

# Do interventions in foreign exchange markets modify investors' expectations? The experience of Japan between 1992 and 2004

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## Abstract

The purpose of this paper is to analyze the impact of the Bank of Japan's official interventions on the JPY/USD parity during the period 1992–2004. The novelty of our approach is to combine two recent advances of the empirical literature on foreign exchange interventions: (i) drawing on over-the-counter option prices to characterize more precisely the distribution of market expectations; (ii) redefining interventions in terms of events as they tend to come in clusters. Moreover, in order to deal with the features of the data (small sample size, non-standard distribution), we use bootstrap tests.

We show that interventions have a significant impact on the mean expectation (the forward rate). The results are more ambiguous for variance. Additionally, we find that the effect of interventions on skewness is significant, robust to different definitions of skewness, and consistent with the direction of interventions. On the contrary, our results clearly show that kurtosis is not affected by interventions. We finally show that: (i) coordination increases effectiveness of interventions; (ii) results are not altered when controlling for other economic and political news.

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## 1. Introduction

The effectiveness of central banks' foreign exchange (FX) interventions has given rise to an important debate. Theoretically, a sterilized intervention is likely to affect agents' expectations and the level of the exchange rate according to three channels (Sarno and Taylor, 2001): portfolio equilibrium (Dominguez and Frankel, 1993), the signal channel (Mussa, 1981), and the microstructure and noise-trading mechanisms (Lyons, 2001; Hung, 1997; De Grauwe and Grimaldi, 2003). From an empirical point of view, the effectiveness of FX interventions has been far more controversial since the Jurgensen report (Jurgensen, 1983). It could even be argued that, until recently, there was a contradiction between the attitude of central banks and conclusions reached by academics. On the one hand, academics

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have often been highly skeptical about the effects of FX interventions with the exception of the periods surrounding the Plaza Accord and the Louvre Accord, or under very specific conditions, mainly interventions that are announced publicly, coordinated and consistent with monetary and fiscal policies (see the surveys of Edison, 1993; Sarno and Taylor, 2001). On the other hand, central banks have always made use of this tool of economic policy, thereby suggesting implicitly that from their point of view interventions do have an impact (Obstfeld and Rogoff, 1996). This point appears in fact quite markedly in the survey of central banks carried out by Neely (2001): while motivations to intervene are heterogeneous and there is no consensus about the horizon when the maximum effect is likely to be observed, no central bank believes in the ineffectiveness of interventions on exchange rates. Nevertheless, it is true that the monetary authorities of the main industrialized countries have significantly reduced their interventions since the nineties. A noteworthy exception is Japan as it has constantly intervened in foreign exchange markets, often massively and alone. Its presence was a well-known fact among currency traders and frequently reported by the financial press. However, information remained vague, as the Bank of Japan (BoJ) maintained secrecy about its interventions.<sup>1</sup> This changed when, in July 2001, the BoJ decided to publish the track record of its interventions (dates, currencies concerned and amounts) since April 1991. Since then, the BoJ has steadily published information, with a slight lag, about its interventions.

Undeniably, the publication of this information has led to a renewed interest in empirical studies about the effectiveness of FX interventions. To the best of our knowledge, the first to have used this database is Ito (2002). From a detailed analysis of the BoJ's interventions and its motivations, Ito reaches the conclusion that interventions have apparently been profitable and effective (notably since 1995). This conclusion has been broadly confirmed by other studies drawing on the same dataset.<sup>2</sup> Among these studies, we can note the Fatum and Hutchison (2006) one which analyzes the effectiveness of BoJ's interventions using an event study approach, along the lines of Fatum (2000) and Fatum and Hutchison (2003).<sup>3</sup> Such a methodology is attractive because, in contrast with the usual approaches based on time series, it is adapted to the sporadic and clustered nature of interventions. In particular, this methodology is well suited to incorporate the fact that there are separate intervention phases corresponding to separate intervention decisions based on a particular economic and market environment but that each phase can be characterized by different length.<sup>4</sup> Furthermore, it is more flexible than standard time-series approach and allows testing in an easier way particular hypotheses such as reversals or smoothing tests of FX interventions (Fatum, 2000). In practice, the event study consists in isolating intervention phases and to analyze moves in exchange rates around these phases. While we also rely on an event study, our work differs significantly from Fatum and Hutchison (2006). Notably, we broaden the analysis to the second to fourth moments (variance, skewness and kurtosis) whereas Fatum and Hutchison (2006) only restrict their analysis to the equivalent of the first moment with the JPY/USD returns.

The overwhelming majority of empirical studies have restricted themselves to the analysis of the impact of FX interventions on the first two moments (Sarno and Taylor, 2001). Such approach is limited for several reasons. First, market expectations description obviously does not amount to the first two moments only, except in a Gaussian world. Secondly, there is a practical interest both for authorities and market participants to have information for instance on asymmetry and the tails of the distribution after an intervention in FX markets: authorities may more precisely estimate the intervention impact on the basis on such information whereas investors can exploit them for risk management or asset valuation purposes (option pricing notably). Few studies have looked at higher moments of the distribution. The analysis of the BoJ's interventions has not been an exception to this rule.<sup>5</sup> To the best of our knowledge, there are only two major exceptions. Another exception is Castrén (2004) in a paper written in parallel to ours. The author studies the impact of interventions on the JPY/USD market, both on this exchange rate and also on the complementary JPY/EUR and USD/EUR exchange rates.

<sup>1</sup> Unlike the Fed and the Bundesbank that have gradually made their intervention data available for the academic community, all the more easily as they have become less interventionist.

<sup>2</sup> See notably Chaboud and Humpage (2003), Hillebrand and Schnabl (2003) and Beine and Szafarz (2003).

<sup>3</sup> See also Fatum and King (2004) for an application to CAD/USD exchange rate with ultra-high frequency data.

<sup>4</sup> See Beine et al. (2004b) for an analysis of the effectiveness of FX interventions and their implications on volatility when one distinguishes between isolated and sequential interventions.

<sup>5</sup> In addition to the studies quoted previously that analyze the impact on the first moment, several studies have analyzed the second moment, i.e. variance/volatility. In the literature, the impact of interventions on volatility has been carried out via two separate measures of volatility: econometric measures drawn from GARCH/FIGARCH specifications (Baillie and Osterberg, 1997; Beine et al., 2002) and implicit measures drawn from at-the-money currency options (Bonser Neal and Tanner, 1996; Dominguez, 1998). In the case of the BoJ's official interventions, both cases are treated respectively by Hillebrand and Schnabl (2003) or Beine and Szafarz (2003) and by Frenkel et al. (2005).

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