When do central bank interventions influence intra-daily and longer-term exchange rate movements?

Kathryn M.E. Dominguez[*]

*Department of Economics, Gerald R. Ford School of Public Policy, University of Michigan and NBER,
Lorch Hall, 611 Tappan Street, Ann Arbor, MI 48109, USA*

Abstract

This paper examines dollar interventions by the G3 since 1989, and the reasons that trader reactions to these interventions might differ over time and across central banks. Market microstructure theory provides a framework for understanding the process by which sterilized central bank interventions are observed and interpreted by traders, and how this process, in turn, might influence exchange rates. Using intra-daily and daily exchange rate and intervention data, the paper analyzes the influence of interventions on exchange rate volatility, finding evidence of both within day and daily impact effects, but little evidence that interventions influence longer-term volatility.
© 2006 Elsevier Ltd. All rights reserved.

1. Introduction

On May 31, 1995 the U.S. government purchased a total of $500 million against marks and $500 million against yen on three occasions between the hours of 1:45 pm and 2:26 pm (Eastern Standard Time), resulting in a 2% increase in the value of the dollar against both the mark and yen

---

* Tel.: +1 734 764 9498; fax: +1 734 763 9181.
E-mail address: kathrynd@umich.edu
URL: http://www-personal.umich.edu/~kathrynd/

over the course of the day.[1] On other occasions when the U.S. government intervened in the dollar exchange rate market, however, the dollar either moved in the opposite direction to that expected, or did not move at all. This paper examines dollar interventions by the G3 since 1989, and the reasons that market reactions to these interventions might differ over time and across central banks.

Standard models of exchange rate determination identify at least two channels through which interventions might be expected to influence exchange rates: the portfolio balance channel and the signaling channel. However, neither of these channels is easily reconciled with the empirical evidence, which suggests that sometimes intervention works and sometimes it does not. Of course, standard exchange rate determination models have a difficult time explaining (often the lack of) exchange rate reactions to all kinds of purportedly fundamental information, suggesting that it may be worth reexamining standard models before drawing conclusions regarding the efficacy of intervention.

One approach to exchange rate modeling that has gone some distance toward reconciling observed short-term currency movements and economic theory is the market microstructure approach. In the context of intervention, market microstructure provides a framework for understanding the process by which central bank interventions are observed and interpreted by traders, and how this process, in turn, might result in exchange rate changes.

Recent advances in market microstructure theory, new sources of data on exchange rates and central bank interventions, and in particular, the availability of high frequency data, offer new tools with which to shed light on the old question of when central bank interventions are likely to influence exchange rates.[2] Section 2 introduces a role for intervention via the signaling and portfolio balance channels in the context of foreign exchange market microstructure. Section 3 describes the G3 intervention and exchange rate data. Section 4 provides an empirical examination of the intra-day and daily dynamics of interventions and exchange rate volatility. Section 5 is the conclusion.

2. Market microstructure and intervention

The exchange rate microstructure model developed by Bacchetta and van Wincoop (2006) provides a way to think about why trader heterogeneity (based on differences in information or the interpretation of information) might lead to short-run price and volatility effects in reaction to information revelation.[3] Information-based trades (including interventions that provide informative signals) and non-informative trades can both move exchange rates in the short run depending on aggregate market ability to differentiate noise from fundamentals.

Consider a standard asset pricing model of exchange rates in which the current exchange rate is the discounted present value of expected macro-fundamentals, and a risk premium associated with non-fundamentals trade. If market participants receive information (or signals) about

---

[1] During New York trading hours on May 31, 1995 the dem−usd rate opened at 1.385 and closed at 1.4135 and the yen−usd rate opened at 82.70 and closed at 84.40. Germany and Japan coordinated their interventions with the U.S. on this day. Reuters' reports indicate that the Bundesbank purchased $395.6 million against the mark on two occasions (starting just before the Fed was in the market), and the BOJ purchased $767.4 million against yen on one occasion (just before the last Fed operation).

[2] See Dominguez and Frankel (1993a,b) and Humpage (1999). Sarno and Taylor (2001) and Edison (1993) provide excellent surveys of the intervention literature. Also, see De Grauwe and Grimaldi (2003), Dominguez (2003b), Ito (2003), Payne and Vitale (2003), Pasquariello (2004, in press), and Vitale (2003b) for recent contributions.

[3] See Lyons (2001) for a thorough discussion of market microstructure in foreign exchange markets as well as Evans and Lyons (2002a,b). For a more general treatment of market microstructure see O'Hara (1995).