

The Exchange Rate Movements with High Frequency Data

Takatoshi Ito

The Graduate School of Economics and Graduate School of Public Policy (GraSPP)
University of Tokyo,
7-3-1 Hongo, Bunkyo-ku, 113-0033, Tokyo, Japan
tito@e.u-tokyo.ac.jp

This paper is an overview of recent new findings on the exchange rate movements in the high-frequency data, namely the EBS data set. The availability of high-frequency data (recorded every second, or nearly every transaction) is changing the conventional wisdom of exchange rate dynamics. It allows the researchers to look into data that are used in the actual trading platform, so that researchers can examine many hypothetical trading strategies for possible profitability as well as establishing the patterns of trading activities.

Research on the exchange rate is classified into the two approaches: Macroeconomic and financial. In both approaches, the exchange rate is often assumed to follow a random walk. Moreover, many empirical papers using daily, and even hourly data, have failed to reject a random walk hypothesis. However, in reality, financial institutions are spending millions of dollars in hiring physics Ph.D.s in order to come up with trading strategies. In recent years, banks' proprietary trading computer that is capable of generating sell and buy orders are directly plugged into a network of electronic brokerage system.

The gap between academic conventional wisdom and the reality is huge. It seems a puzzle for traditional academics is why banks are spending so much money in an attempt to make profits, which theory says no predictability. They make money and stay in business. Thus, banks who are in the market must know some privileged information that economists do not know.

High-frequency data may allow economists to have glimpse into what are the relevant information in predicting the exchange rate movements and volatility. Among others, the followings are facts discovered in the research utilizing the EBS data in the recent

years: (1) There are distinct patterns within the day: Three peaks in a day in activities and three troughs; (2) the surge in activities coincides with the opening of the major markets, Tokyo, London, and New York; (3) Some of macro statistics announcements have significant impacts on returns and activities; (4) When sell pressures, measured by trade occurred on the bid side, dominate buy pressures, measured by trade occurred on the ask side, the prices tend to decline, and vice versa; and (5) When there is a “run” (consecutive changes in one direction), the probability of a run continuing is more than 0.5.

References:

- (1) Takatoshi Ito, “The Exchange Rate in the Japanese Economy: the Past, Puzzles, and Prospects,” *Japanese Economic Review*, vol.56, no.1, March 2005: 1-38.).
- (2) T.Ito and Y. Hashimoto, “Microstructure of the Yen/Dollar Foreign Exchange Market: Patterns of Intra-day Activity Revealed in the Electronic Broking System,” NBER wp no. 9856, Oct 2004.
- (3) T.Ito and Y. Hashimoto, “Price Impacts of Deals and Predictability of the Exchange Rate Movements,” presented in the East Asian Seminar on Economics, NBER, June 22-24.
- (4) T.Ito and Y. Hashimoto, “Intra-day Seasonality in Activities of the Foreign Exchange Markets: Evidence from the Electronic Broking System,” *The Journal of the Japanese and International Economies*, Vol 20, Issue 4, Dec 2006: 637-664.