Trader Attention and Market Reaction to Fundamental News: Evidence from Natural Gas Futures

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Literature on Investor Attention

- Attention is limited cognitive resource.
- Attention influences trading behavior (Barber and Odean, 2008) and price discovery (Fedyk, 2024).
- Existing studies focus on the stock market and find that investor inattention weakens the market response to news (Boulland and Dessaint, 2017; Ben-Rephael, Da, and Israelsen, 2017).

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- DellaVigna and Pollet (2009) and Louis and Sun (2010) show weaker reaction to earnings and merger announcements on Fridays.
    - Investors seem to be distracted on Fridays because of the approaching weekend.
- Michaely, Rubin, and Vedrashko (2016) argue that weaker stock market response to Friday corporate announcements is the outcome of selection bias rather than investor inattention.

Main Takeaways

- Research question: Does trader attention influence the reaction to fundamental news in a commodity market?
- Main findings:
  - The market response to natural gas inventory announcements is weaker for Friday announcements, compared to non-Friday announcements.
  - Traders pay less attention to the natural gas market on Fridays.
- Main contribution: Show that trader attention plays an important role in price discovery in a commodity market.

Weekly Natural Gas Storage Report (WNGSR)

- The most important regular information event for the natural gas market.
- Released by the U.S Energy Information Administration (EIA).
- Estimate of working natural gas volume held in underground storage in the lower 48 states.
- The net change in storage for the week ending the previous Friday.
- Normally released every Thursday at 10:30 a.m. ET.
- In some weeks, which include national holidays, releases are either one day before or after the holiday (on Wednesday or Friday).

  $\Rightarrow$ No selection bias.

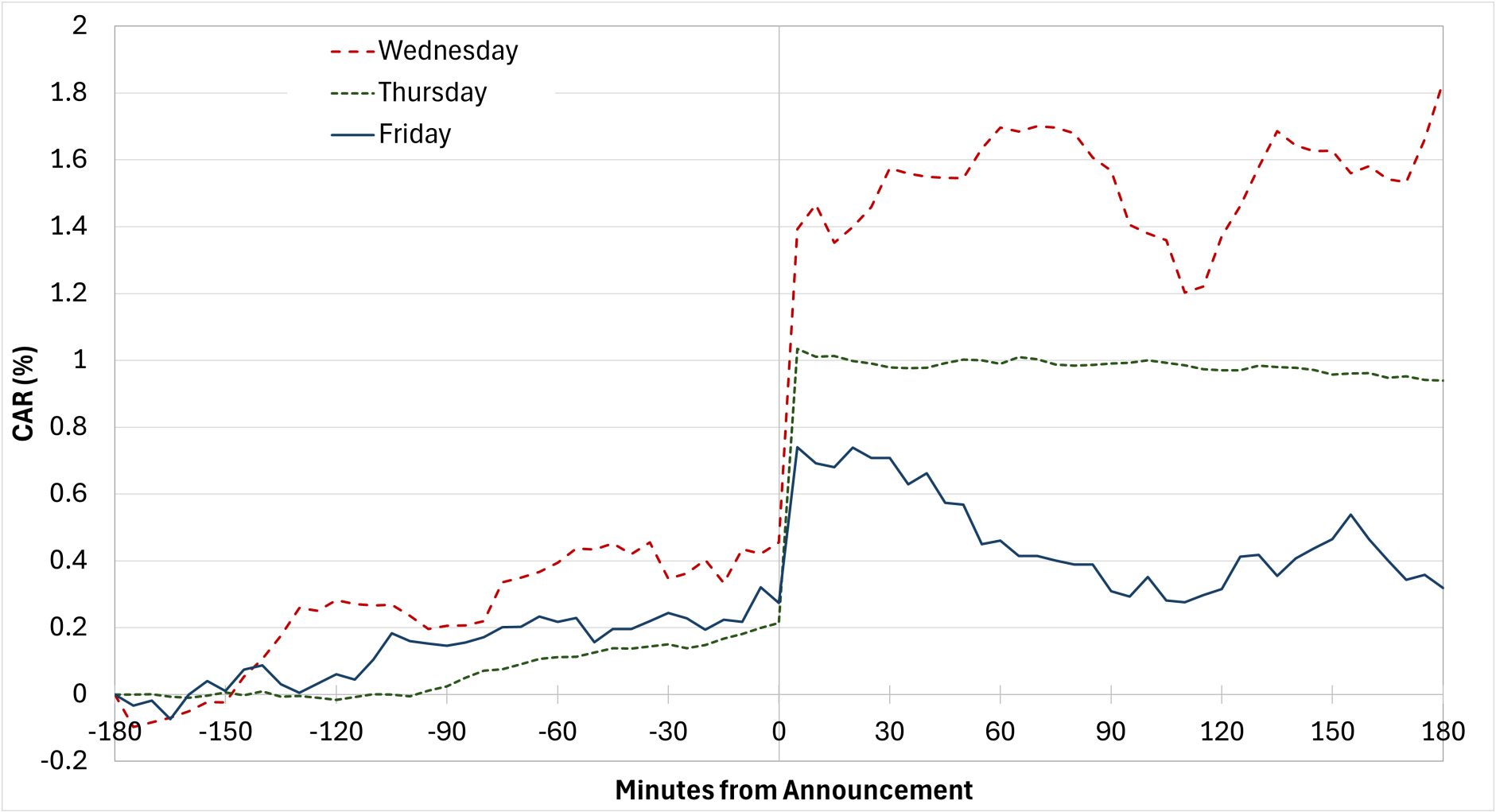
Data

- Sample period: May 2002 – December 2023.
- 1120 WNGSR releases, including 33 (31) released on Wednesdays (Fridays).
- Intraday and daily natural gas futures data.
- Inventory announcement data from Bloomberg.

$$S_t = A_t - F_t \tag{1}$$

  - A_t is the actual inventory change.
  - F_t is the Bloomberg consensus forecast (proxy for market expectation).
  - S_t is the inventory surprise.

Cumulative Average Returns around Natural Gas Inventory Announcements



Methodology: Event Study Regression

- Examine the impact of announcement surprises on the natural gas futures returns using event study regression:

$$\begin{aligned} R_t = a_0 + b_1 AnnWed_t + b_2 AnnFri_t + b_3 Withdrawal_t + c_1 S_t \\ + c_2 S_t AnnWed_t + c_3 S_t AnnFri_t + c_4 S_t Withdrawal_t + e_t \end{aligned} \tag{2}$$

- $AnnWed = 1$ ($AnnFri = 1$) if the natural gas storage report is released on Wednesday (Friday).
- $Withdrawal = 1$ during the withdrawal season (November – March).

Regression with Daily Returns

	Dependent variable: R_t		
	(1)	(2)	(3)
S	-0.133 $(0.015)^{***}$	-0.134 $(0.015)^{***}$	-0.197 $(0.025)^{***}$
$S * AnnWed$		-0.106 (0.074)	-0.146 $(0.075)^{**}$
$S * AnnFri$		0.163 $(0.074)^{**}$	0.145 $(0.044)^{***}$
$S * Withdrawal$			0.103 $(0.030)^{***}$
Adjusted R^2 (%)	11.57	12.48	14.10
Observations	1120	1120	1120

*, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Regression with Intraday Returns

	Dependent variable: R_t		
	(1)	(2)	(3)
S	-0.103 $(0.007)^{***}$	-0.105 $(0.008)^{***}$	-0.143 $(0.015)^{***}$
$S * AnnWed$		-0.020 (0.015)	-0.045 $(0.015)^{***}$
$S * AnnFri$		0.058 $(0.019)^{***}$	0.047 $(0.019)^{**}$
$S * Withdrawal$			0.063 $(0.017)^{***}$
Adjusted R^2 (%)	32.60	33.10	35.92
Observations	1120	1120	1120

*, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Attention Measures

- Use three attention proxies:
  - The number of analysts providing inventory forecasts (**Analyst Attention**).
  - Google Trends search volume for 'natural gas' (**Retail Investor Attention**).
  - The number of articles related to natural gas that were published on Bloomberg (**Institutional Investor Attention**).

Regression for Attention Measures

Estimate the following regression for the three attention proxies:

$$Y_t = a_0 + b_1 AnnWed_t + b_2 AnnFri_t + b_3 Withdrawal_t + b_4 Trend_t + e_t \quad (3)$$

	Dependent variable:		
	Nr. of Estimates	Google SVI	Bloomberg articles
AnnWed	−0.96 (0.98)	−1.76 (1.36)	−0.23 (0.16)
AnnFri	−2.34 (1.31)*	−3.63 (0.88)***	−0.38 (0.15)**
Withdrawal	−0.62 (0.35)	3.07 (0.57)***	−0.04 (0.05)
Adjusted R^2 (%)	0.78	4.49	0.40
Observations	1095	728	1120

*, **, and *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Analyst Forecast Dispersion

- Lobo, Song, and Stanford (2017) find a stronger reaction to earnings news when there is a greater consensus among analysts.
- Is the weaker response to Friday WNGSR announcements driven by greater disagreement among analysts?
- Find no significant difference between the standard deviation of forecasts for Friday and regular Thursday announcements.

Pre-announcement Drift

- Gu and Kurov (2018) show that natural gas futures start to adjust to inventory reports about 90 minutes before the announcement.
- Could stronger pre-announcement drift explain the weaker intraday market reaction to Friday announcements?
- Find no evidence of stronger pre-announcement drift before Friday announcements.

Friday Effect or Post-Holiday Effect?

- Investor attention may be lower on Friday announcement days because it is the day following a federal holiday.
- Estimate the following regression for Thursday announcements:

$$R_t = a_0 + c_1 Holiday_t + c_2 S_t + c_3 S_t Holiday_t + e_t \tag{4}$$

- $Holiday = 1$ for Thursday announcements released after a federal holiday.

- Find no evidence of a weaker response to WNGSR releases on Thursdays following a federal holiday.

Robustness

- Bootstrapped standard errors are similar.
- Outlier-robust regression results (Yohai, 1987) are very similar.

Conclusion

- Natural gas futures have a weaker response to inventory announcements released on Fridays.
- Lower investor attention on Fridays compared to other weekdays contributes to the weaker response to inventory announcements.
- Trader attention influences price discovery in a commodity market.