

S&P 500 implied volatility and monetary policy announcements

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Abstract

While many studies have investigated the link between macroeconomic events and equity market volatility, few have considered the impact on option implied volatilities. Given the recent focus on trading in implied volatility, in the context of the S&P 500 VIX index, this paper examines how the VIX index behaves around US monetary policy announcements. It is revealed that the VIX index falls significantly on the day of Federal Open Market Committee meetings.

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1. Introduction

There has been a great deal of research into the impact of macroeconomic announcements on equity markets, in terms of both returns and volatility. Evidence of links between the level of equity returns and macroeconomic announcements has been mixed. [Cutler et al. \(1989\)](#) and [Jones et al. \(2005\)](#) find no strong evidence of a relationship between equity returns and macroeconomic announcements. Whereas [Goodhart and Smith \(1985\)](#) and [Joyce and Read \(1999\)](#) find that UK equity returns react to a range of macroeconomic announcements. Evidence of the impact of announcements on equity volatility is also somewhat mixed. [Jones et al. \(2005\)](#) find some evidence

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of UK equity market volatility falling at the time of announcements, based on intraday futures data. Bomfim (2003) considers how US equity volatility reacts to US monetary policy announcements, specifically the surprise element in announcements. In doing so, Bomfim (2003) reveals quite a significant increase in daily volatility conditional on the surprise element.

While there has been a great deal of research into the impact of announcements on physical equity markets, there has been relatively little into the impact on options markets. Kearney and Lombra (2004) find that S&P 100 implied volatility increases with the surprise element in employment announcements. Nikkinen and Sahlström (2004) find that S&P 100 implied volatility rises prior to, and falls after a series of macroeconomic announcements.

This paper is related to Nikkinen and Sahlström (2004) in that we examine the behaviour of the returns on the VIX index (recently a tradable index relating to S&P 500 implied volatility) around FOMC board meetings. In summary, an interesting pattern is revealed in that the S&P 500 implied volatility index falls (around 2%) on the day of FOMC board meetings. No significant movements before or after the FOMC board meetings is detected. This finding is revealed irrespective of whether the FOMC changed US monetary policy conditions. While these results appear to suggest a profitable investment strategy, this is a question for future research.

This is a slightly different finding to that of Nikkinen and Sahlström (2004) as they found that implied volatility rose in the period prior to, and fell on the day of various macroeconomic announcements. Reasons for these differences will be discussed in Section 4.

The paper proceeds as follows: Section 2 outlines the data relevant to this study, Section 3 discusses the relevant econometric methodology used to determine the significance of the VIX returns in response to the monetary policy announcements, Section 4 presents empirical results, Section 5 concludes.

2. Data

The sample considered in this study is daily S&P 500 implied volatility estimates, from 3 January 1996 to 1 September 2006. The implied volatility measure utilised here is that provided by the Chicago Board of Options Exchange, the VIX.¹ The VIX is an implied volatility index derived from a number of put and call options on the S&P 500 index, which generally have strike prices close to the current index value with maturities close to the target of 22 trading days.² Therefore the resulting VIX index has a fixed 22 trading day horizon. It is derived without reference to a restrictive option pricing model. For technical details relating to the construction of the VIX index, see CBOE (2003).³

To examine the reaction of the VIX index surrounding potential monetary policy announcements, dates on which FOMC board meetings occurred during the period of 3 January 1996 to 1 September 2006 have been noted. The FOMC board met 88 times during this period, with each

¹ The VIX index used here is the most recent version of the index, introduced on September 22, 2003. VIX data for this study was downloaded from the CBOE website.

² The daily volatility implied by the VIX can be calculated when recognising that the VIX quote is equivalent to 100 times the annualised return standard deviation. Hence $(\text{VIX}/(100\sqrt{252}))^2$ represents the daily volatility measure (see CBOE, 2003).

³ All subsequent analysis is based on the most recent definition of the VIX using S&P 500 options. The empirical analysis presented below was also conducted using the older definition of the VIX using S&P 100 options. These results are not presented here and are available upon request.

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