Words that shake traders ☆
The stock market's reaction to central bank communication in real time

Carlo Rosa

University of Essex, Wivenhoe Park Colchester, CO4 3SQ, United Kingdom

A B S T R A C T

This paper investigates the effects of Federal Reserve's decisions and statements on U.S. stock and volatility indices (Dow Jones Industrial Average, NASDAQ 100, S&P 500, and VIX) using a high-frequency event-study analysis. I find that both the surprise component of policy actions and official communication have statistically significant and economically relevant effects on equity indices, with statements having a much greater explanatory power of the reaction of stock prices to monetary policy. For instance, around 90% of the explainable variation in S&P 500 is due to the surprise component of Fed's statements. This paper also shows that equity indices tend to incorporate FOMC monetary surprises within 40 min from the announcement release. Finally, I find that these results are robust along several dimensions. In particular, I consider different estimators, such as the Generalized Empirical Likelihood, and I extend the sample to include the recent period of heightened financial stress. This sensitivity analysis corroborates that central bank communication about its future policy intentions is a key driver of stock returns.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

The existing literature has extensively examined the influence of the Federal Reserve monetary policy on U.S. asset prices. This relationship is an important topic for several reasons. From the perspective of monetary policy makers, the response of asset prices to Federal Reserve policy is a key component for analyzing the effects of monetary policy on the economy, and thus understanding the policy transmission mechanism. From an asset pricing perspective, monetary policy decisions are often associated with large stock price movements. This paper contributes to the extant literature in two main aspects. First, this work investigates the real-time effect on equity and volatility indices of a new type of news item, specifically the information originating from the Federal Open Market Committee (FOMC) balance of risk statements that accompany the fed funds target decisions. Several papers have recently used high-frequency data to examine the response of stock prices to monetary decisions.[1] This strand of research has reached a consensus that equity prices strongly respond to unanticipated policy actions, i.e. the difference between what the Fed does and what the market expects the Fed to do. A potential drawback of this approach is that it does not take into consideration

[1] Some important studies employing intraday data, though this list is by no means exhaustive, include Andersen et al. (2007), Andersson (2010), Chuliá et al. (2010), Davig and Gerlach (2006), Farka (2009), and Wongswan (2006). Bernanke and Kuttner (2005), Ehrmann and Fratzscher (2004), Jansen and Tsai (2010), and Rigobon and Sack (2004) analyze the response of stock prices to Federal Reserve policy shocks using daily data.

the information regarding the likely direction of future monetary policy that the Fed has systematically communicated since May 1999 after every FOMC meeting. More specifically, Fed's statements not only explain the rationale for the policy action but also convey the outlook for the future monetary policy stance (i.e. the future policy tilt). For instance, the FOMC shares its views on the economic outlook by indicating whether the FOMC believes that the risks for the economy in the foreseeable future are weighted toward "conditions that may generate heightened inflation pressures" (indication of future policy tightening), or "the risks are balanced" (neutral announcement), or "risks are weighted toward economic weakness" (dovish statement). This paper confirms the findings of the previous literature that an unexpected policy tightening is associated with a decrease in stock prices, and goes one step further by explicitly accounting for the surprise component of central bank statements, i.e. the difference between what the Fed announces and what the market expects the Fed to announce.[2] Second, this paper considers high-frequency stock and volatility indices (Dow Jones Industrial Average, NASDAQ 100, S&P 500, and VIX) and a long time series of intraday data — spanning up to January 2010. By using high-frequency data, this paper seeks to more accurately characterize the response of stock prices to monetary policy shocks. On the one side, intraday data allow to better assess the microstructure details of how new information is impounded into asset prices, and more specifically the speed of the response of equity prices to FOMC decisions and statements. In addition, some of the results become much weaker, or even absent when using daily data. On the other side, by employing high-frequency data I address both (i) the endogeneity problem (i.e. the simultaneous interaction between stock prices and monetary decisions), and (ii) the omitted variables bias (i.e. substantially decreasing the likelihood that other relevant information, such as macro news, is released around policy announcements).[3]

The main findings of the paper can be summarized as follows. First, I show that both the surprise component of policy actions and official communication have statistically significant and economically relevant effects on equity indices. On average, an unanticipated 25-basis-point cut in the federal funds target is associated with about 1% increase in stock prices. An unanticipated hawkish statement, when the market expects a neutral statement, is associated with 0.6% decrease in equity indices. Importantly, I find that statements have a much greater explanatory power of the reaction of stock prices to monetary policy compared to monetary decisions. For instance, I find that around 90% of the explainable variation in S&P 500 is due to the surprise component of the Fed's statements. I interpret this striking finding as indicating that stock prices are strongly influenced by the expected path of policy. Second, I precisely characterize how stock prices adjust to the Fed's monetary policy providing further insights into the market adjustment process. I find that the volatility of equity returns peaks at the time of the release of the FOMC statement, and remains significantly higher than non-announcement days for about 40 min. In addition, stock prices react immediately to monetary shocks. The process of fully incorporating the new information, however, takes about 1 h, and thus it takes some time before prices settle into a new equilibrium. Third, I examine the robustness of the above estimation results along several dimensions. For instance, I consider different estimators, such as members of the class of Generalized Empirical Likelihood (GEL) estimators, and I extend the sample period to include the recent period of heightened financial stress. This sensitivity analysis corroborates the core finding that central bank communication about its future policy intentions is a key driver of stock returns.

The rest of the paper is organized as follows. Section 2 starts by describing the dataset. Section 3 contains the discussion of the empirical results of the stock market reaction to the Fed's monetary policy, and looks at the speed of equity price responses to FOMC announcements. Section 4 investigates the impact of monetary policy on equity prices during the recent financial crisis, and examines the robustness of the results. Finally, Section 5 concludes. Details on some estimation procedures are delegated to the Appendices at the end of the paper.

2. Data

I proceed by outlining the data for equity and volatility indices, and for the surprise component of monetary policy actions and statements.

2.1. Stock price data

In order to mitigate the nonsynchronous trading problem for component securities in an index (Lo and MacKinlay, 1990), all results reported below are based on (equally-spaced) 5-min continuously compounded stock returns, $100 \cdot log(p_t/p_{t-1})$, where p_t denotes the price of the last trade in the 5-min interval.[4] The equity returns data consist of the following cash stock and volatility indices:

• **INDU**: The Dow Jones Industrial Average cash index, also referred to as the Dow Jones or the Dow 30, is a stock market index that tracks 30 large publicly owned companies based in the United States. The Industrial portion of the name is largely historical, as many of the current 30 components have little or nothing to do with traditional heavy industry.

---

[2] The role of central bank communication for the conduct of monetary policy-making has recently received increasing attention in the academic literature both theoretically and empirically (see Blinder et al., 2008, for an excellent survey).

[3] Some very limited work has been undertaken on estimating the impact of monetary policy news on option-implied state-price densities of future stock returns (Birru and Figlewski, 2010), and on the daily response of the VIX index (Chen and Clements, 2007). This paper extends this literature by taking into account the surprise component of both policy decisions and statements, and by considering high-frequency VIX data.

[4] If no trade occurs in a given 5-min interval, I use the price from the previous interval. Andersen et al. (2003) and Bandi and Russell (2008) argue that 5-min returns provide a reasonable balance between sampling too frequently (and confounding price reactions with market microstructure noise), and sampling too infrequently (and blurring price reactions to monetary policy).