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The welfare implications of foreign exchange intervention

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This paper examines the welfare implications of foreign exchange intervention in a two-country, two-currency, general equilibrium model with limited participation in financial markets and cash-in-advance constraints on transactions. Both sterilized and nonsterilized intervention operations have significant impacts on the allocation of liquidity in international financial markets and therefore affect real economic activities. The welfare effects of shocks to monetary policy, sterilized and nonsterilized foreign exchange interventions are examined and compared. The design of welfare-maximizing intervention policy rules is also discussed.

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1. Introduction

Official interventions in the foreign exchange markets have long been used by the monetary authorities of industrialized countries as a stabilization instrument. Although in recent years the Federal Reserve of the United States and the European Central Bank have been reluctant to intervene, the Bank of Japan has been increasingly active in the markets.¹ It is of interest to analyze the implications of official interventions on economic welfare. In the existing literature, however, little of that analysis is based on choice-theoretic models. The objective of this paper is to examine the welfare consequences of foreign exchange interventions in a general equilibrium model with microeconomic foundations. With an adequate welfare criterion, the welfare effects of monetary policy, sterilized and nonsterilized foreign exchange interventions are examined and compared. In addition, the design of welfare-maximizing intervention policy rule is discussed.

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¹ As reported in [Beine and Bernal \(2007\)](#), the Bank of Japan was present in the market for more than 10% of trading days over the period of 1991–2004, while this increased to more than 40% after 2002 until April 2004.

As surveyed by Edison (1993), Dominguez and Frankel (1993), and Sarno and Taylor (2001), the effectiveness of foreign exchange intervention has been analyzed extensively in the literature. Although sterilized intervention has been viewed as having effects on exchange rates through either the portfolio-balance channel or the signaling channel, the evidence on the effectiveness of intervention via the two channels is inconclusive. Ho (2004) presents an alternative channel of influence of foreign exchange intervention that emphasizes the role of international financial markets in allocating liquidity across market participants. By using a two-country, two-currency, general equilibrium model with limited participation in the financial markets and cash-in-advance restrictions on all transactions, the paper studies the liquidity effects induced by official intervention.² It shows that both sterilized and nonsterilized intervention operations result in changes in asset supplies; these shocks to the liquidity in international financial markets cause fluctuations in exchange rates and interest rates and have real effects on the world economy.³

In the model, limited participation in financial markets implies that the key to the transmission mechanism is how the liquidity in these markets is affected. When the domestic monetary authority conducts an official sale of domestic currency so as to keep the domestic currency from appreciating, the supply of domestic currency to the foreign exchange market increases. The nominal exchange rate rises to clear the market, and the sellers (buyers) receive (pay) more domestic currency for each unit of foreign currency traded. Because of the cash-in-advance constraints, changes in the quantities of a currency obtained by market participants imply that there are changes in their economic activities.

In addition to the direct impact on the liquidity in the foreign exchange market, the relative liquidity of the domestic-currency-denominated and foreign-currency-denominated asset markets is affected by the resulting adjustments of the domestic monetary authority's asset holding. In the case of nonsterilized intervention, the domestic monetary authority uses the proceed of foreign currency from the official sale of domestic currency to purchase the foreign-currency-denominated bonds. As the supply of liquidity in the market increases, the interest rate on the foreign-currency-denominated assets falls, and the allocation of liquidity in this market changes. In the case of sterilized intervention, the domestic monetary authority not only purchases the foreign-currency-denominated bonds but also conducts an open market sale of the domestic-currency-denominated bonds to sterilize the effect of intervention on the domestic money supply. The increase in demand for liquidity in the domestic-currency-denominated asset market leads to a rise in the interest rate and a reallocation of the liquidity in this market. These liquidity shocks to the asset markets affect the real activity of market participants. It is therefore natural to extend the analysis of Ho (2004) to study the welfare consequences of the liquidity shocks induced by official intervention.

A shortcoming of the existing literature is the absence of welfare assessment of foreign exchange intervention.⁴ By modeling explicitly the preferences, production and trading opportunities of

² By generating short-term financial disconnectedness in the economy, limited participation in financial markets is an important mechanism that gives rise to the liquidity effects of monetary authorities' actions. The limited participation models are first developed by Grossman and Weiss (1983) and Rotemberg (1984). However, their heterogeneous-agent models are very difficult to work with due to the complications in tracking the redistribution of wealth across the population over time. Lucas (1990) suggests a methodology to capture liquidity effects in modified versions of cash-in-advance models in which the convenience of the representative household fiction can be retained, while eliminating the wealth redistribution effects. Fuerst (1992) extends Lucas' work by introducing production in the exchange economy of Lucas (1990). The open-economy models allowing for liquidity effects of monetary injections have been studied by Grilli and Roubini (1992), Ho (1993), and Schlagenhaut and Wrase (1995a,b). Ho (2004) follows this approach to examining the liquidity effects of foreign exchange intervention.

³ Both the portfolio-balance channel and the signaling channel are absent in the model. Given that the current state of the world is revealed before the market participants trade in the spot and forward exchange markets, they do not face any uncertainty in holding an asset denominated in the currency of another country during a period, and therefore are indifferent as to whether they hold the domestic or foreign assets. In addition, as the intervention policy is independent of both the current and future monetary policy variables, intervention does not provide a signal of future monetary policy.

⁴ As discussed in Sarno and Taylor (2001), the theoretical literature on optimal exchange rate management essentially assumes that the central bank has a particular loss function, and its decision to respond to a shock is based on a cost–benefit analysis of foreign exchange intervention (e.g. Almekinders, 1995). Recently, game-theoretic approaches have been undertaken to analyze the signaling role of sterilized intervention by emphasizing the strategic interaction between the central bank and private rational speculators in the foreign exchange market (e.g. Bhattacharya and Weller, 1997; Vitale, 1999). In Bhattacharya and Weller (1997) and Vitale (1999), the central bank is assumed to minimize a loss function that depends on the gap between the actual exchange rate to its target level, and on the cost of intervention.

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