Chapter V
Macroeconomic Announcements, Asymmetric Volatility, and IT:
Evidence from JGB Futures

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ABSTRACT

This study analyzes the impact of macroeconomic announcements on the conditional volatility of Japanese government bond (JGB) futures returns. As information technology continues to develop, the arrival and the processing of new market-related information become more rapid. Using high-frequency data of JGB futures, we find that announcement shocks influence the dynamics of bond market volatility. Our results provide empirical evidence that the JGB futures market does not immediately incorporate implications of macroeconomic announcement news. The volatility of JGB futures returns persists for a while. Moreover, after distinguishing among types of shocks, volatility is asymmetric. Negative shocks have a stronger impact on subsequent volatility than do positive shocks.

INTRODUCTION

Recently, some event studies have used high-frequency data to investigate the efficient market hypothesis (EMH), which requires examination of announcement effects on volatility. For this chapter, we specifically examine scheduled news: macroeconomics announcements and asymmetric volatility.

Regarding volatility, precedent studies show that it is not constant through time. For example, Arshanapalli, d'Ouville, Fabozzi, and Switzer (2006), Wang, Wang, and Liu (2005), Ederington and Lee (2001), Bollerslev, Cai, and Song (2000), Jones, Lamont, and Lumsdaine (1998), Andersen and Bollerslev (1997), Glosten, Jagannathan, and Runkle (1993), and Nelson (1991) use volatility models such as the GARCH model to analyze market efficiency. Aside from those studies, many early investigations such as those of Fleming and Remolona (1999), Li and Engle (1998), and Ederington and Lee (1993) have similarly analyzed volatility.

Glosten et al. (1993), Nelson (1991), and Ederington and Lee (2001) also analyze the asymmetry of volatility. However, few studies have examined the government bond market; instead, they have investigated stock markets. The present study was intended to elucidate asymmetric volatility for a government bond market.

The asymmetric volatility effect refers to the tendency that good and bad news about returns differently affect the conditional volatility. Many studies have addressed the conditional volatility of stock returns. For example, Black (1976) argues that a drop in the value of a stock increases financial leverage, which renders the stock more risky and increases its volatility (the so-called leverage effect hypothesis). Recently, Goeij and Marquering (2006) report asymmetry in bond return volatility. Because financial leverage is inapplicable to government bonds, the leverage argument cannot explain asymmetry in bond volatility.

In this chapter, we investigate the asymmetric volatility in the Tokyo Stock Exchange (TSE) for Japanese government bond (JGB) futures. First, it is examined whether macroeconomic announcements influence volatility. Next, after including announcement effects into the model of the asymmetry of volatility, market efficiency is analyzed.

Minaki (2006), using identical data to those used in this study, demonstrates that the JGB futures market in TSE is not efficient. However, that study did not address asymmetric volatility. Therefore, we devote attention to the asymmetry of volatility and verify market efficiency.

We follow Glosten et al. (1993) and Ederington and Lee (2001), and examine whether the dynamics of volatility is different after positive and negative shocks.

Moreover, we use the surprise to estimate the model. That difference is calculated using the expected value that the Bloomberg is reporting and the actual value. To investigate the influence of the announcement effects, we must consider the importance of the difference between the actual data and the expectations of macroeconomic announcements: the surprise caused by the announcement, that is, market participants' unpredicted components of data. The difference between the actual value of macroeconomic announcements and their expected value is important, as described by Balduzzi, Elton, and Green (2001) and Fleming and Remolona (1999), when the influence of public information is estimated. Therefore, we also use surprise variables. For this study, we presume that unpredicted information, the so-called surprise, is important for measuring announcement effects.

Results show that the asymmetry of volatility is apparent in the JGB futures market. When a price falls unexpectedly rather than increasing, volatility is higher in the subsequent interval. In addition, the effects of macroeconomic announcements are considerable. Moreover, the JGB futures market is inefficient.

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