

Central bank FOREX interventions assessed using realized moments

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Abstract

This paper assesses the impact of G3 official central bank interventions on daily realized moments of DEM/USD exchange rate returns obtained from intraday data, 1989–2001. Event studies of the realized moments for the intervention day, the days preceding and following the intervention illustrate the shape of this impact. Rolling regressions results for an AR(FI)MA model for realized moments are used to measure the impact and its significance. The analysis confirms previous empirical findings of a temporary increase of volatility after a coordinated central bank intervention. It highlights new findings on the timing and the temporary nature of the impact of coordinated interventions on exchange rate volatility and on cross-moments between foreign exchange markets.

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1. Introduction

This paper aims at providing an accurate estimate of the size and the time persistence of the impact of Central Bank Interventions (CBIs) in terms of FX volatility and spillover to other FX

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markets. Previous studies have used daily or weekly FX data to document level and variance effects of CBIs. Among the more recent literature using intraday data, Dominguez (2004) pays particular attention to the influence of intraday market conditions on effectiveness of the CBIs. Unlike Dominguez (2004), that uses squared returns as a proxy of the observed volatility, we rely on a less noisy and more efficient realized moment measures to assess the impact of CBIs on the dynamics of the exchange rates. The realized moments used are measures of the integrated (daily) moments, whereas the use of a single return reflects an instantaneous moment. Interestingly, the use of realized moments allows us to document new impacts in terms of cross-moments. We show that concerted interventions tend to lead to increases in the cross-moments of exchange rates, therefore confirming previous results obtained with daily data (Beine, 2004).

Our results have also strong implications for the modeling of the impact of CBIs using daily data. By characterizing the persistence of the effects of CBIs, we show that the choice of the quotation time of the exchange rate is of overwhelming importance for picking up appropriately the daily effects of CBIs.

The paper is organized as follows. In Section 2, we report boxplots of various realized moments for the different types of interventions mentioned above, starting 2 days before the day when the intervention occurred and including realized moments up to the end of the second day after the intervention. After this visual model-free inspection, rolling regressions (rolled over the various hours of the day) are estimated on the realized moments to quantify (and test) the impact of CBIs across hours of the day. In Section 3, we discuss the modeling implications of our empirical findings. Section 4 draws some general lessons both for modeling and for policy interventions from our analysis.

2. The impact of CBIs on daily realized FX moments

2.1. Official interventions

We study the impact of official interventions on the DEM/USD over a period ranging from 1 January 1989 to 28 February 2001. Since we also look at cross-market effects (impact on the co-movements of the exchange rate returns), we also include in our investigation the YEN/USD exchange rate and the interventions occurring on this market. We use hourly data referring to GMT+1 physical time. Details and the sources relative to the exchange rate data as well as the central bank interventions variables are given in the appendix.

For two major exchange rates (DEM/USD and YEN/USD), we distinguish between six different types of official interventions:

- (1) unilateral interventions by the US Federal Reserve on the DEM/USD market denoted FEDU (observed on 62 days, 26 and 38 days of USD purchases and sales, respectively),¹
- (2) unilateral interventions conducted by the Bundesbank (ECB after 1999) on the DEM/USD market denoted BBU (observed on 33 days, only on USD sales),
- (3) coordinated interventions defined as interventions conducted on the DEM/USD market the same day and in the same direction by the two involved central banks denoted COORD (observed on 58 days, 14 and 44 days of respectively USD purchases and sales),

¹ Beine et al. (2004) report results on CBIs involving either purchases or sales of USD. In line with the empirical literature and consistent with the signalling channel, we use only intervention days but not the amounts involved in these operations.

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