affect exchange rates through three hypothetical channels: the portfolio balance[1], the noise trading[2] and the signalling channels.

Here, we study the 'signalling effect' of sterilized intervention on an exchange rate in a currency band. The possibility of the 'signalling effect' has been suggested by Mussa (1981) who states that interventions (even sterilized) may signal monetary policy objectives. For instance, authorities may need to choose between two options, either to have relatively small variations of the exchange rate within its band, or to allow the exchange rate to move within the entire official band. By intervening frequently inside the band (intramarginally), the central bank may want to signal that it wishes to defend a narrower implicit band than the official one and reduce the volatility of the exchange rate. A different signal is given when interventions occur close to or at the edges of the currency band. The exchange rate is thus allowed to move within the entire band in order to gain some monetary independence (Svensson, 1994).[3]

Interventions are modelled here as dichotomous choices. The effect of interventions on the exchange rate is measured through hazard functions (weighted probabilities of intervention). We find this approach useful when information about interventions is not (at least not immediately) made public to the market. Instead, one can observe the central bank's participation in the foreign exchange market. In Norway, simultaneous intervention data are not available even in newspapers or similar sources.[4]

On the other hand, we justify the assumption that the market knows when the central bank intervenes by noting that the Norwegian foreign exchange market is

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[1] Sterilized interventions will affect the exchange rate through the 'portfolio channel' as long as foreign and domestic assets are imperfect substitutes. Sterilized interventions change the relative outstanding supply of domestic assets leading to a necessary change in the expeced relative returns and eventually the exchange rate, in order to restore equilibrium. See Henderson (1984).

[2] Hung (1997) studies the noise trading channel in order to explain why central banks need to intervene secretly. This author argues that through this channel secret intervention can lead chartists to believe that the prevailing exchange rate trend has been broken and that the trend is reversing. Noise traders may then alter their positions, betting on the intervention-inspired reversal.

[3] In this context, monetary independence can be achieved when the exchange rate moves freely within its band and the monetary authorities can adjust, at least for a short time, interest rates to local conditions, for example, by lowering the domestic interest rate in a recession and increasing it during a boom.

[4] This approach provides a methodology for the case where only qualitative rather than quantitative data are available to the econometrician and the market. The model can be applied not only to interventions but to other monetary policy variables which are known to be endogenous but are only observed as dichotomous decisions.