The Impact of Monetary Policy Shocks - Do not rule out Central Bank Information Effects or Economic News*

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Abstract

This paper reassesses the impact of monetary policy and central bank information shocks while accounting for the influence of economic news. We regress a set of monetary policy surprises on a measure of economic news and incorporate these new instruments into an SVAR model. Furthermore, we distinguish between the two shocks via sign restrictions on the instruments' impulse response functions. Our findings indicate significantly stronger and more enduring economic effects for monetary policy shocks, while the economic effects of central bank information shocks are weaker, if not vanish entirely. Nevertheless, persistent financial effects prevent us from completely dismissing the existence of central bank information effects. Consequently, it is important to account for both the effects of central bank information shocks and economic news in monetary policy settings.

Keywords: Monetary Policy, Central Bank information Channel, Economic News
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1 Introduction

What are the effects of monetary policy on the economy? Answering this question is empirically challenging because the central bank typically responds systematically to changes in economic conditions. For example, the central bank might raise interest rates in response to increasing inflation. These confounding factors make the analysis of the effects of monetary policy hard to identify. Recent advancements in the empirical macroeconomics literature propose a promising method to address these endogeneity concerns. Researchers measure the movements in financial variables, such as interest rate futures, in close windows around monetary policy announcements. Assuming financial markets are efficient and forward-looking, *expected* policy changes are already priced in before the announcements are made. This implies that the resulting *surprise series* can then be used as measures of monetary policy shocks.

However, the literature has begun to question the validity of these monetary policy surprises. For example, Nakamura and Steinsson (2018), Bauer and Swanson (2022), and Jarociński and Karadi (2020) argue that during its policy announcements, central banks do not only disclose the current and future course of their policies but also reveal private information about the state of the economy. They conclude that the central bank's revelation of private information can, in turn, affect agents' beliefs about economic fundamentals. For example, if the Fed announces an interest rate hike, it does not only announce its policy but also proposes that the economy is strong enough to withstand higher interest rates. Consequently, professional forecasters revise their output forecasts upward instead of downwards. This is the so-called "central bank information" effect. In contrast, Bauer and Swanson (2023) argue that instead of revealing private information about the state of the economy, the Fed endogenously responds to economic news. For instance, when newly released data in the employment report suggest that employment is higher than expected, the central bank revises its monetary policy decision accordingly, while the market updates its output forecasts. The study claims that it is these simultaneous responses to news rather than the disclosure of private information about the economy that drive the positive correlation between FOMC announcements and revisions in output forecasts. The authors call this the "Fed response to news" channel.

This paper reassesses the effects of monetary policy and central bank information shocks while taking into account the effect of economic news. To the best of our knowledge, ours is the first study to simultaneously consider both the effects of central bank information shocks and economic news in a monetary policy setting. First, we regress a set of monetary policy surprises on a measure of economic news to eliminate any potential contamination from economic news in our results. Second, we include the 'cleansed' surprise series in Jarociński and Karadi (2020)'s SVAR model and further distinguish between monetary policy and central bank information shocks via sign restrictions on the impulse responses of the surprise series. While the signs of the economic and financial effects remain consistent, we uncover important differences. For instance, the output and price responses to monetary policy shocks are 50% and 20% stronger at the trough, respectively. In addition, the responses are considerably longer lasting. By contrast, the output and price responses to central bank information shocks are weaker, if not vanish completely. However, the impact on financial variables, particularly on bond yields, persists and remains significant. This suggests that we cannot entirely dismiss the existence of central bank information effects. Consequently, our findings emphasize the importance of simultaneously considering both economic news *and* central bank information effects in the context of monetary policy. Ignoring either introduces bias into our inferences.

The paper proceeds as follows. Section 2 describes the methodology. Section 3 presents the results, and Section 4 concludes.

2 Methodology

This section outlines Jarociński and Karadi (2020)'s SVAR model. Equation 1 states the model

$$\begin{pmatrix} m_t \\ y_t \end{pmatrix} = \sum_{p=1}^{P} \begin{pmatrix} 0 & 0 \\ B^p_{ym} & B^p_{yy} \end{pmatrix} \begin{pmatrix} m_{t-p} \\ y_{t-p} \end{pmatrix} + \begin{pmatrix} 0 \\ c^y \end{pmatrix} + \begin{pmatrix} u^m_t \\ u^y_t \end{pmatrix}, \begin{pmatrix} u^m_t \\ u^y_t \end{pmatrix} \sim \mathcal{N}(0, \Sigma) \qquad (1)$$

where m_t is a vector of monetary policy surprises and consists of the changes in the three-months ahead fed funds futures and the S&P 500 stock market index. We construct m_t by summing up all changes within a 30-minute window around each FOMC meeting within a month and set m_t equal to zero for months without an FOMC meeting. Moreover, y_t is a vector of macroeconomic variables including the one-year government bond yield, the log of S&P 500 stock market index, the log of real GDP, the log of the GDP deflator and Gilchrist and Zakrajšek (2012)'s excess bond premia. B^p_{ym} and B^p_{yy} are the lag coefficient matrices where p is the lag length. Following Jarociński and Karadi (2020), we assume that m_t is not affected by the lags of either m_t or y_t, i.e., $B^p_{mm} = B^p_{my} = 0$. Lastly, $(u^{m'}_t, u^{y'}_t)'$ is a vector of reduced form residuals assumed to be normally distributed with zero mean and covariance matrix Σ.

We estimate Equation 1 via Bayesian methods. As it is standard in the Bayesian SVAR literature, we assume a normal Minnesota prior for B and an inverse Wishart prior for Σ. The sample period runs from December 1984 until December 2016. The lag length of the model is 12.

2.1 Identification and controlling for Economic News

In our context, applying m_t directly as external instruments is problematic because m_t does not only capture the pure monetary policy shock but also the central bank information shock and the central bank's response to economic news. Hence, we need additional measures to disentangle the three effects.

First, we follow Bauer and Swanson (2023) and regress the monetary policy surprises on the first lag of Brave et al. (2019)'s "big data" index of economic news, BBK_t, to strip m_t from any economic news that may contaminate our results. The index represents an extension of the Chicago Fed National Activity Index and is based on an unbalanced panel of 500 U.S. macroeconomic variables. The index in $t-1$ captures data for period $t-1$ which are often released in period t, e.g., the unemployment rate. We run the following pair of regressions

$$m_t = \beta BBK_{t-1} + m_t^{\perp}, \tag{2}$$

with the sample restricted to months with FOMC announcements. Since BBK_{t-1} controls for economic news, the residual $m_t^{\perp}$ exclusively captures the the monetary policy and the CB information shocks. Thus, we proceed with $m_t^{\perp}$ instead of m_t to estimate Equation (1).[1]

Second, we still need to distinguish between monetary policy and central bank information shocks. We follow Jarociński and Karadi (2020) and apply sign restrictions on the impulse responses of the two monetary policy surprises in $m_t^{\perp}$. We define a pure monetary policy shock as a shock that generates a negative co-movement between the interest rate and the stock market surprises, i.e., a monetary policy tightening is contemporaneously accompanied by a decrease in the stock market. By contrast, a central bank information shock is defined as a shock that induces a contemporaneous positive co-movement between the two surprises, e.g., a monetary policy tightening is accompanied by an increase in the stock market on impact.

[1]One downside of using the BBK_t index is that the index also captures data releases that post-date the FOMC meetings in t. If the Federal Reserve information advantage confirms itself in the post-meeting releases, BBK_{t-1} and the central bank information shock will be correlated. In that case, controlling for BBK_{t-1} entails the risk of projecting out the central bank information effect, biasing our results. According to our empirical estimates, this bias cannot be too large, however, as we continue to find significant central bank information effects. Furthermore, in Appendix A.1 we demonstrate the robustness of our results when we employ an alternative measure of monetary policy shocks that is not subject to these timing issues.

3 Results

Figure 1 presents our main results. The left (right) column shows the impulse response functions of a monetary policy (central bank information) shock. The black solid lines represent the posterior median estimates along with the 68% (dark) and the 90% (light) credible bands. The red solid lines refer to Jarociński and Karadi (2020)'s original posterior median impulse responses.

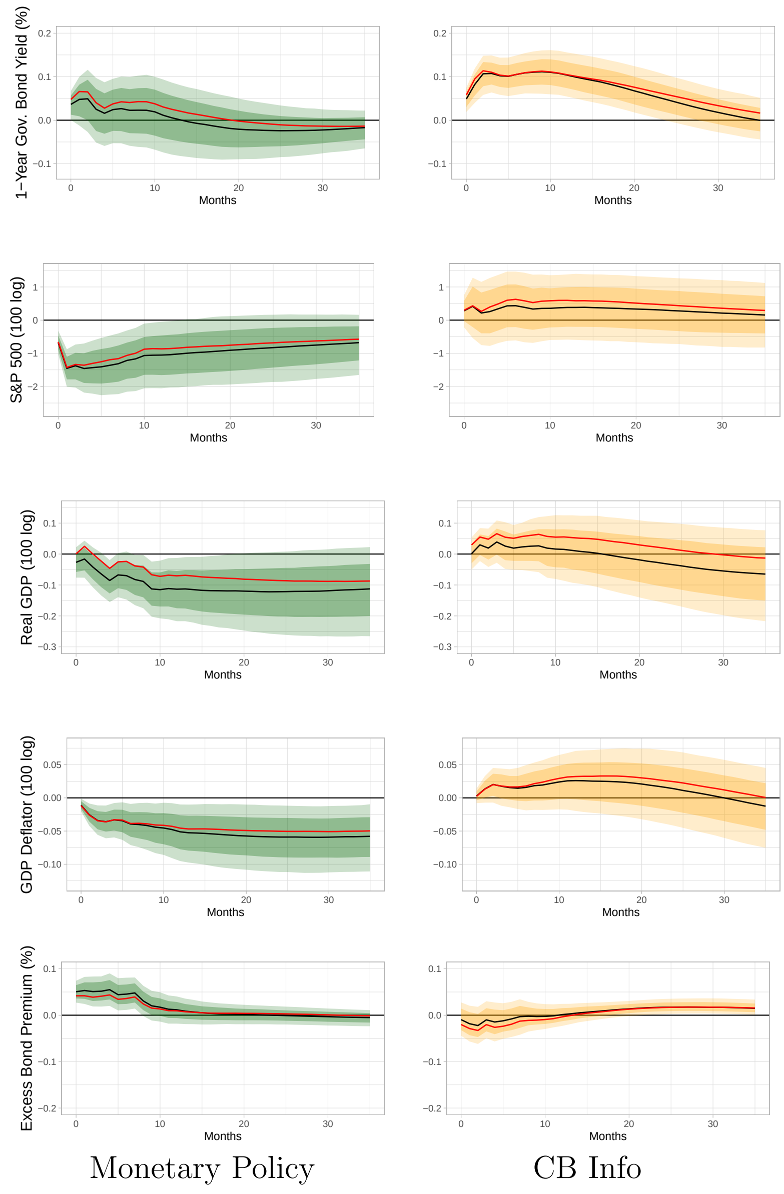
The Figure shows that the signs of the responses match those in Jarociński and Karadi (2020). For instance, we find that monetary policy and central bank information shocks induce different economic dynamics. Following a contractionary monetary policy shock output, prices and stock prices all decrease while interest rates and excess bond premia both increase. By contrast, a central bank information shock leads to an increase in output, prices and stock prices, while excess bond premia decrease.

However, we also find important and noticeable differences. First, our estimated monetary policy responses have larger magnitudes. For example, real GDP decreases by 0.12% at the trough after 20 months. This decrease is 50% stronger compared to the 0.08% decrease in Jarociński and Karadi (2020). The GDP deflator decreases, at the trough after 26 months, by 0.06% compared to the 0.05% as in Jarociński and Karadi (2020) – a 20% larger decline. Moreover, excess bond premia increase, at the peak after 4 months, by 0.055 bp compared to the 0.043 bp after four months as in Jarociński and Karadi (2020) – a 28% stronger increase.

Second, our estimated monetary policy responses are more persistent. For example, real GDP and the GDP deflator significantly decrease for at least twenty and thirty-six months, respectively. In contrast, in Jarociński and Karadi (2020), the response of real GDP is only significant nine months after the shock when we consider the 68% credible bands, and never significant when we refer to the 90% credible bands. In addition, Jarociński and Karadi (2020)'s response of the GDP deflator is only significant for eight months after the shock.

Third, we find that the macroeconomic responses to a central bank information shock are weaker, if not vanish completely. Our estimated peak responses have smaller magnitudes.

Figure 1: Main Results: Impulse Response Functions



Note: Figure shows the impulse response functions to a monetary policy shock (left column) and a central bank information shock (right column). The black solid lines represent the posterior median estimates along with the 68% (dark) and the 90% (light) credible bands. The red solid lines refer to Jarociński and Karadi (2020)'s original posterior median estimates.

We find that output and prices increase by 0.04% after three months and by 0.025% after twelve months, respectively. These effects are 40% and 20% smaller, respectively, compared to Jarociński and Karadi (2020). Moreover, Jarociński and Karadi (2020) show that real GDP and the GDP deflator increase for eight and eighteen months, respectively, if we refer to the 68% credible bands. Our estimated 68% credible bands of the output and price responses include zero for almost the entire forecast horizon. However, we also find that the financial effects of a central bank information shock remain present. For example, the response of government bond yields remains significantly positive for more than twenty months, while the posterior median response is close to that in Jarociński and Karadi (2020) for at least fifteen months. Lastly, our estimated response of excess bond premia is indistinguishable from its counterpart in Jarociński and Karadi (2020) after fifteen months.

4 Conclusion

This paper reassesses the effects of monetary policy and central bank information shocks while taking into account the effect of economic news. First, we build upon Bauer and Swanson (2023), who argue that the effects of central bank information shocks are also consistent with a central bank's endogenous response to macroeconomic data releases. We account for this 'central bank response to news' channel by regressing a set of high-frequency monetary policy surprises on a measure of economic news. Second, we include the cleansed surprise series into Jarociński and Karadi (2020)'s SVAR model and apply sign restrictions to further distinguish between monetary policy and central bank information shocks.

Our analysis reveals that the responses of output and prices to monetary policy shocks have larger magnitudes and exert a more prolonged impact compared to Jarociński and Karadi (2020). By contrast, the macroeconomic responses to central bank information shocks are weaker, if not vanish completely. But, because the financial effects, especially on bond yields, remain present, we cannot entirely dismiss the existence of central bank information effects. Our analysis has important implications for future research. Our findings underscore the importance of simultaneously accounting for both economic news *and* central bank information effects in the context of monetary policy settings. Ignoring either introduces bias into our inferences.

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A Supporting Online Appendix for Publication

A.1 Robustness Checks and Alternative Instruments

In this appendix, we report impulse responses when we use the following alternative specifications of the external instrument:

Alternative Instrument 1: We use Bauer and Swanson (2022)'s monetary policy surprises 'orthogonalized' for economic news instead of the surprises in the federal funds rate. This series is publicly available in their replication files. The difference between this instrument and the ones in our main exercise is that, aside from different measures of economic news, they measure monetary policy surprises using Eurodollar futures contracts (one to four quarters ahead). The advantage of using this series over $m_t^{\perp}$ is that the data releases all pre-date FOMC meetings, unlike the BBK index. The main downside is that the series is built from non-publicly available data.

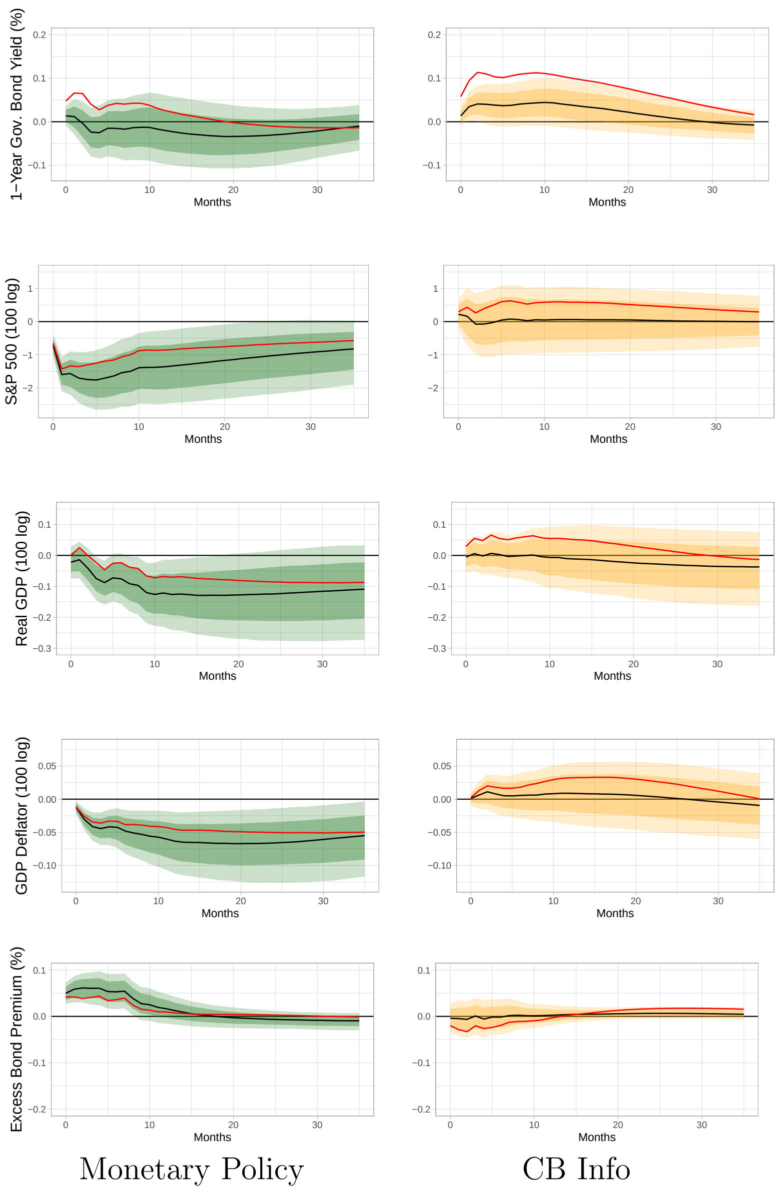
Figure A.1 showcases the impulse responses. Results are qualitatively the same as the ones reported in the main paper, but the impact of a central bank information shock on real GDP and the GDP deflator is even less pronounced. Remarkably, our conclusion that the central bank information shock still exists and might be a key driver of financial responses to monetary policy surprises survives this robustness check.

Alternative Instrument 2: To account for the possibility news released at the end of one month could be driving surprise announcements at the beginning of the next month, we run the regression (2) with one additional lag of the BKK index:

$$m_t = \beta BBK_{t-1} + \alpha BBK_{t-2} + m_t^{\perp}, \tag{A.1}$$

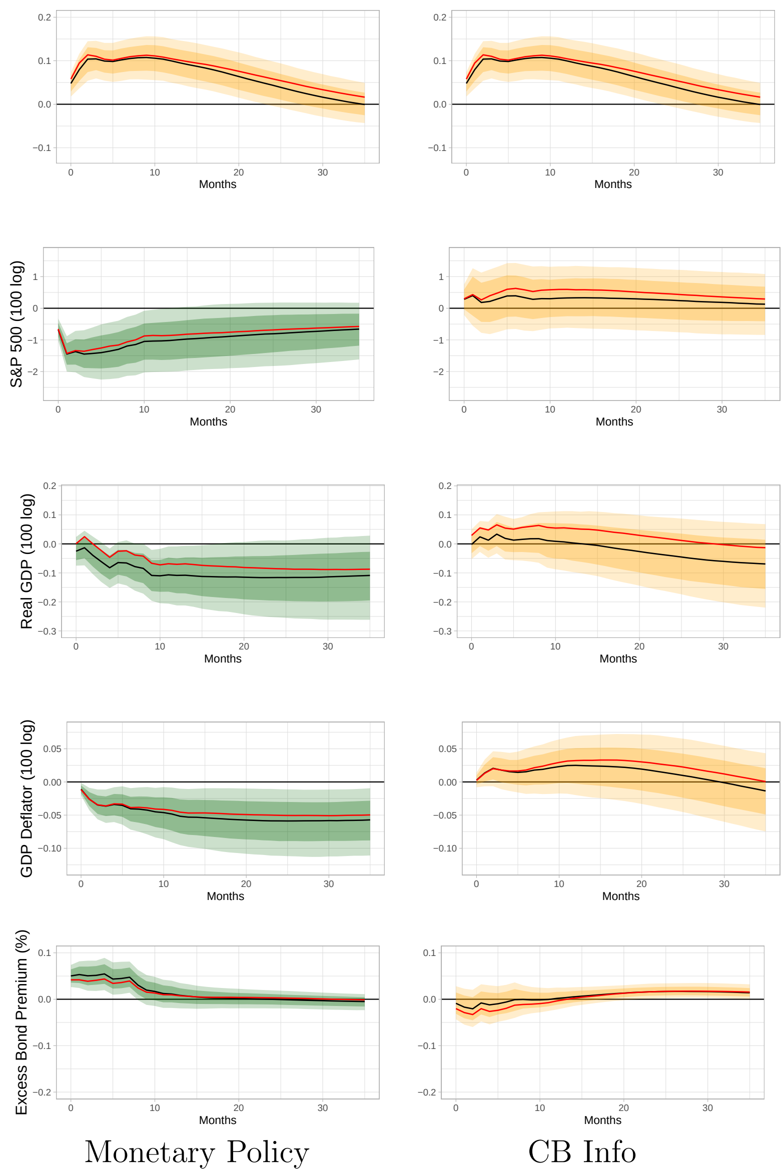
and use $m_t^{\perp}$ as external instruments. We report the impulse responses in Figure A.2. There is no substantial difference compared to our main result.

Figure A.1: Results for Alternative Instrument 1



Note: Figure shows the impulse response functions to a monetary policy shock (left column) and a central bank information shock (right column) when using Bauer and Swanson (2022) orthogonalized monetary policy surprise series. The black solid lines represent the posterior median estimates along with the 68% (dark) and the 90% (light) credible bands. The red solid lines refer to Jarociński and Karadi (2020)'s original posterior median estimates.

Figure A.2: Results for Alternative Instrument 2



Note: Figure shows the impulse response functions to a monetary policy shock (left column) and a central bank information shock (right column) when using the first and second lag of the BBK index. The black solid lines represent the posterior median estimates along with the 68% (dark) and the 90% (light) credible bands. The red solid lines refer to Jarociński and Karadi (2020)'s original posterior median estimates.