Effects of the Bank of Japan's intervention on yen/dollar exchange rate volatility

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This paper examines the effects of the Bank of Japan's (BOJ) intervention on the volatility as well as the level of the yen/dollar exchange rate. Specifically, the conventional GARCH model proposed by Bollerslev [Bollerslev, T., 1986. Generalized autoregressive conditional heteroskedasticity. J. Econometrics 31, 307–327] and the component GARCH model proposed by Engle and Lee [Engle, R.F., Lee, G.G.J., 1999. A long-run and short-run component model of stock return volatility. In: Engle, R., White, H. (Eds.), Cointegration, Causality and Forecasting. Oxford Univ. Press, Oxford, UK, pp. 475–497], where the volatility consists of short-run and long-run components, are estimated using the BOJ's and the Federal Reserve system's (Fed's) official intervention data. Results based on the component GARCH model provide new evidence on the effects of the BOJ's intervention on the volatility of the yen/dollar exchange rate. The BOJ's intervention only reduces the short-run volatility component from the late 1990s to 2003, while it does not have an impact on volatility (both the short- and long-run volatilities) at all in the early 1990s. The stabilizing effect of the BOJ's intervention in the late 1990s and the first few years of the 2000s is not enhanced by the Fed's coordinated intervention. *J. Japanese Int. Economies* **20** (1) (2006) 99–111. Faculty of Economics, Tokyo Metropolitan University, 1-1 Minami Ohsawa, Hachioji-shi, Tokyo 192-0397, Japan; Grad-

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1. Introduction

This paper examines the effects of the Bank of Japan's (BOJ) intervention on the behavior of the yen/dollar exchange rate. Recent empirical studies on the effects of foreign exchange intervention by central banks have analyzed the effects of intervention on the volatility as well as the level of the exchange rate. It is well known that exchange rate volatility changes randomly over time. Taking this fact into account, several researchers such as Chang and Taylor (1998) and Dominguez (1998) have employed the most widely used model of exchange rate volatility, the generalized autoregressive conditionally heteroskedastic (GARCH) model proposed by Bollerslev (1986) to investigate the effects of intervention. In particular, Chang and Taylor (1998) and Dominguez (1998) introduce intervention variables as explanatory variables into the mean and volatility equations in the GARCH model.

The use of a GARCH model, however, has an important drawback. It is the well-known phenomenon called volatility clustering, that shocks to exchange rate volatility are highly persistent. Incorporating intervention variables into the GARCH volatility equation is equivalent to assuming that the effects of intervention are also persistent. If the effects of intervention on exchange rate volatility are transitory, this approach is not valid. In this paper, to overcome the problem, we use the component GARCH model proposed by Engle and Lee (1999). This model assumes that the volatility consists of two components: one is the long-run volatility component whose shocks are highly persistent, and the other is the short-run volatility component whose shocks are less persistent. By entering the intervention variables into both long-run and short-run volatility equations, we can capture the effects of intervention whether the effects are persistent or not.

This paper is also different from previous studies in that we use the BOJ's official intervention data. Previous researchers used the BOJ's intervention data collected from the financial press because the official BOJ's intervention data was not available until July 2001.[1] Recently, some studies have examined the effects of intervention using the BOJ's official intervention data. Ito (2002) examined the effects of the BOJ's intervention on the level of the yen/dollar exchange rate using the official intervention data. Frenkel et al. (2003) investigate the accuracy of financial press reports of intervention, and find that they are inaccurate indicators of the actual level of intervention. We examine the effects of in-

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[1] See Dominguez (1998) and Chang and Taylor (1998). Baillie and Osterberg (1997) estimate the effects of central bank intervention on the yen/dollar exchange rate volatility, but they only use data on the Fed's intervention.