



Contents lists available at ScienceDirect

## Finance Research Letters

journal homepage: [www.elsevier.com/locate/frl](http://www.elsevier.com/locate/frl)

## Investor sentiment and the pre-FOMC announcement drift

Haifeng Guo<sup>a</sup>, Chi-Hsiou D. Hung<sup>b</sup>, Alexandros Kontonikas<sup>\*,c</sup><sup>a</sup> Durham Business School, United Kingdom<sup>b</sup> Adam Smith Business School, United Kingdom<sup>c</sup> Essex Business School, United Kingdom

## ARTICLE INFO

## Keywords:

Investor sentiment  
Pre-FOMC drift  
Order imbalance

## JEL classification:

G11  
G12  
G14

## ABSTRACT

We find that the stock market increases significantly over the pre-FOMC announcement window only during periods of high investor sentiment and low economic policy uncertainty. Buy-initiated trades associated with high sentiment are positively related to pre-FOMC returns. These findings are consistent with a behavioural interpretation of the pre-FOMC announcement drift.

## 1. Introduction

Lucca and Moench (2015) document large average stock market returns in a 24-h window preceding monetary policy announcements made after scheduled Federal Open Market Committee (FOMC) meetings. This phenomenon, which they refer to as the pre-FOMC announcement drift, is difficult to explain with rational arguments based on standard asset pricing theory.

Prior research has documented a strong impact of investor sentiment on stock prices (Baker and Wurgler, 2006) and the mean-variance relationship (Yu and Yuan, 2011; Wang, 2018). Little is known, however, about how sentiment may affect the relationship between monetary policy and the stock market.<sup>1</sup> In this paper, we revisit the pre-FOMC announcement drift by considering the role of investor sentiment. In order to capture different dimensions of sentiment, we employ Baker and Wurgler's (2006) investor sentiment index (BWI) and the University of Michigan consumer sentiment index (CSI). The latter is developed on basis of surveys of individuals, while the former is extracted from several financial variables. Moreover, we also consider a measure of economic policy uncertainty (EPU), which is negatively related to investor sentiment (Zhang, 2019).

We find that the pre-FOMC announcement drift is related to the state of investor sentiment and economic policy uncertainty. In high sentiment (low uncertainty) months, the S&P500 index increases by about 20 basis points during the pre-FOMC window. Whereas, in low sentiment (high uncertainty) months there is no positive drift. Our analysis of the potential determinants of the pre-FOMC announcement drift reveals the important role of order imbalance. Specifically, buy-initiated trades during periods of high investor sentiment are positively related to pre-FOMC returns. These findings are consistent with a well-established idea in the psychology literature, that high sentiment leads people to make optimistic judgments (Bower, 1981; Arkes et al., 1988). Overall, our evidence is in line with a behavioural interpretation of the pre-FOMC announcement drift.

\* Corresponding author.

E-mail address: [ak16270@essex.ac.uk](mailto:ak16270@essex.ac.uk) (A. Kontonikas).

<sup>1</sup> With the exception of Guo et al. (2019), previous studies do not account for the role of sentiment.

<https://doi.org/10.1016/j.frl.2020.101443>

Received 10 October 2019; Received in revised form 6 January 2020; Accepted 23 January 2020  
1544-6123/ © 2020 Elsevier Inc. All rights reserved.

## 2. Data

Our analysis focuses on stock returns before scheduled FOMC meetings over the period February 1994 to October 2015 (175 meetings).<sup>2</sup> We define the pre-FOMC window to include the trading day that precedes FOMC meetings, hence we do not incorporate developments that occur on the FOMC day itself. In this respect, our analysis is different from previous studies that test for information leakage shortly (a few minutes) before the FOMC announcement (Bernile et al., 2016).

### 2.1. Investor sentiment

We employ two proxies for sentiment: Baker and Wurgler's (2006) investor sentiment index and the University of Michigan's consumer sentiment index.<sup>3</sup> The BWI is a commonly used measure of investor sentiment (Yu and Yuan, 2011; Stambaugh et al., 2012). By taking the first principal component of five financial variables that can reflect sentiment (closed-end fund discount, the number and the first-day returns of IPOs, the equity share in total new issues and the dividend premium), the BWI filters out idiosyncratic noise in its constituents and captures common variation. The CSI is measured outside financial markets, based on surveys conducted by the University of Michigan in which 500 U.S. participants are asked questions about their outlook on the economy. It has been used by Lemmon and Portniaguina (2006) and McLean and Zhao (2014), among others, to measure sentiment. Fisher and Statman (2003) report positive correlations between consumer confidence and measures of bullishness of individual investors about the stock market.

To remove the effect of business cycle variation, Baker and Wurgler (2006) orthogonalize each of the constituent variables of their sentiment index with respect to a set of macroeconomic conditions before conducting the principal component analysis. We obtain the orthogonalized BWI index from their dataset, and also regress the CSI on the same set of macroeconomic variables. The residuals from these regressions capture sentiment (optimism or pessimism) that is not justified by economic fundamentals.

Fig. 1 plots the orthogonalized sentiment indexes. They all rise during the 1990s but start to decline from around 2000, following the culmination of the dot-com boom. Sentiment declines during the recent global financial crisis, but somewhat recovers afterward. The two indexes exhibit different dynamics. For example, the late 1990s dot-com boom episode features more prominently in the BWI, as compared with the CSI.

In order to examine whether the pre-FOMC drift is conditional on the state of investor sentiment, we construct a dummy variable based on the orthogonalized level of sentiment. The dummy variable,  $S_t^H$ , is equal to 1 (0) for the days that are in a month starting with a high (low) sentiment level. We define a month as starting with high (low) sentiment if the sentiment index in the previous month is above (below) the full sample mean value, following Baker and Wurgler (2006).

### 2.2. Economic policy uncertainty

To capture uncertainty related to economic policies, we adopt a news-based measure of economic policy uncertainty recently developed by Baker et al. (2016).<sup>4</sup> Zhang (2019) show that EPU is negatively related to investor sentiment. This pattern can also be observed in Fig. 1, e.g. the sharp decline in the BWI since 2001 went hand-in-hand with a large increase in EPU. The negative correlation between sentiment and EPU is stronger in the case of the CSI ( $-0.40$  vs.  $-0.13$  for the BWI). We proceed by constructing a dummy variable  $EPU_t^L$ , which equals to 1 (0) for the days that are in a month starting with a low (high) EPU level.

### 2.3. Stock returns and trading activity

We measure daily stock market returns using the log returns of the S&P500 index. Returns are in excess of the 1-month Treasury bill rate.

Following Bernile et al. (2016), we measure investors' trading activity by the aggregate order imbalance (OIB), defined as  $(B-S)/(B+S)$ , where B (S) is the aggregate buyer-initiated (seller-initiated) dollar trading volume. Aggregate dollar trading volume is constructed using the tick-by-tick transaction data on S&P500 constituents. List of S&P500 constituents is obtained from CRSP database. We obtain buyer- and seller-initiated trading volume from the Intraday Indicators of the WRDS database. Following Lee and Ready (1991), a trade is defined as buyer-initiated (seller-initiated) if the trade price is above (below) the midpoint of the recent (previous second) bid-ask quote. If the transaction price is equal to the midpoint, we define a trade as buyer-initiated (seller-initiated) if the trade price is above (below) the last executed trading price. The order imbalance data is only available over February 1994 to December 2013.

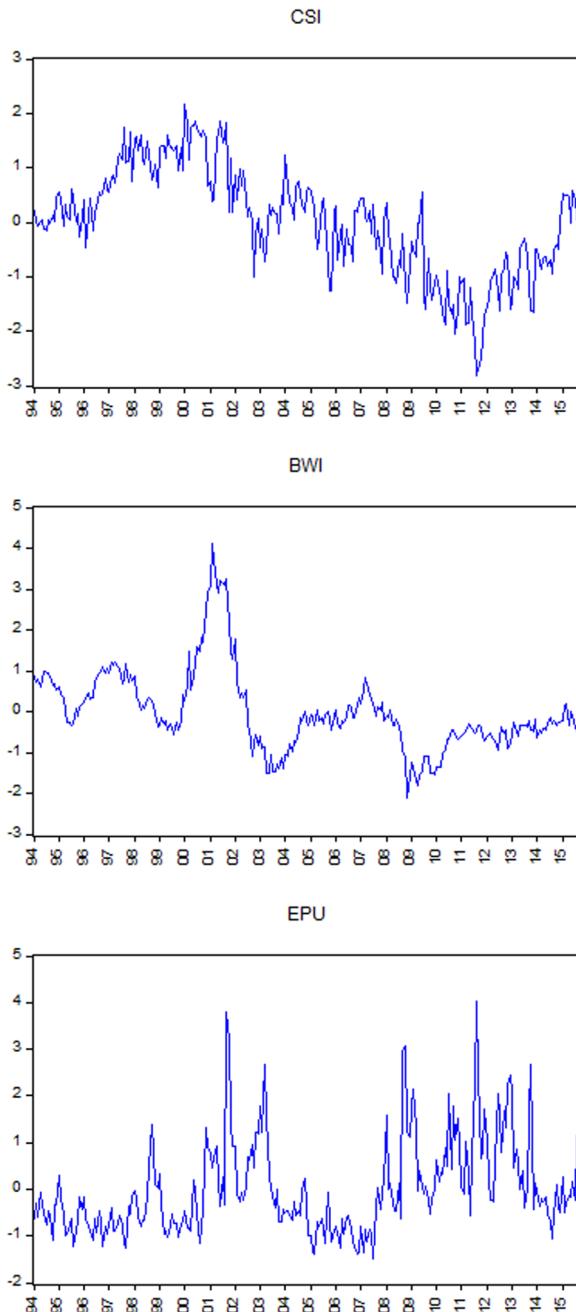
## 3. Empirical results

We analyse pre-FOMC announcement stock market excess returns across different sentiment states. To this end, we define a

<sup>2</sup> To ensure that our results are not affected by outliers, following Lucca and Moench (2015) we exclude the top and bottom 1% of pre-FOMC returns, which reduces the number of related events to 171.

<sup>3</sup> We obtained the CSI from the FRED database. The BWI is available at Jeffrey Wurgler's personal website: <http://people.stern.nyu.edu/jwurgler/>.

<sup>4</sup> We obtained the EPU from: <https://www.policyuncertainty.com/>.



**Fig. 1.** Sentiment and Economic Policy Uncertainty indices This figure plots the CSI, BWI and EPU indices using monthly data over the period February 1994 - October 2015.

dummy variable that equals 1 on the pre-FOMC window and zero otherwise ( $FOMC_t^{pre}$ ), and interact it with the previously defined sentiment state indicator ( $S_t^H$ ):

$$r_t = \beta_0 + \beta_1(1 - S_t^H)FOMC_t^{pre} + \beta_2 S_t^H FOMC_t^{pre} + \varepsilon_t \quad (1)$$

similarly, we also examine the impact of EPU by replacing the sentiment state indicator  $S_t^H$  with  $EPU_t^L$ .

**Table 1** reports ordinary least squares (OLS) estimation results with heteroskedasticity-consistent standard errors. First, the

**Table 1**

Pre-FOMC announcement drift, investor sentiment and economic policy uncertainty.

	Obs	FOMC meetings	$\beta_0$	$\beta_1$	$\beta_2$
CSI	5473	171	0.02 (0.01)	-0.05 (0.11)	0.22** (0.10)
BWI	5473	171	0.01 (0.01)	0.01 (0.10)	0.24** (0.11)
EPU	5473	171	0.01 (0.01)	-0.04 (0.12)	0.22** (0.09)

This table presents OLS estimates with Huber–White heteroscedasticity-consistent standard errors (in parentheses) of Eq. (1). The sample period is February 1994 - October 2015. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

**Table 2**

Order imbalance, investor sentiment and economic policy uncertainty.

	Obs	FOMC meetings	$\beta_0$	$\beta_1$	$\beta_2$
CSI	5011	156	0.05** (0.01)	-0.04*** (0.01)	0.02*** (0.005)
BWI	5011	156	0.05** (0.01)	-0.01** (0.005)	0.01** (0.005)
EPU	5011	156	0.04** (0.01)	-0.01* (0.006)	0.01* (0.006)

This table presents OLS estimates with Huber–White heteroscedasticity-consistent standard errors (in parentheses) of Eq. (1), replacing stock returns with OIB as the dependent variable. The sample period is February 1994 - December 2013. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

coefficient for mean excess return on the pre-FOMC window during periods of low sentiment, as captured by  $\beta_1$ , is statistically insignificant using either of the two sentiment indicators. Second, the mean excess return on the pre-FOMC window during periods of high sentiment, as captured by  $\beta_2$ , is positive and statistically significant. Specifically, the results show that the pre-FOMC announcement drift during periods of high sentiment corresponds to about 20 basis points.<sup>5</sup> The results are robust across the two sentiment measures. Moreover, our results show that the pre-FOMC announcement drift materializes only on the periods with low EPU, which is consistent with the fact that EPU is negatively related to sentiment.

We then examine investors' trading activity at the pre-FOMC window, conditional upon sentiment states. We replace the dependent variable in Eq. (1) with OIB, and report the results in Table 2. They show that there is a positive (negative) and significant order imbalance on the pre-FOMC window during periods of high (low) sentiment, or during periods of low (high) EPU.

We further regress the stock market excess returns on the pre-FOMC window during periods of high sentiment on a number of variables that could potentially explain the pre-announcement drift. In line with Lucca and Moench (2015), the variables that we consider include: a recession dummy as classified by the NBER business cycle dates (NBER); a measure of monetary policy shocks (unexpected changes in Federal Funds rate; FFRS) proposed by Kuttner (2001); investors' expectations about the future path of monetary policy as measured by the first two principal components (Level, Slope) from the cross-section of Treasury yields (Gürkaynak et al., 2005); the lagged trading volume (TV) and implied stock market volatility (VIX); and order imbalance. All explanatory variables, apart from the NBER recession indicator are standardized to have zero mean and unit variance. The results in Table 3 indicate that, in the most extended specifications (columns 7 and 14), only order imbalance matters, being positively related to pre-announcement returns.

#### 4. Conclusions

We extend the previous literature on the pre-FOMC announcement drift by showing that this materialises only during periods of high sentiment and low economic policy uncertainty, and it is accompanied by positive order imbalance. A plausible behavioral interpretation of these findings is as follows. When sentiment (uncertainty) is high (low), investors hold an optimistic view about the yet-to-be-realized policy decisions. This leads to more buyer-initiated trades, and, in turn, positive stock returns in the pre-FOMC window.

#### CRediT authorship contribution statement

**Haifeng Guo:** Conceptualization, Methodology, Software, Formal analysis, Writing - original draft. **Chi-Hsiou D. Hung:** Conceptualization, Writing - review & editing, Supervision. **Alexandros Kontonikas:** Conceptualization, Supervision.

<sup>5</sup> In unreported analysis that does not account for sentiment (available upon request), we obtain evidence qualitatively similar to Lucca and Moench (2015), in that the drift is less pronounced on the day before the announcement (see Fig. 1 of that paper).

**Table 3**

Modelling the pre-FOMC announcement drift during periods of high sentiment.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	CSI							BWI						
NBER	0.43 (0.28)							-0.02 (0.29)	0.44* (0.26)					0.11 (0.35)
FFRS		-0.01 (0.06)						-0.08 (0.05)	0.08 (0.07)					0.02 (0.07)
Level			-0.10 (0.09)					-0.11 (0.09)		-0.07 (0.11)				-0.09 (0.12)
Slope				-0.04 (0.13)				-0.05 (0.12)		-0.04 (0.15)				-0.02 (0.15)
TV					-0.07 (0.11)			-0.01 (0.08)			-0.02 (0.12)			0.01 (0.08)
VIX						0.20* (0.10)		0.07 (0.11)			0.21** (0.10)			0.13 (0.10)
OIB							0.48*** (0.10)	0.46** (0.10)						0.42*** (0.10)
Constant	0.20** (0.10)	0.23** (0.09)	0.23** (0.09)	0.23** (0.09)	0.23** (0.06)	0.25*** (0.08)	0.25*** (0.09)	0.20** (0.11)	0.25** (0.11)	0.25** (0.11)	0.25*** (0.11)	0.25** (0.10)	0.25** (0.10)	0.24** (0.11)
Obs	98	98	98	98	98	98	98	71	71	71	71	71	71	71

This table presents OLS estimates with Huber-White heteroscedasticity-consistent standard errors (in parentheses) of pre-FOMC announcement returns during periods of high sentiment on the explanatory variables defined in Section 3. \*, \*\*, \*\*\* indicate statistical significance at the 10%, 5% and 1% level, respectively.

## Supplementary material

Supplementary material associated with this article can be found, in the online version, at [10.1016/j.frl.2020.101443](https://doi.org/10.1016/j.frl.2020.101443)

## References

- Arkes, H.R., Herren, L.T., Isen, A.M., 1988. The role of potential loss in the influence of affect on risk-taking behavior. *Organ. Behav. Hum. Decis. Process.* 42 (2), 181–193.
- Baker, M., Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. *J. Finance* 61 (4), 1645–1680.
- Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. *Q. J. Econ.* 131 (4), 1593–1636.
- Bernile, G., Hu, J., Tang, Y., 2016. Can information be locked up? Informed trading ahead of macro-news announcements. *J. Financ. Econ.* 121 (3), 496–520.
- Bower, G.H., 1981. Mood and memory. *Am. Psychol.* 36 (2), 129.
- Fisher, K.L., Statman, M., 2003. Consumer confidence and stock returns. *J. Portfolio Manage.* 30 (1), 115–127.
- Guo, H., Hung, C.-H. D., Kontonikas, A., 2019. The Fed and the stock market: a tale of sentiment states. Available at SSRN 3184974.
- Gürkaynak, R.S., Sack, B., Swanson, E.T., 2005. Do actions speak louder than words? The response of asset prices to monetary policy actions and statements. *Int. J. Cent. Bank.* 1 (1), 55–93.
- Kuttner, K.N., 2001. Monetary policy surprises and interest rates: Evidence from the Fed funds futures market. *J. Monet. Econ.* 47 (3), 523–544.
- Lee, C., Ready, M.J., 1991. Inferring trade direction from intraday data. *J. Finance* 46 (2), 733–746.
- Lemmon, M., Portniaguina, E., 2006. Consumer confidence and asset prices: Some empirical evidence. *Rev. Financ. Stud.* 19 (4), 1499–1529.
- Lucca, D.O., Moench, E., 2015. The pre-FOMC announcement drift. *J. Finance* 70 (1), 329–371.
- McLean, R.D., Zhao, M., 2014. The business cycle, investor sentiment, and costly external finance. *J. Finance* 69 (3), 1377–1409.
- Stambaugh, R.F., Yu, J., Yuan, Y., 2012. The short of it: Investor sentiment and anomalies. *J. Financ. Econ.* 104 (2), 288–302.
- Wang, W., 2018. The mean–variance relation and the role of institutional investor sentiment. *Econ. Lett.* 168, 61–64.
- Yu, J., Yuan, Y., 2011. Investor sentiment and the mean–variance relation. *J. Financ. Econ.* 100 (2), 367–381.
- Zhang, B., 2019. Economic policy uncertainty and investor sentiment: linear and nonlinear causality analysis. *Appl. Econ. Lett.* 26 (15), 1264–1268.