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Monetary Policy and Information Production in the Secondary Market

Abstract

This paper studies the effect of Federal Reserve decisions on information production in the secondary market. We distinguish conventional monetary shocks from those conveying new economic information. Monetary contraction in the conventional sense leads information-driven traders to intensify their information production activity. In contrast, monetary contraction that conveys positive economic news reduces information production in the secondary market. In terms of influencing price informativeness, the Fed's information shocks are more impactful than the conventional shocks.

Keyword: Federal Reserve; Informed trading; Monetary policy; Information shocks.
JEL Codes: G14; E52; E58.

1. Introduction

Monetary shocks are recognized as drivers of asset returns and macroeconomic performance (Gertler and Karadi, 2015; Rigobon and Sack, 2004). In this paper, we expand the analysis of the monetary policy's role to the realm of informed trading in the secondary market. The emphasis on informed trading is relevant because of its consequential role in guiding firms when making investment and financing decisions (Chen et al., 2007; Fresard, 2012). When intensifying their information search, market traders can come across valuable information that can even guide corporate insiders (Luo, 2005).

How does informed trading in the U.S. market react to an influential force like the Federal Reserve? In answering this question, we distinguish between the Fed's role as an executor of monetary policy in the conventional sense and its role as a producer of macroeconomic information (Cieslak and Schrimpf, 2019; Nakamura and Steinsson, 2018; Romer and Romer, 2000). Economy-wide information occupies half of the announcements made by the Fed (Cieslak and Schrimpf, 2019). Moreover, the Fed's allocation of substantial resources to economic forecasting compared to private companies increases its credibility as a source of relevant economic information (Romer and Romer, 2000).

We build our predictions on two premises. First, there is robust evidence that uncertainty is considerably high under bad economic and financial conditions (Bloom et al., 2018). Second, as suggested in the information economic literature, by increasing the marginal return on privately collected information, uncertain conditions are key catalysts of informed trading (Grossman and Stiglitz, 1980). Hence, the Fed can affect informed trading by (a) influencing economic conditions through conventional policy, and (b) alerting investors to changes in these conditions as an information producer.

This reasoning has direct empirical implications on the informed trading's reaction to monetary policy announcements. We predict that conventional monetary contraction, which is known to lead to a deterioration in economic performance, incentivizes more informed trading. In contrast, monetary contraction that conveys a positive assessment of the economic outlook by the Fed reduces the investors' need to expend significant resources in the private acquisition of information. As shown in Section 3, our results based on the analysis of informed trading for more than 4,000 firms and 90,000 firm-quarter observations support this prediction.

This paper is the first to introduce monetary shocks as key predictors of firm-level of informed trading at the firm level. We provide robust evidence suggesting that the secondary market traders' behavior is highly responsive to monetary shocks in both their conventional and informational forms. Our findings also enhance the understanding of the Fed's role as an information producer (Cieslak and Schrimpf, 2019; Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2020; Nakamura and Steinsson, 2018; Romer and Romer, 2000). As suggested by Miranda-Agrippino and Ricco (2020), disentangling conventional and informational shocks allows richer insights into the Fed's role.

2. Identifying Conventional and Fed Information Shocks

We separate conventional monetary shocks from Fed information shocks by examining the high-frequency co-movements of stock returns and interest rates in the short window surrounding the announcement by the Federal Open Markets Committee (FOMC) (Cieslak and Schrimpf, 2019). This window covers the 10 minutes preceding the announcement to the 20 minutes that follow. Monetary shocks in their conventional sense are identified as those where the change in the fed futures and the S&P 500 are negatively correlated. In turn, interest rate movements that are positively correlated with changes in the S&P 500 suggest that equity investors consider interest rate increases (decreases) as a signal of a positive (negative)

economic forecast by the Fed. Rather than reducing growth prospects, unanticipated monetary contraction is treated as a reassuring signal of a robust economic outlook by a credible information producer (Breitenlechner et al., 2021). We rely on the expansive Jarociński and Karadi (2020) dataset that covers 240 FOMC announcements between 1990 and 2016.

As in Jarociński and Karadi (2020), Figure 1 presents a scatterplot of interest rate and stock return surprises as each meeting is presented by a dot. The dots in the top-left and bottom-right quadrants are aligned with the conventional view of monetary policy: 182 meetings (75.8% of obs.) fit into this category. The dots in the top-right and bottom-left quadrants reflect a positive association between interest rates and stock returns at the time of FOMC announcements. A recent contribution by Adra (2021) uses these identified shocks to show that the Initial Public Offering (IPO) activity decreases in response to conventional contraction and increases in response to positive information shocks.

(Figure 1)

3. Variables and Results

We examine the variation in informed trading using a local projection approach in a panel regression setting (Jordà et al., 2020). We estimate the following specification:

$$\begin{aligned}\left(\ln(Info_{t+h,i}) - \ln(Info_{t-1,i})\right) \times 100 \\ = \gamma_i^h + \beta_{ConvShock}^h . ConvShock_t + \beta_{InfoShock}^h . InfoShock_t \\ + f\left(firm\ factors_{t-1,i}\right) + g(Economic\ Factors_{t-1}) + \beta_{Info}^h . \ln(Info_{t-2,i}) \\ + \epsilon_{t+h,i}\end{aligned} \quad (1)$$

where *Info* refers to the degree of informed trading in firm *i* *h* quarters after quarter *t* where the shock occurs. Our primary proxy for this measure is the Multimarket Information Asymmetry (MIA) developed by Johnson and So (2018). MIA, which is bounded between 0 and 1, exploits

the trading dynamics between the options and equities market to quantify the activity of information-driven investors. The distinguishing feature of MIA is that it increases in response to abnormally high trading in either (a) options relative to stocks, or (b) stocks relative to options. We retrieve daily MIA levels from Tavis Johnson's webpage and average them for each quarter. We also validate our results by using the Probability of Informed Trading (PIN) estimates of Brown and Hillegeist (2007), which are available for the subperiod between 1993 and 2010 on Stephen Brown's website.

$ConvShock$ is the aggregate quarterly level of conventional shocks. $InfoShock$ is the equivalent level of Fed information shocks. In addition to the one-quarter lag in the proxy of informed trading, we control for firm-specific factors (logs of size, turnover: retrieved COMPUSTAT, and quarterly return: retrieved from CRSP) and macroeconomic indicators (logs of GDP, CPI, and S&P 500: retrieved from the FRED database). Descriptive statistics are reported in Table 1. γ_i^h represents the firm-specific effect at each horizon. $\epsilon_{t+h,i}$ is a white noise error.

(Table 1)

Evidence from Table 2 supports our prediction. A standard deviation conventional contraction leads to a growth in MIA by 1% in the subsequent quarter. This growth persists for up to five quarters. Interestingly, these effects are considerably smaller than the effects of the Fed's information shocks. Contractionary shocks that convey a positive economic outlook lead to an immediate decline in MIA by 1%. The cumulative effect reaches 2.5% after two quarters. The relatively stronger impact of Fed information shocks testifies to the Fed's relevance as a consequential information producer.

(Table 2)

The results in Table 3, which are based on PIN, show even larger effects. A standard deviation information shock reduces informed trading by 5% in the subsequent three quarters. To some extent, these results are predicted, as MIA covers the activity of options investors, while PIN does not. The options investors' sophistication is a reason why not all the economic news by the Fed is treated as new information.

(Table 3)

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Table 1: Descriptive statistics

Variable	# of Obs.	Mean	Median	25th Pct	75th Pct	SD
MIA	93,916	0.40	0.40	0.31	0.57	0.13
PIN	60,326	0.10	0.10	0.07	0.13	0.05
$ConvShock$	93,916	-0.01	0.00	-0.01	0.04	0.07
$InfoShock$	93,916	-0.01	0.00	0.00	0.02	0.04
$Size$	93,916	7.79	7.70	6.34	9.08	1.96
$Turnover$	93,916	2.78	2.08	1.29	3.36	2.81
Ret	93,916	0.56	0.55	-6.16	7.03	14.77
GDP	93,916	9.61	9.64	9.51	9.69	0.12
CPI	93,916	5.31	5.35	5.20	5.47	0.13
$S\&P\ 500$	93,916	7.18	7.16	7.03	7.62	0.22

Note: This table presents the key descriptive statistics of the variables used in this paper.

Table 2: The effects of Fed conventional shocks and information shocks on MIA

Quarter\Variables	$Firm\ Effects$	$ConvShock_t$	$InfoShock_t$	$Size_{t-1}$	$Turnover_{t-1}$	Ret_{t-1}	GDP_{t-1}	CPI_{t-1}	$S\&P\ 500_{t-1}$	$ln(MIA_{t-2})$	*P-Value (F-Test)*
$h=1$	YES	12.839***	-23.930*	1.090**	-0.189*	-0.095***	-38.680***	22.997**	10.284***	-8.226***	0.00
		(3.702)	(14.152)	(0.523)	(0.114)	(0.017)	(11.707)	(9.465)	(1.498)	(0.747)	
$h=2$	YES	10.521***	-61.991***	1.513***	-0.217*	-0.091***	-55.531***	37.116***	11.157***	-11.186***	0.00
		(3.772)	(14.439)	(0.557)	(0.120)	(0.018)	(11.934)	(9.657)	(1.541)	(0.767)	
$h=3$	YES	14.056***	-54.204***	2.671***	-0.179	-0.148***	-32.524***	12.218	8.733***	-11.138***	0.00
		(4.076)	(15.524)	(0.601)	(0.129)	(0.019)	(12.799)	(10.352)	(1.656)	(0.822)	
$h=4$	YES	14.044***	21.510	3.948***	0.229*	-0.102***	-48.379***	11.299	13.094***	-11.582***	0.00
		(4.279)	(16.172)	(0.617)	(0.136)	(0.021)	(13.350)	(10.777)	(1.728)	(0.856)	
$h=5$	YES	13.570***	31.932**	4.463***	0.482***	-0.102***	-39.654***	7.114	15.320***	-13.522***	0.00
		(4.207)	(16.139)	(0.606)	(0.138)	(0.021)	(13.589)	(10.819)	(1.710)	(0.852)	
$h=6$	YES	6.233	-23.831	5.021***	0.464***	-0.113***	-34.169***	-0.781	18.698***	-15.410***	0.00
		(4.289)	(16.121)	(0.629)	(0.140)	(0.021)	(13.636)	(10.972)	(1.747)	(0.870)	

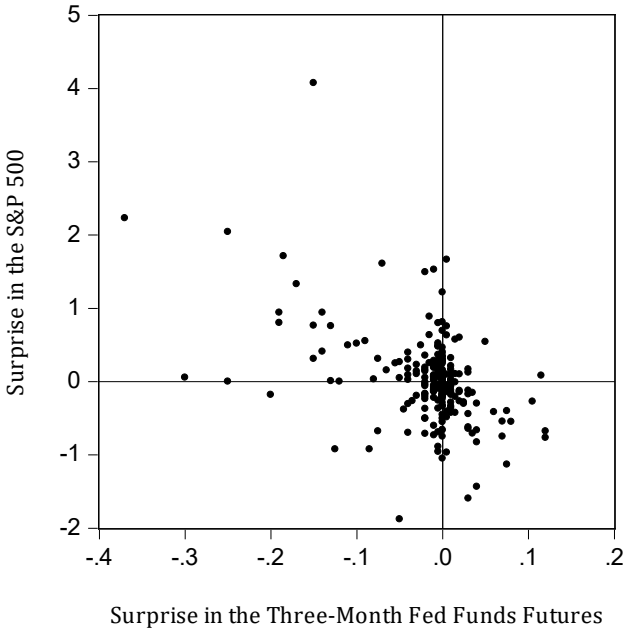
Note: The results of the local projection estimations. ***, **, and * represent significance at the 1%, 5%, and 10% levels, respectively. Clustering is done at the firm-level, but results do not change if clustering is done at the quarter level.

Table 3: The effects of Fed conventional shocks and information shocks on PIN

Quarter\Variables	*Firm Effects*	$ConvShock_t$	$InfoShock_t$	*Control Variables*	*P-Value (F-Test)*
$h = 1$	YES	13.927*** (2.576)	-23.608** (11.325)	YES	0.00
$h = 2$	YES	21.534*** (2.666)	-57.697** (11.760)	YES	0.00
$h = 3$	YES	10.598*** (2.937)	-131.912*** (12.872)	YES	0.00
$h = 4$	YES	24.846*** (2.758)	-111.871*** (12.094)	YES	0.00
$h = 5$	YES	36.621*** (2.700)	-105.890*** (11.910)	YES	0.00
$h = 6$	YES	27.981*** (2.942)	-126.529*** (12.804)	YES	0.00

Note: This table replicates the analysis from Table 2 using PIN as the proxy of informed trading.

Figure 1: Interest rates and S&P 500 surprises



Note: The thirty-minute changes in the Fed funds futures and the S&P 500. Each dot represents a separate FOMC meeting between February 1990 and December 2016.