

Under the Spotlight: How External Informed Traders Impact Share Repurchases

Hongyi Xu

Stockholm School of Economics

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Motivation

- Rising share repurchase amounts.

"In 2021, buybacks amounted to nearly \$950 billion and reportedly reached more than \$1.25 trillion in 2022,"

- SEC Chair Gary Gensler

Motivation

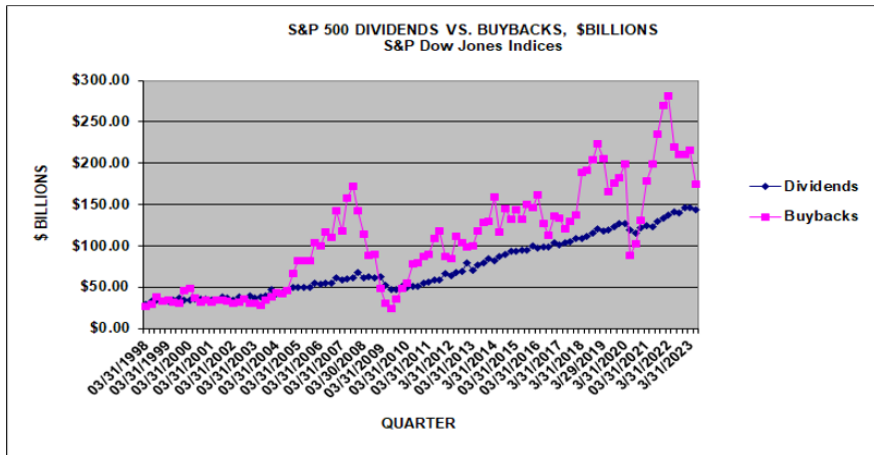


Figure: S&P500 Quarterly Share Repurchases and Dividends (in billion dollar)

Motivation

- Rising share repurchase amounts.

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- Focus on the managers' incentives
 - inflate stock prices.
 - manipulate financial ratios, e.g. EPS, ROA, ROE, ROIC.
 - undervaluation
 - price support motive

Motivation

Question:

- Does the participation of other agents influence the manager's share repurchase decision?

Key Results

THEORY:

- Introduce the “external informed trader”
 - predict that external informed trader's participation $\uparrow \Rightarrow$ share repurchases \downarrow

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EMPIRICAL:

- Utilize firm-level institutional investor attention. (Ben-Rephael, Da, and Israelsen 2017)
 - Use abnormal institutional investor attention (AIA) to proxy for the participation of “external informed traders” in the market.

Key Results

THEORY:

- Introduce the “external informed trader”
 - predict that external informed trader's participation $\uparrow \Rightarrow$ share repurchases \downarrow

EMPIRICAL:

- Utilize firm-level institutional investor attention. (Ben-Rephael, Da, and Israelsen 2017)
 - Use abnormal institutional investor attention (AIA) to proxy for the participation of “external informed traders” in the market.
- Higher abnormal institutional investor attention leads to a reduction in the amount and the probability of share repurchases.
 - one within-firm $\sigma_{AIA} \uparrow$ leads to an approximate 10% reduction in monthly share repurchase intensity relative to the average level (0.31%).
 - one within-firm $\sigma_{AIA} \uparrow$ reduces the probability of repurchasing shares by 1.5pp.

Share Repurchases

- Brav et al. (2005), Brockman, Khurana, and Martin (2008), Hong, J. Wang, and Yu (2008), Gaspar et al. (2013), Dittmar and Field (2015), Hillert, Maug, and Obernberger (2016), Liu and Swanson (2016), Almeida, Fos, and Kronlund (2016), Ferri and N. Li (2020), Edmans, Fang, and Huang (2022), Busch and Obernberger (2016), and Dittmann et al. (2022)

Investor Engagement and Informativeness

- Admati and Pfleiderer (2009), Edmans (2009), Duan and Jiao (2016), McCahery, Sautner, and Starks (2016), Dasgupta, Fos, and Sautner (2021), Gantchev and Giannetti (2021), Goldman and W. Wang (2021), Iliev, Kalodimos, and Lowry (2021), S. Z. Li, Maug, and Schwartz-Ziv (2022), and Meirowitz and Pi (2022)

Investor Attention

- Da, Engelberg, and Gao (2011), Sicherman et al. (2016), Ben-Rephael, Da, and Israelsen (2017), Loughran and McDonald (2017), Peress and Schmidt (2020), Focke, Ruenzi, and Ungeheuer (2020), and Iliev, Kalodimos, and Lowry (2021)

- Case 1: Manager + Liquidity traders
 - the manager as **the sole trader with private information**.
 - the undervalued firm repurchases more shares than the overvalued firm.

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 - the manager as **the sole trader with private information**.
 - the undervalued firm repurchases more shares than the overvalued firm.
- Case 2: Manager + Liquidity traders + **External informed trader**
 - the **external informed trader** has a noisy private signal. \Rightarrow price informativeness \uparrow .
 - undervalued firm: increased competition \rightarrow higher prices \rightarrow fewer repurchases.
 - overvalued firm: more informative prices \rightarrow
 - $\left\{ \begin{array}{l} \text{marginal increase in the share price } \downarrow \\ \qquad \qquad \qquad \vee \\ \text{marginal cost of price manipulation } \downarrow \end{array} \right. \rightarrow \text{fewer repurchases.}$
 - the informed trader's participation, ceteris paribus, **reduces the share repurchase amount**.

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 - the informed trader's participation, ceteris paribus, **reduces the share repurchase amount**.
- ★ Main Prediction: the manager will buy back fewer shares when the external informed trader participates in the market.

Data

Data Constructions:

- Firm-level **monthly share repurchases** from 10-Q and 10-K filings [▶ detail](#)
- Firm-level **daily maximum readership score** and **daily max/average story flow** from Bloomberg
- Stock-level trading information from CRSP
- Stock-level financial information from Compustat

Final Unbalanced Panel:

- Russell 3000 stock universe
- Firms with at least one active OMR program in the sample period
- February 2010 – December 2021
- 73,926 firm-month observations, 1,575 firms

Data - Abnormal Institutional Investor Attention

Firm-level **Daily Maximum Readership (DMR)**: (Bloomberg)

[▶ details:](#)

- Users' hourly read & search frequency \Rightarrow Hourly Attention Score
- **DMR** is the maximum hourly attention score within each calendar day.

[▶ detail](#)

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Firm-level Monthly Measures: (Ben-Rephael, Da, and Israelsen 2017)

[► detail](#)

- Firm-level **Monthly Abnormal Institutional Investor Attention (AIA)**

$$AIA_{i,m} = \frac{1}{N_m} \sum_{s=1}^{N_m} \text{Discrete DMR}_{i,m,s}$$

- Firm-level **Monthly Continuous Abnormal Institutional Investor Attention (AIAC)**

$$AIAC_{i,m} = \frac{1}{N_m} \sum_{s=1}^{N_m} \text{Continuous DMR}_{i,m,s}$$

Data - AIA and AIAC

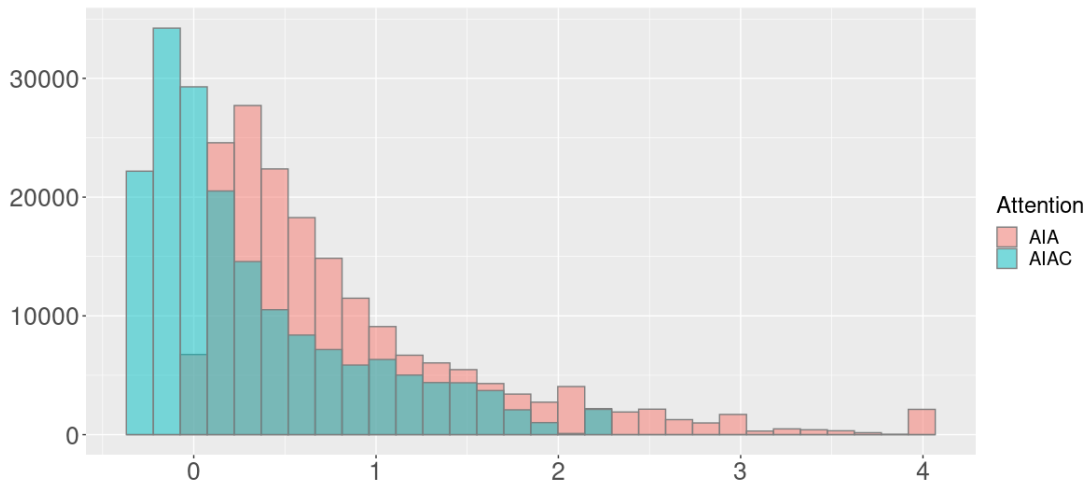


Figure: Histogram for AIA and AIAC

Methodology and Empirical Results

How does the repurchase intensity response to changes in attention?

$$ReplIntensity_{i,t} = \alpha + \beta AIA_{i,t} + \delta ReplIntensity_{i,t-1} + \sum_{l=1}^N \gamma_l Control_{i,l,t} + \mu_i + \eta_t + \varepsilon_{i,t}, \quad (1)$$

- $ReplIntensity_{i,t}$ is the normalised actual share repurchase amount under the publicly announced program by firm i at time t .
 - Repurchase Intensity = # Share Repurchased / Last Month Share Outstanding
 - Repurchase Intensity (TV) = # Share Repurchased / Current Month Trading Volume
- Standard errors are clustered at firm level.

Methodology and Empirical Results - Panel OLS

| Dependent Variable: Model: | Repurchase Intensity = # Share Repurchased / Last Month Share Outstanding | | | | | |
|-------------------------------|---|------------------------|------------------------|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| AIA_t | -0.0006*** (0.0001) | -0.0006*** (0.0001) | -0.0005*** (0.0001) | | | |
| $AIAC_t$ | | | | -0.0008*** (0.0001) | -0.0009*** (0.0001) | -0.0007*** (0.0002) |
| Repurchase Intensity $_{t-1}$ | 0.1781*** (0.0229) | 0.1769*** (0.0243) | 0.1758*** (0.0244) | 0.1781*** (0.0229) | 0.1769*** (0.0243) | 0.1758*** (0.0244) |
| Amihud $_t$ (ln) | -0.0009*** (0.0001) | -0.0021*** (0.0001) | -0.0021*** (0.0001) | -0.0009*** (0.0001) | -0.0021*** (0.0001) | -0.0021*** (0.0001) |
| OMRFlag $_t$ | 0.0016*** (0.0003) | 0.0016*** (0.0003) | 0.0016*** (0.0003) | 0.0016*** (0.0003) | 0.0016*** (0.0003) | 0.0016*** (0.0003) |
| Return Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Fundamental Controls | | ✓ | ✓ | | ✓ | ✓ |
| Info Flow Controls | | | ✓ | | | ✓ |
| Firm Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time Fixed effects | Month | Month | Month | Month | Month | Month |
| Observations | 41,730 | 39,836 | 39,470 | 41,730 | 39,836 | 39,470 |
| R^2 | 0.24622 | 0.25699 | 0.25699 | 0.24623 | 0.25702 | 0.25703 |
| R^2 (within) | 0.04441 | 0.05630 | 0.05687 | 0.04442 | 0.05634 | 0.05692 |

Clustered (Ticker) standard-errors in parentheses and Signif. Levels: ***: 1%, **: 5%, *: 10%

Methodology and Empirical Results - Panel OLS

| Dependent Variable: | Repurchase Intensity (TV) = # Share Repurchased / Trading Volume | | | | | |
|------------------------------------|--|------------------------|------------------------|------------------------|------------------------|------------------------|
| Model: | (1) | (2) | (3) | (4) | (5) | (6) |
| AIA_t | -0.0052*** (0.0005) | -0.0053*** (0.0005) | -0.0039*** (0.0005) | | | |
| $AIAC_t$ | | | | -0.0076*** (0.0008) | -0.0077*** (0.0008) | -0.0057*** (0.0008) |
| Repurchase Intensity (TV) $_{t-1}$ | 0.2047*** (0.0351) | 0.2047*** (0.0372) | 0.2026*** (0.0374) | 0.2043*** (0.0351) | 0.2044*** (0.0372) | 0.2023*** (0.0374) |
| Amihud $_t$ (ln) | -0.0020*** (0.0005) | -0.0039*** (0.0007) | -0.0045*** (0.0007) | -0.0021*** (0.0005) | -0.0040*** (0.0007) | -0.0046*** (0.0007) |
| OMRFlag $_t$ | 0.0071*** (0.0015) | 0.0071*** (0.0016) | 0.0077*** (0.0016) | 0.0071*** (0.0015) | 0.0070*** (0.0016) | 0.0077*** (0.0016) |
| Return Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Fundamental Controls | | ✓ | ✓ | | ✓ | ✓ |
| Info Flow Controls | | | ✓ | | | ✓ |
| Firm Fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Time Fixed effects | Month | Month | Month | Month | Month | Month |
| Observations | 41,730 | 39,836 | 39,470 | 41,730 | 39,836 | 39,470 |
| R^2 | 0.28374 | 0.28965 | 0.29125 | 0.28388 | 0.28981 | 0.29138 |
| R^2 (within) | 0.04901 | 0.05343 | 0.05570 | 0.04919 | 0.05365 | 0.05588 |

Clustered (Ticker) standard-errors in parentheses and Signif. Levels: ***: 1%, **: 5%, *: 10%

Methodology and Empirical Results - Instrument

Reverse causality is unlikely.

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External Market-wide AIA: average AIA in the market w/o firm i

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Potential concern of omitted variables.

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External Market-wide AIA: average AIA in the market w/o firm i

$$MarketAIA_{i,t} = \frac{1}{|\Omega_t \setminus \{i\}|} \sum_{j \in \Omega_t \setminus \{i\}} AIA_{j,t}, \quad (2)$$

where Ω_t represents the set of firms in the Russell 3000 universe with a valid AIA/AIAC measure at time t .

Methodology and Empirical Results - 2SLS

$$AIA_{i,t} = \beta_0 + \beta_1 MarketAIA_{i,t} + \beta_2 ReplIntensity_{i,t-1} + \sum_{l=1}^N \gamma_l Control_{i,l,t} + \mu_i + \eta_t + \varepsilon_{i,t} \quad (FS),$$

$$ReplIntensity_{i,t} = \delta_0 + \delta_1 \widehat{AIA}_{i,t} + \delta_2 ReplIntensity_{i,t-1} + \sum_{l=1}^N \theta_l Control_{i,l,t} + \mu_i + \eta_t + u_{i,t} \quad (SS),$$

Methodology and Empirical Results - 2SLS

Panel A: Instrumental Variable Estimation

| Dependent Variables: Model: | AIA (1) | (2) | AIAC (3) | (4) |
|--------------------------------|------------------------|------------------------|------------------------|------------------------|
| MarketAIA _t | -1,246.2*** (5.214) | -1,246.3*** (5.214) | | |
| MarketAIAC _t | | | -1,234.8*** (6.101) | -1,234.9*** (6.100) |
| F-test (First Stage) | 49.443 | 102.10 | 48.645 | 102.73 |

Panel B: Second Stage Estimation

| Dependent Variables: Model: | Repurchase Intensity (1) | Repurchase Intensity (TV) (2) | Repurchase Intensity (3) | Repurchase Intensity (TV) (4) |
|--------------------------------|--------------------------------|-------------------------------------|--------------------------------|-------------------------------------|
| Predicted AIA _t | -0.0006*** (0.0001) | -0.0043*** (0.0006) | | |
| Predicted AIAC _t | | | -0.0008*** (0.0002) | -0.0060*** (0.0008) |
| Observations | 39,470 | 39,470 | 39,470 | 39,470 |
| R ² | 0.25698 | 0.29122 | 0.25702 | 0.29138 |

- Firm and time fixed effects are included in both stages.
- Same set of controls are included in both stages.

Methodology and Empirical Results - 2SLS

Panel A: Instrumental Variable Estimation

| Dependent Variables: Model: | (1) | AIA (2) | (3) | AIAC (4) |
|--------------------------------|------------------------|------------------------|------------------------|------------------------|
| MarketAIA _t | -1,246.2*** (5.214) | -1,246.3*** (5.214) | | |
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Panel B: Second Stage Estimation

| Dependent Variables: Model: | Repurchase Intensity (1) | Repurchase Intensity (TV) (2) | Repurchase Intensity (3) | Repurchase Intensity (TV) (4) |
|--------------------------------|--------------------------------|-------------------------------------|--------------------------------|-------------------------------------|
| Predicted AIA _t | -0.0006*** (0.0001) | -0.0043*** (0.0006) | | |
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| MarketAIAC _t | | | -1,234.8*** (6.101) | -1,234.9*** (6.100) |
| F-test (First Stage) | 49.443 | 102.10 | 48.645 | 102.73 |

Panel B: Second Stage Estimation

| Dependent Variables: Model: | Repurchase Intensity (1) | Repurchase Intensity (TV) (2) | Repurchase Intensity (3) | Repurchase Intensity (TV) (4) |
|--------------------------------|--------------------------------|-------------------------------------|--------------------------------|-------------------------------------|
| Predicted AIA _t | -0.0006*** (0.0001) | -0.0043*** (0.0006) | | |
| Predicted AIAC _t | | | -0.0008*** (0.0002) | -0.0060*** (0.0008) |
| Observations | 39,470 | 39,470 | 39,470 | 39,470 |
| R ² | 0.25698 | 0.29122 | 0.25702 | 0.29138 |

- Firm and time fixed effects are included in both stages.
- Same set of controls are included in both stages.
- F-stat > 10 .
- Economic significance: one within-firm sd of AIA $\nearrow \Rightarrow \approx 0.03\text{pp} \searrow$ in Repurchase Intensity, on average. (=0.0006 \times 0.43)

Methodology and Empirical Results - extensive margin

| Dependent Variable: | Repurchase Dummy (0 / 1) | | | |
|---------------------------|--------------------------|------------------------|------------------------|------------------------|
| Model: | LPM (1) | LPM (2) | IV (3) | IV (4) |
| AIA_t | -0.0326*** (0.0061) | | -0.0341*** (0.0070) | |
| $AIAC_t$ | | -0.0451*** (0.0091) | | -0.0460*** (0.0098) |
| $Repurchase\ Dummy_{t-1}$ | 0.3653*** (0.0124) | 0.3651*** (0.0124) | 0.3653*** (0.0124) | 0.3651*** (0.0124) |
| $Amihud_t$ (ln) | -0.0567*** (0.0081) | -0.0573*** (0.0081) | -0.0567*** (0.0081) | -0.0573*** (0.0081) |
| $OMRFlag_t$ | 0.0813*** (0.0147) | 0.0812*** (0.0147) | 0.0814*** (0.0147) | 0.0812*** (0.0147) |
| Controls | ✓ | ✓ | ✓ | ✓ |
| Firm Fixed effects | Yes | Yes | Yes | Yes |
| Time Fixed effects | Month | Month | Month | Month |
| Observations | 39,470 | 39,470 | 39,470 | 39,470 |
| F-test (First Stage) | | | 43.054 | 41.382 |
| R^2 | 0.50686 | 0.50683 | 0.50686 | 0.50683 |

Conclusion

Contributions:

- Highlight external informed traders as a significant factor in managers' share repurchases.
- Use institutional attention as a proxy for the involvement of external informed traders in the market.
- The **participation of external informed traders** reduces both the amount and the probability of executing buybacks by the manager.
- Indicate that managers strategically abstain from repurchasing shares when their firms are under the spotlight.

Future Research:

- Look into undervalued versus overvalued firms. [▶ MORE](#)
- Impact of retail investor attention.

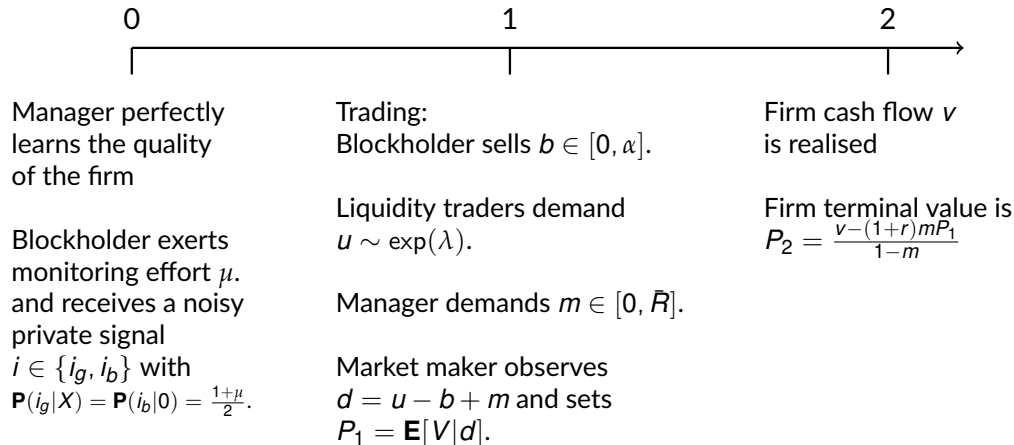
Appendix

Conceptual Framework - Players

For a firm that generates a signal cash flow $v = \{0, X\}$ with the prior $\mathbf{P}(v = X) = \frac{1}{2}$:

1. One corporate manager (M)
 - conducts an publicly announced Open Market Share Repurchase (OMR) program.
 - cares about both the stock price P_1 and terminal firm value P_2 .
2. One blockholder (B)
 - holds a sufficient large minority interest $\alpha \in [0, \bar{\alpha}]$, $\bar{\alpha} > 0$.
 - may exert research effort $\mu \in [0, 1]$ at cost $\frac{c}{2}\mu^2$.
 - when $\mu > 0$, B becomes an "external informed trader".
 - cares about her trading profits.
3. Atomistic liquidity traders/Households
 - collectively hold the rest of the shares $1 - \alpha$.
4. One competitive market maker
 - observes the aggregate order flow.
 - sets the price to make zero conditional expected profits ex ante.

Conceptual Framework - Timeline



Note: without time discounting and transaction costs, and all agents are risk-neutral. [▶ Intuition](#)

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

MARKET AND STOCKHOLDERS

Our common stock is traded on the NASDAQ Stock Market under the symbol MSFT. On July 27, 2020, there were 91,674 registered holders of record of our common stock.

SHARE REPURCHASES AND DIVIDENDS

Following are our monthly share repurchases for the fourth quarter of fiscal year 2020:

| Period | Total Number of Shares Purchased | Average Price Paid Per Share | Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs | Approximate Dollar Value of Shares That May Yet be Purchased Under the Plans or Programs |
|--------------------------------|----------------------------------|------------------------------|--|--|
| | | | | (In millions) |
| April 1, 2020 – April 30, 2020 | 8,906,563 | \$ 165.90 | 8,906,563 | \$ 35,323 |
| May 1, 2020 – May 31, 2020 | 9,655,700 | 182.31 | 9,655,700 | 33,563 |
| June 1, 2020 – June 30, 2020 | 9,648,400 | 191.80 | 9,648,400 | 31,712 |
| | <u>28,210,663</u> | | <u>28,210,663</u> | |

All share repurchases were made using cash resources. Our share repurchases may occur through open market purchases or pursuant to a Rule 10b5-1 trading plan. The above table excludes shares repurchased to settle employee tax withholding related to the vesting of stock awards.

Figure: An excerpt from Microsoft's 10-K filing in 2020

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| Period Info | | Share Repurchased* | | |
|--------------------------------|----------------------------------|------------------------------|--|--|
| Period | Total Number of Shares Purchased | Average Price Paid Per Share | Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs | Approximate Dollar Value of Shares That May Yet be Purchased Under the Plans or Programs |
| | | | | Unit (In millions) |
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Footnotes

Figure: An excerpt from Microsoft's 10-K filing in 2020

Data - Monthly Share Repurchases [▶ back](#)

| item | period | variable | value | unit |
|--------------------------------|--------------------------------|---|------------|---------------|
| April 1, 2020 – April 30, 2020 | April 1, 2020 – April 30, 2020 | Total Number of Shares Purchased | 8,906,563 | |
| May 1, 2020 – May 31, 2020 | May 1, 2020 – May 31, 2020 | Total Number of Shares Purchased | 9,655,700 | |
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| April 1, 2020 – April 30, 2020 | April 1, 2020 – April 30, 2020 | D\$- Approximate Dollar Value of Shares That May Yet be Purchased Under the Plans or Programs | 35,323 | (in millions) |
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| | June 1, 2020 – June 30, 2020 | D\$- Approximate Dollar Value of Shares That May Yet be Purchased Under the Plans or Programs | | (in millions) |

Table: Cleaned share repurchases data

Data - Abnormal Institutional Investor Attention

Firm-level Daily Maximum Readership (Bloomberg):

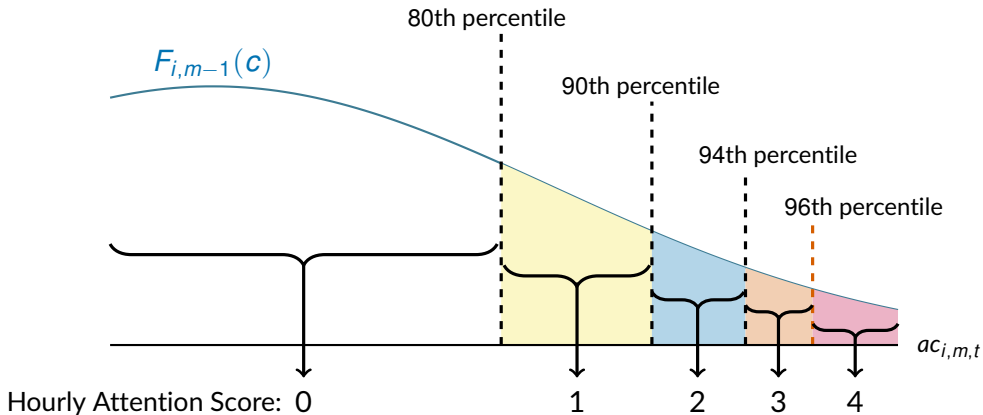
- Hourly Read & Search Frequency $\rightarrow \begin{cases} \text{Search} = 10 \\ \text{Read} = 1 \end{cases} \Rightarrow \text{Hourly Counts } c_{i,m,t} \Rightarrow$
8-hour Average Counts $ac_{i,m,t} = \frac{1}{8} \sum_{s=t-7}^t c_{i,m,s}$

- Hourly Attention Score =
$$\begin{cases} 0 & , \text{ if } F_{i,m-1}(ac_{i,m,t}) \leq 80\% \\ 1 & , \text{ if } F_{i,m-1}(ac_{i,m,t}) \in (80\%, 90\%] \\ 2 & , \text{ if } F_{i,m-1}(ac_{i,m,t}) \in (90\%, 94\%], \\ 3 & , \text{ if } F_{i,m-1}(ac_{i,m,t}) \in (94\%, 96\%] \\ 4 & , \text{ if } F_{i,m-1}(ac_{i,m,t}) > 96\% \end{cases}$$

where $F_{i,m-1}(c)$ is the CDF of past-month hourly counts for firm i .

- Daily Maximum Readership (DMR) is the maximum hourly attention score within each calendar day.

Data - Abnormal Institutional Investor Attention



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Data - Abnormal Institutional Investor Attention [▶ back](#)

Firm-level Monthly Measures: (Ben-Rephael, Da, and Israelsen 2017)

- Firm-level **Monthly Abnormal Institutional Investor Attention (AIA)**

$$AIA_{i,m} = \frac{1}{N_m} \sum_{s=1}^{N_m} \text{Discrete } DMR_{i,m,s}$$

- Firm-level **Monthly Continuous Abnormal Institutional Investor Attention (AIAC)**

$$AIAC_{i,m} = \frac{1}{N_m} \sum_{s=1}^{N_m} \text{Continuous } DMR_{i,m,s}$$

N_m is the total number of calendar days with valid DMR values in month m .

| | | | | | |
|----------------|--------|-------|-------|-------|-------|
| Discrete DMR | 0 | 1 | 2 | 3 | 4 |
| Continuous DMR | -0.350 | 1.045 | 1.409 | 1.647 | 2.154 |

Subgroup Analysis - undervalued versus overvalued firms [▶ back](#)

| Dependent Variable: | Repurchase Intensity | | | |
|-----------------------------|----------------------------|------------------------|------------------------|------------------------|
| Model: | CAR (current month) (1) | CAR (1-month) (2) | CAR (3-month) (3) | CAR (6-month) (4) |
| AIA \times (CAR \leq 0) | -0.0008*** (0.0002) | -0.0007*** (0.0002) | -0.0009*** (0.0002) | -0.0008*** (0.0002) |
| AIA \times (CAR $>$ 0) | -0.0004** (0.0002) | -0.0005** (0.0002) | -0.0003 (0.0002) | -0.0004* (0.0002) |
| (CAR $>$ 0) | -0.0005 (0.0003) | -0.0001 (0.0003) | -0.0003 (0.0003) | -0.0001 (0.0003) |
| Controls | ✓ | ✓ | ✓ | ✓ |
| Firm Fixed effects | Yes | Yes | Yes | Yes |
| Time Fixed effects | Month | Month | Month | Month |
| Observations | 32,800 | 32,847 | 32,847 | 32,847 |
| R ² | 0.26024 | 0.26055 | 0.25966 | 0.25995 |
| Within R ² | 0.05376 | 0.05406 | 0.05293 | 0.05330 |

Clustered (Ticker) standard-errors in parentheses and Signif. Levels: ***: 1%, **: 5%, *: 10%