

Impact study on the interest rate futures market

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Abstract

Any announcement from the Federal Reserve has a huge impact on the interest rate markets. The press releases from the Federal Open Market Committee (FOMC) are major inputs to the market and the random intervention model is applied to interest rate futures transaction data to measure FOMC announcement impact. Missing prices during non-trading time periods are imputed iteratively during the estimation of model parameters. The study shows that the market trading on the announcement day is different from the market trading on a non-announcement for both the Eurodollar and T-Note futures market.

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1. Introduction

As the central bank of the United States, the Federal Reserve (Fed) manages the nation's money supply and credit, supervises and regulates a large share of the nation's banking and financial system. The most critical role of the Fed is to keep the economy healthy and the open market operation is one of the main means to control the market. The Fed's monetary policy affects prices, employment and economic growth by influencing the availability and the cost of money and credit in the economy.

The FOMC meets eight times a year in Washington, D.C. and for each session, they set the Fed's monetary policy based on the extensive analysis of economic statistics. The press releases

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are issued after the FOMC meetings and they are very critical inputs to the interest rate market traders. Strategies are set in advance of the announcement and trading plans are developed. Once the announcements are made, the traders react to the information according to their predetermined plans.

There are two aspects of market reaction that this paper attempts to address. First, the price change at the announcement day is expected to be bigger, because the market is more active and the price at the beginning of the second day reflects the market activity overnight. With the assumption that the short-term returns in trading defined as the price change are normally distributed, this paper explains the average level price change and the extreme price change with the mean and the tail behavior of the normal distribution, instead of explaining it with the price of other instruments. Second, assuming that the baseline of 2 h around the day change does not change, the differences in volatility of the prices with and without FOMC announcement can be explained with the difference in the baselines.

The benefit of the random effect model is to identify the origin of variance by specifying the source of variation in the model. The emphasis is on the distribution of the price level change at the announcement day compared to the price level change at the non-announcement day. Depending on the information from the Fed, the returns and the baseline can be different. However, the distribution explains the different expected behavior of the price level change. With the assumption that the FOMC announcement can affect the price level and the baseline structure which is associated with the volatility, this paper intends to identify the source of the difference between the announcement days and non-announcement days with the random intervention model.

In this study, the tick data¹ is used to analyze the FOMC impact on the interest rate futures market. The tick data is recorded at the same time when the trade occurs. Because the trading does not occur every minute, there are times when nothing is happening and the unobserved prices during non-trading hours are considered missing. Especially, during the earlier years of the study period, the market is not liquid and the trade occurs infrequently leaving many missing prices. The continuous price process is a commonly accepted belief to participants and those who study financial markets.² When the data is missing, i.e., non-trading, the cause is presumed to be that the bid-ask spread is not enough to compensate for the risk that the traders have to take in dealing with the futures and keeping the markets liquid. In this study, missing data is replaced with a model imputing the price bounded by two adjacent recorded prices. This allows the continuous price process to be assured over the entire period of the study.

The remainder of the paper is organized as follows: Section 2 provides background on the role of Federal Reserve and the interest rate futures market. Section 3 describes the tick data and addresses the assumptions on the data analysis. Section 4 outlines the methodologies used for the analysis. Section 5 reports the results from the empirical study. Section 6 contains the interpretation of the results, conclusions and future research direction. The statistical details on the methodology are included in the [Appendix A](#).

¹ Data Source: TickData, Inc.

² The greater emphasis on timing by hedge fund, traders and other market participants has motivated the research on the microstructure of the market and the high frequency data from the market enables them to study the continuous market behavior. The random intervention model is appropriate to study the microstructure of the market, with the assumption that the data from the daily market activities are independent samples. Besides the change in the mean due to the intervention, the random intervention model can be identify the sources of variability: day level and market level.

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