Retail Investors' Contrarian Behavior Around News, Attention, and the Momentum Effect

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MOTIVATION & RESEARCH QUESTION

This paper studies the role of retail investors in the gradual incorporation of information into security prices.

Large literature showing security prices under-react to new information at short and medium horizons:

- **earnings momentum** (Ball and Brown 1968, Bernard and Thomas 1989, 1990)

- **price momentum** (Jegadeesh and Titman 1993, Chan, Jegadeesh, and Lakonishok 1996, Rouwenhorst 1998)

- **relationship between the two** (Chordia and Shivakumar 2006, Novy-Marx 2012, Novy-Marx 2015)

MOTIVATION & RESEARCH QUESTION

Why focus on retail investors?

- Subject to behavioral biases
- Own directly a substantial fraction of the stocks outstanding
  - Fed Flow of Funds Data: between 43.1% in 2001 and 37.7% in 2019
  - 13F data: 25%-30% in 2019 (1 – institutional ownership from 13F filings)
- Represent a significant fraction of trading volume
- Increased importance of retail trading during the pandemic (after a period of declining participation in direct ownership)

Main Findings

Using a dataset containing the holdings and transactions of more than 2.8 million accounts at one of the largest U.S. online discount brokers in the period 2010-2014, we document that:

- ***Retail investors are contrarian, especially on bad news***

- Retail contrarian trading behavior ***slows the incorporation of information into stock prices,*** contributing to price underreaction:
  - Effect is concentrated in stocks with ***poor earnings and low past returns***
  - Effect is stronger in ***small stocks and stocks with low institutional ownership***

- Retail contrarian behavior appears to be ***persistent***, which may explain the persistence of momentum returns

- Contrarian trading is positively correlated with
  - The magnitude of the earnings surprise
  - *Investor attention*
  - Is strongest for holding periods between a month and a year
- *Retail investors buy losers and sell winners*, especially following large earnings surprises
- Magnitude is significant
- *Earnings Momentum is present only among the stocks with high retail trade intensity*:
  - Among the stocks with a bad (good) earnings surprise, only the ones with large retail trading in(out)flows end up in the loser (winner) portfolio.

- Post-Earnings Announcement Drift (***PEAD***) *for loser, bad SUE stocks* becomes increasingly more negative as ***retail buying pressure*** increases.

- ***PEAD for winner, good SUE stocks*** becomes increasingly more positive as ***retail selling pressure*** increases.

- Contrarian Index for investors and firms

- Holding returns

- Attention

CLOSEST RELATED LITERATURE

Kaniel at al. (2012) who analyze the daily buy and sell volume of executed retail orders for a large cross-section of NYSE stocks in the 2000-2003 period and show that individuals in the aggregate tend to trade in the opposite direction of earnings surprises.

Advantage of our setting are that

- we follow each investor over time, rather than the group of retail inv.
- information on the pattern of web clicks and the time spent investigating each stock and visiting different pages on the brokerage firm site

Grinblatt and Keloharju (2000, 2001) also find evidence of contrarian trading behavior by Finnish investors as a function of past returns, although in a shorter sample, and using a more indirect methodology.

Kogan et al. (2023) confirm our findings for their dataset of retail traders on the e-Toro platform, and show that for crypto retail traders tend to follow a momentum trading strategy

INVESTOR DATA

Proprietary data from one of the largest U.S. discount brokers

- Quarterly holdings and daily transactions for retail clients between 2010Q2 – 2014Q2.

- More than 2.8 million accounts and ~$270B client assets

- Individual stocks dominate (90.3% of assets)

- For a subset of approx. 11,000 accounts, clicks activity data (login, page views, …), 2013.M1- 2014.M6.

Investors are similar to the Barber and Odean's discount brokerage dataset for age distribution, gender, and trading frequencies:

- 64.7% of the account holders are men, 25.44% are women, and the remaining are not classified

- The age distribution is bell shaped and peaks at 46.

SUMMARY STATISTICS

Quarterly holdings and daily transactions for retail clients between 2010Q2 – 2014Q2

Account Type	# Accounts		Portfolio Size			
	Count	Pct.	Amount ($M)	Pct.	Median ($)	Mean ($)
Individual: Taxable	1,658,547	58.50%	$ 135,096	49.50%	$ 7,407	$ 81,454
Individual: Retirement	882,022	31.10%	$ 69,934	25.60%	$ 24,090	$ 79,288
Organization	266,824	9.40%	$ 64,878	23.80%	$ 22,650	$ 243,150
Foreign	27,043	1.00%	$ 3,163	1.20%	$ 12,922	$ 116,954
Total	2,834,436	100.00%	$ 273,070	100.00%		

Account Type	# of Securities						
	Stock	Option	Bond	Mutual Funds	Warrant	Units	All
Individual: Taxable	6.08	0.33	0.07	0.17	0.03	0.00	6.67
Individual: Retirement	6.09	0.27	0.09	0.47	0.02	0.00	6.95
Organization	8.06	0.50	0.27	0.44	0.03	0.00	9.30
Foreign	5.90	0.70	0.05	0.05	0.02	0.00	6.73
Median Position Size ($)	$2,891	$396	$16,039	$7,931	$148	$146	$7,931
Total Position ($M)	$246,591	$2,309	$7,579	$18,337	$145	$10	$273,070

	25th %tile	Median	75th %tile	Mean	SD
Pct Months Traded	8.2%	20.4%	48.9%	31.4%	29.2%
Monthly Turnover	2.0%	6.4%	22.6%	44.3%	138.0%
Trade Size ($)	$1,671	$3,859	$8,855	$9,825	$33,090
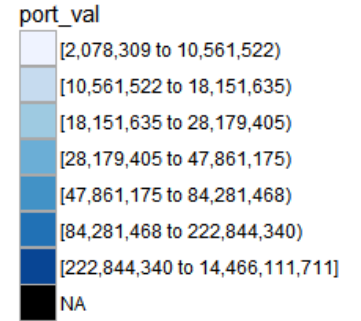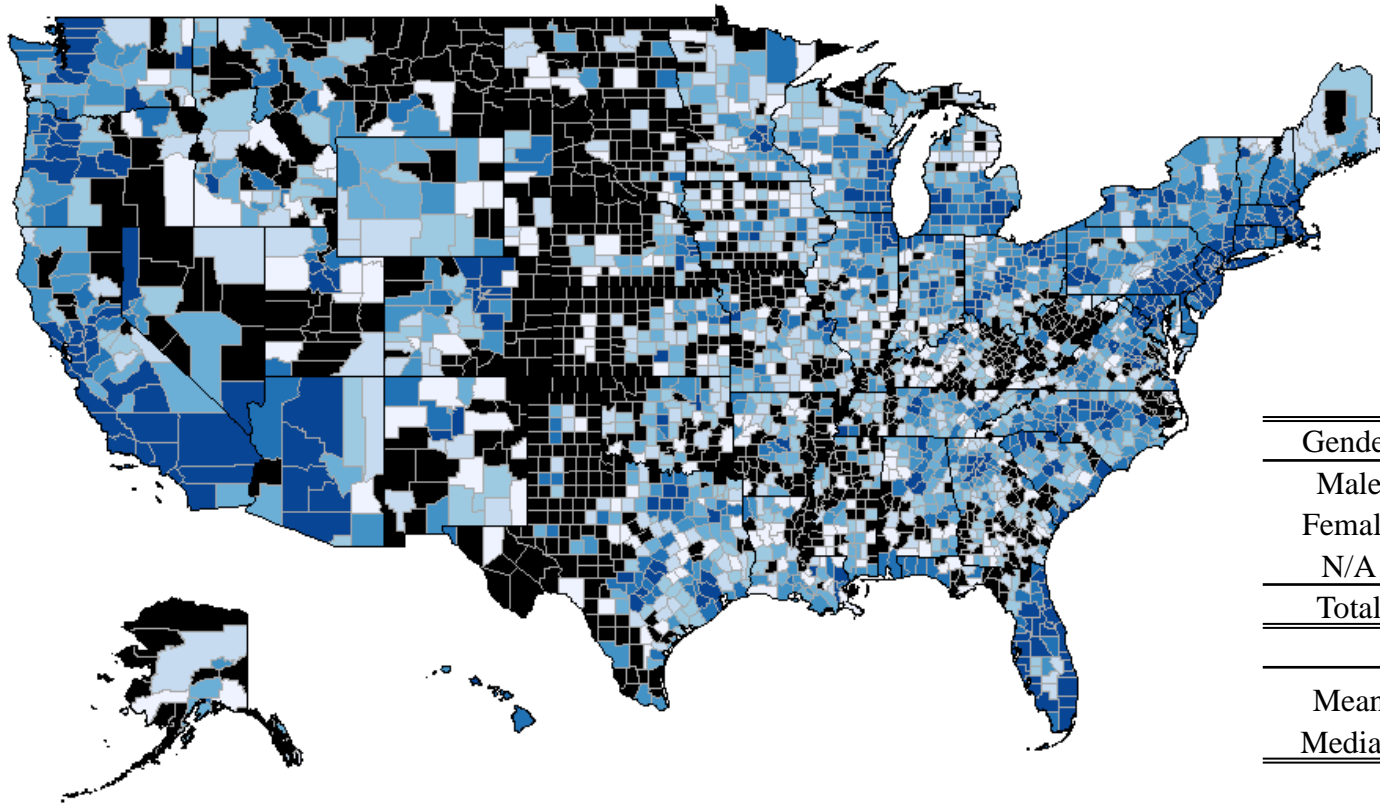
Gender	# Accts	% Accts
Male	1,839,381	65%
Female	722,628	25%
N/A	278,084	10%
Total	2,840,093	100%
Age		
Mean	46.9	
Median	49.0	

MAGNITUDE

Although our sample constitutes a small fraction of the overall population of retail investors, it is highly representative of such population:

Total stock holdings in our sample as of June 2014 were $264 billion, compared to the $13,883 billion in assets owned by all households

→ 1.77% of retail holdings

Estimating retail holdings as (1 – ownership by 13F-filing institutions) for each stock

→ 2% (4%) of total retail holdings on a value(equal)-weighted basis

MAGNITUDE

Although our sample constitutes a small fraction of the overall population of retail investors, it is highly representative of such population:

Fraction of total trading volume captured by investors in our sample
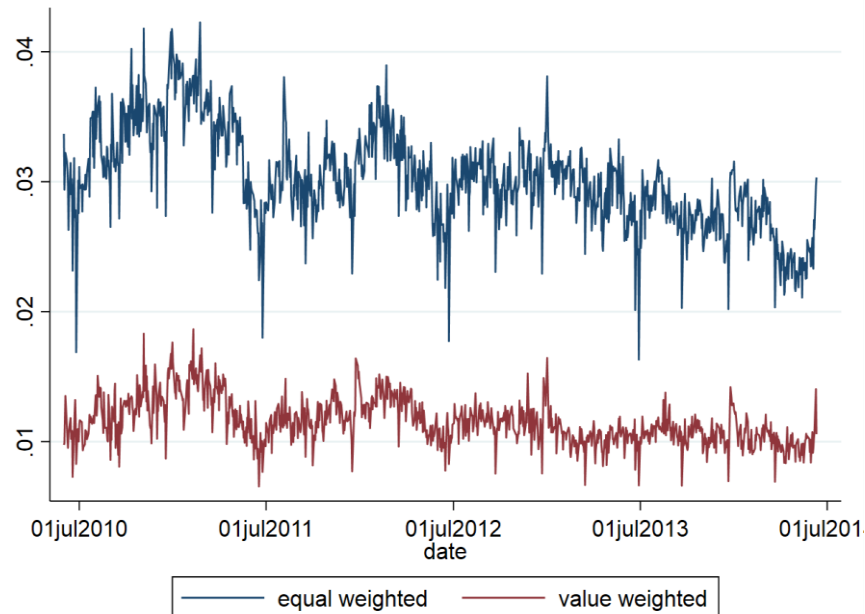
Compared to Boehmer et al. (2021) who estimate total retail trading volume at about 8% of total volume

DEFINITIONS

Net inflow: $x_{it} = (\text{Buys}_{it} - \text{Sells}_{it})/\text{CRSP Volume}_{it}$

Normalization: $w_{it} = x_{it} - \text{CrossSectMean}(x_{it})$

i = stock; t = day

Absolute Flow: $[(\text{Buys}_{it} + \text{Sells}_{it})] / \text{CRSP Volume}_{it}$

Calculate average normalized net inflow and absolute flow for each portfolio over holding period (1 month).

Portfolios: momentum portfolios, portfolios by earnings surprises and other characteristics, and double and triple sorts

Earnings Surprise:

$SUE(t) = (\text{actual-median estimate})/\text{price}(t-1)$

PRICE MOMENTUM AND EARNINGS MOMENTUM
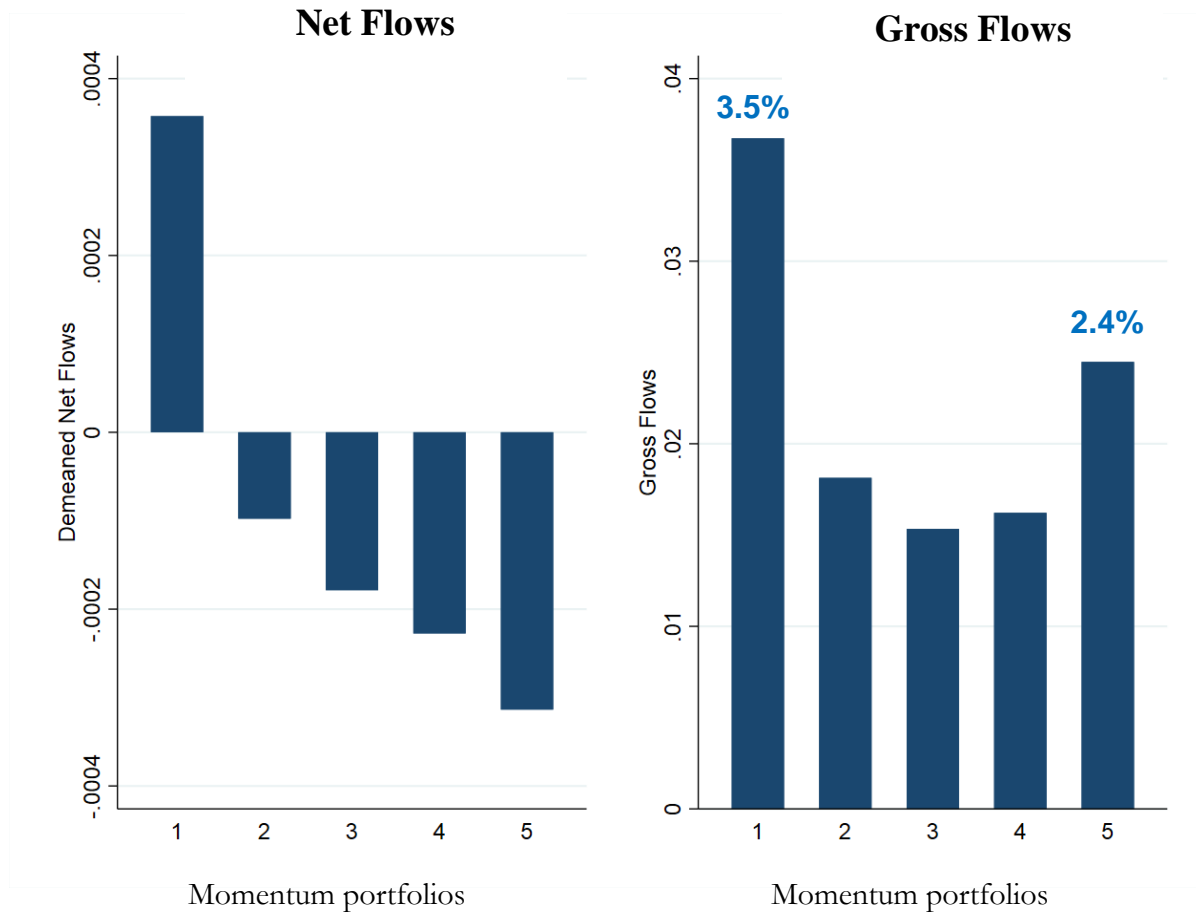
Fraction of firms with surprises > 0.5 SD
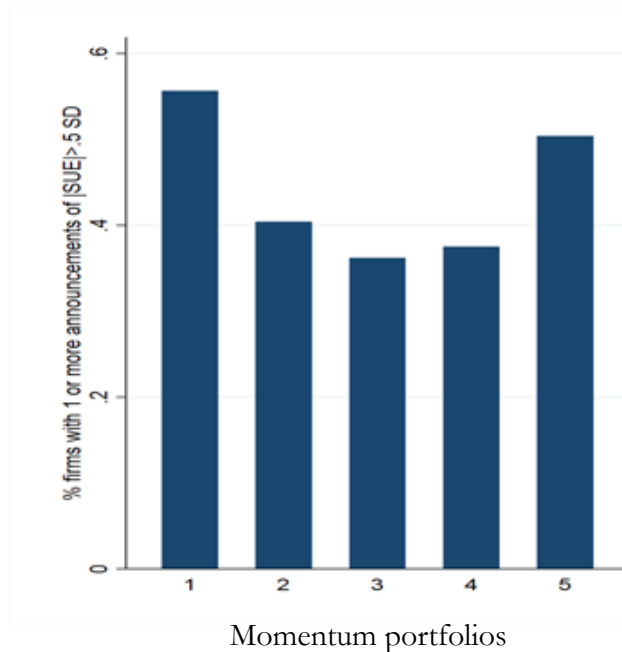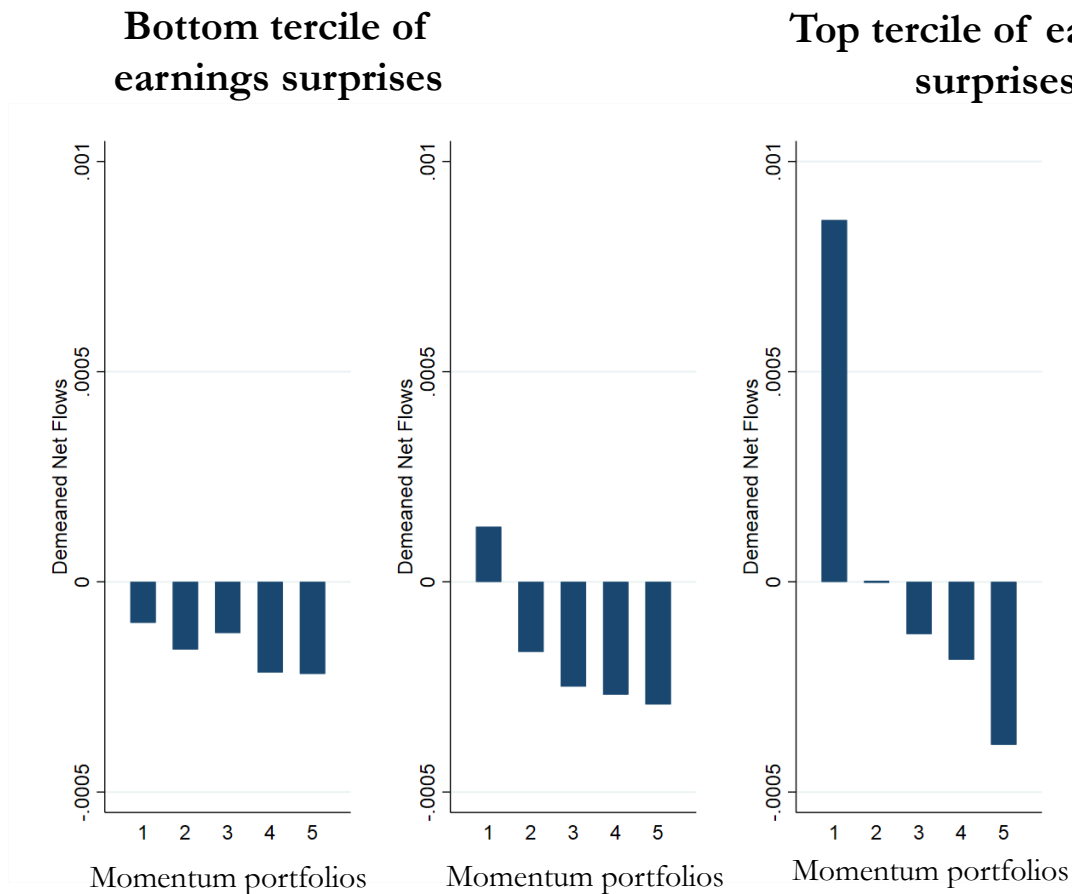
Fraction of announcements with surprises > 0.5 SD
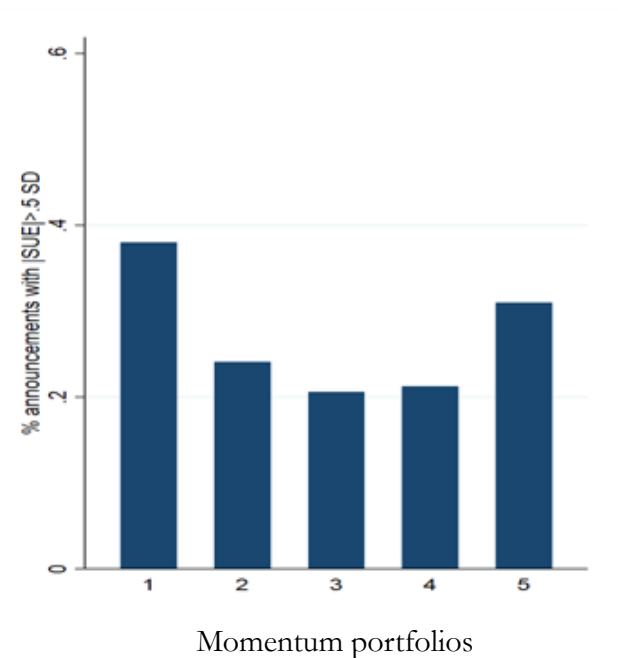
Note: Each month, we sort firms into 5 groups based on their cumulative returns from t-12 to t-2. **Momentum portfolio #1 = Losers; #5 = Winners**

RETAIL INVESTORS BUY LOSERS AND SELL WINNERS
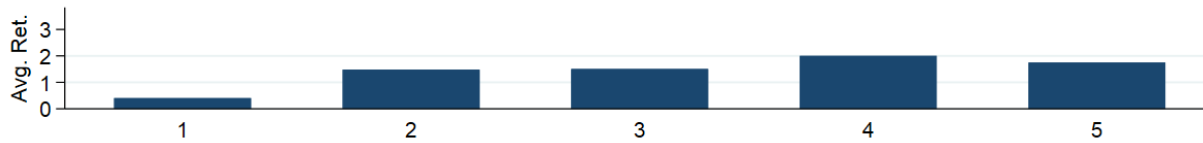

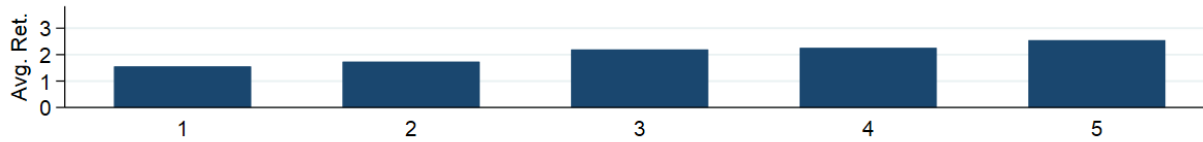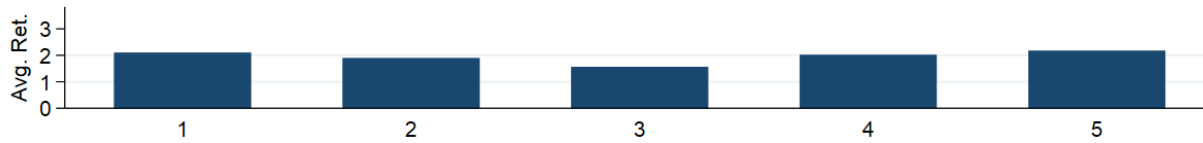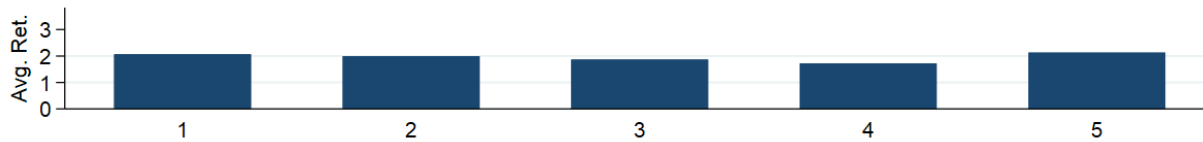Momentum portfolio #1 = Losers; #5 = Winners

RETAIL INVESTORS BUY LOSERS AND SELL WINNERS ONLY FOR LARGE SURPRISES

Bottom tercile of earnings surprises

Top tercile of earnings surprises

Momentum portfolio #1 = Losers; #5 = Winners

MOMENTUM IS PRESENT ONLY AMONG STOCKS WITH HIGH RETAIL ACTIVITY
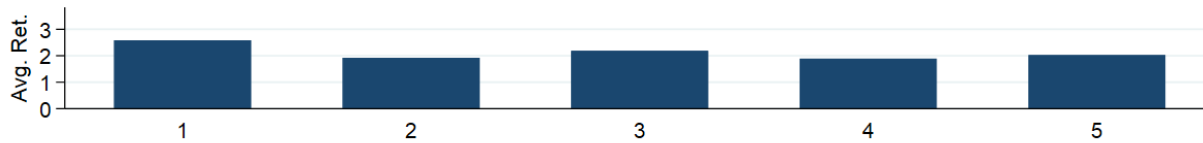
Notes: Each month, we sort firms into 5 groups based on their cumulative returns from t-12 to t-2. Then, within each of these groups, we form 5 sub-groups based on average absolute retail flows into each stock over our whole sample. Each bar represents the average monthly return (in %) for each of these 5 x 5 = 25 groups.

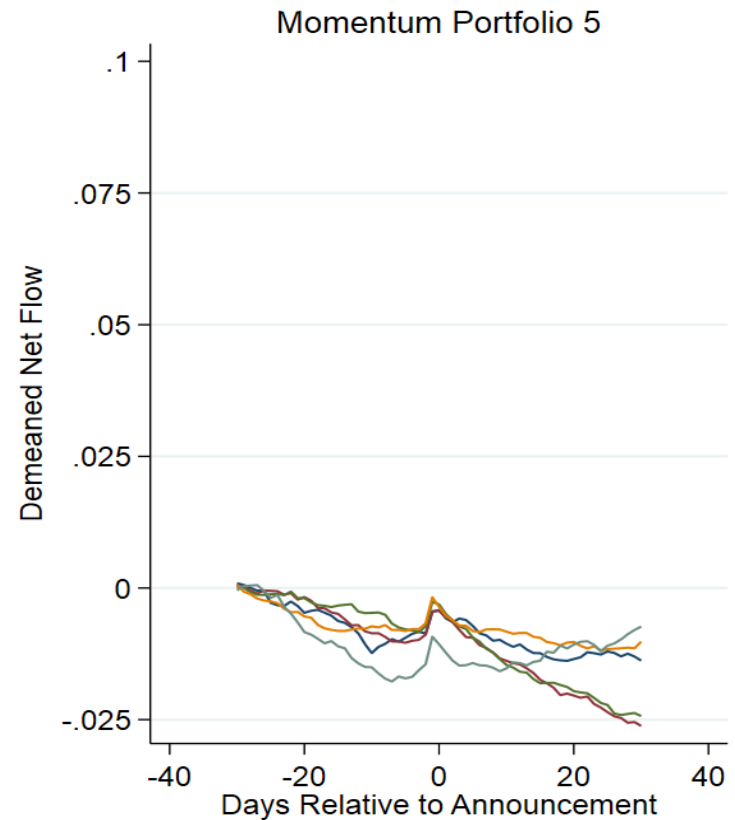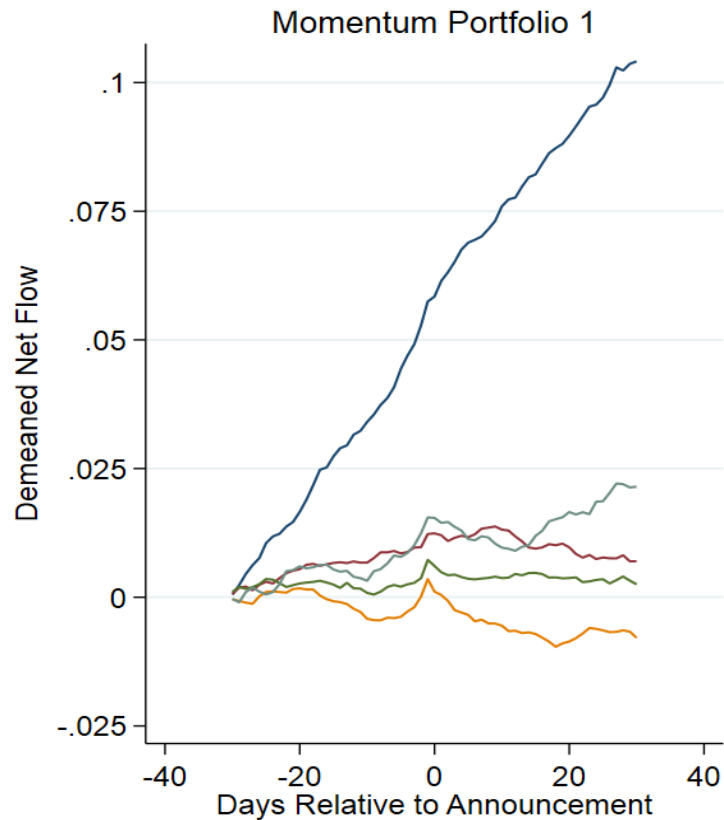# RETAIL INVESTORS ARE CONTRARIAN ON EARNINGS NEWS

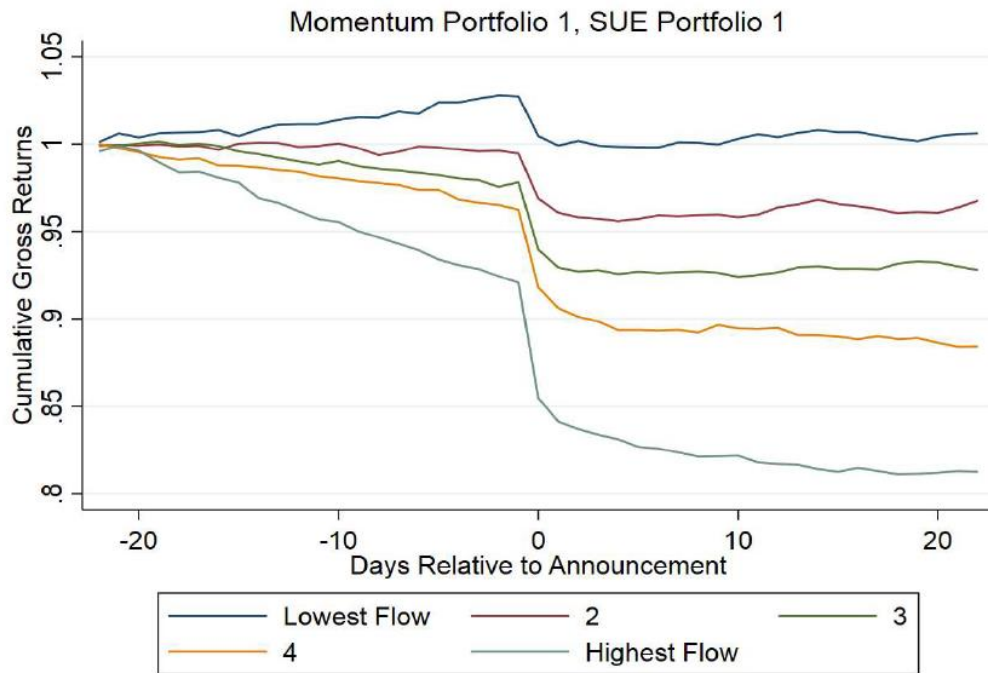**Daily Evidence: Net Retail Flow into SUE Quintiles**
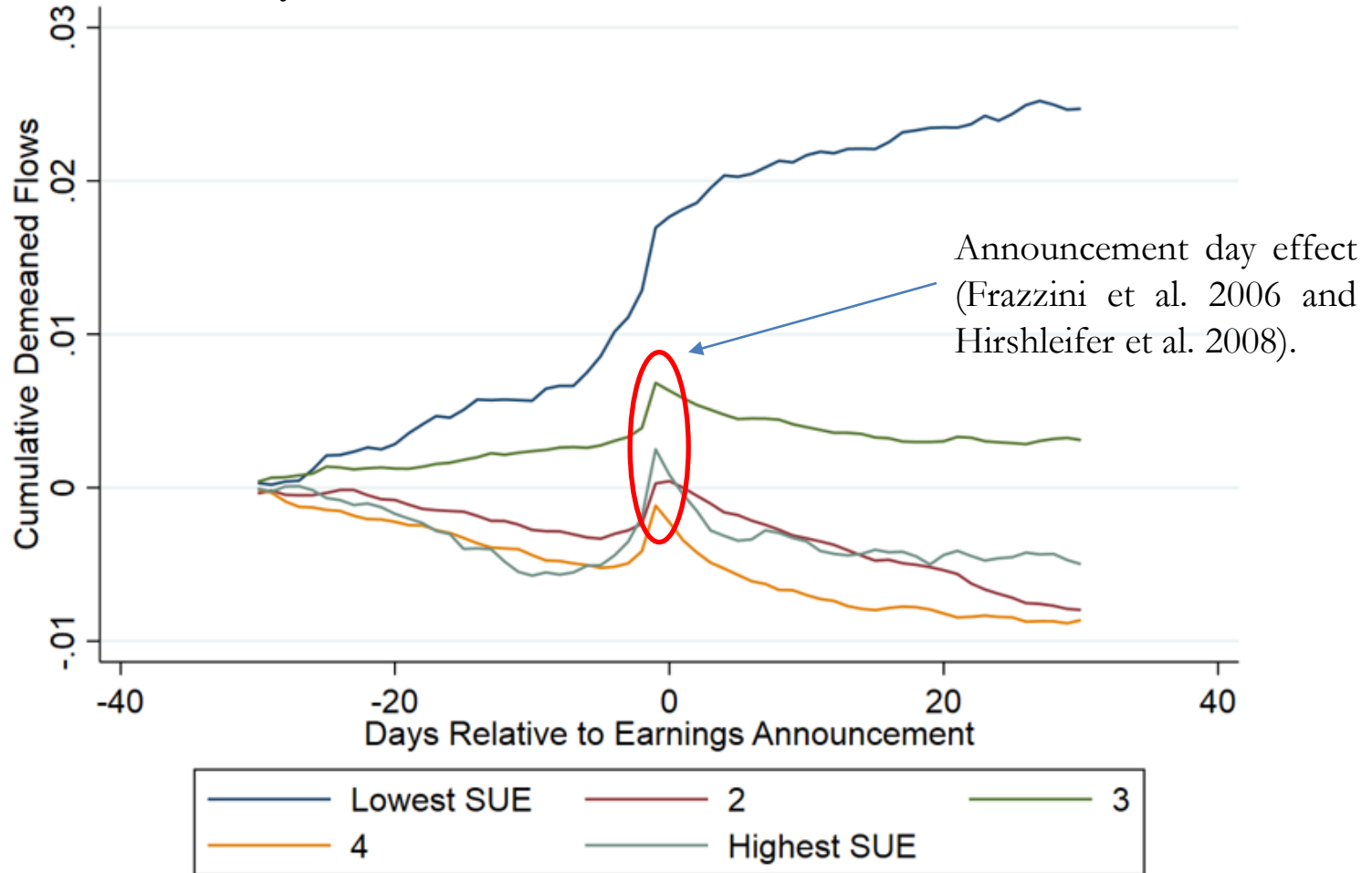
RETAIL FLOW BY MOMENTUM AND SUE

Daily Evidence: Net Retail Flow into Losers and Winners and SUE groups

PEAD BY RETAIL FLOW, MOMENTUM, AND SUE

Momentum Portfolio 1, SUE Portfolio 1

Cumulative Gross Returns (y-axis) vs. Days Relative to Announcement (x-axis)

Legend: Lowest Flow — 2 — 3 — 4 — Highest Flow

Cumulative gross return on the stocks with the lowest past returns and the lowest earnings surprises

Negative PEAD is most pronounced for the group with the most positive retail net flow.

Momentum Portfolio	SUE quintile	Retail flow quintile	Cumulative return from t=0 to t==1	Cumulative return from t=1 to t==22
1	1	1	0.9798	1.0026
1	1	2	0.9749	0.9973
1	1	3	0.9613	0.9859
1	1	4	0.9555	0.9621
1	1	5	0.9299	0.9450

PEAD by Retail Flow, Momentum and SUE

Momentum Portfolio 5, SUE Portfolio 5

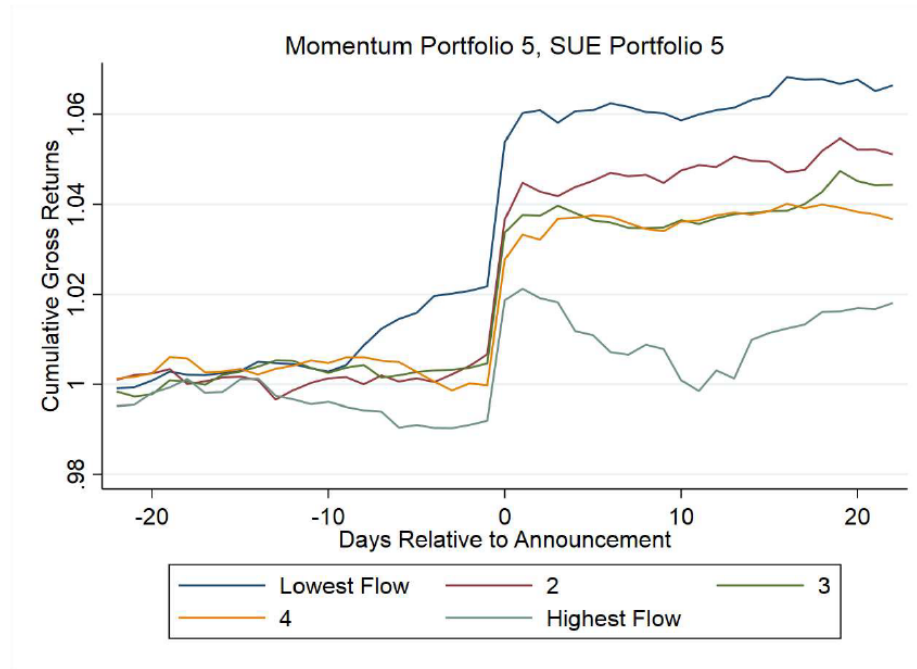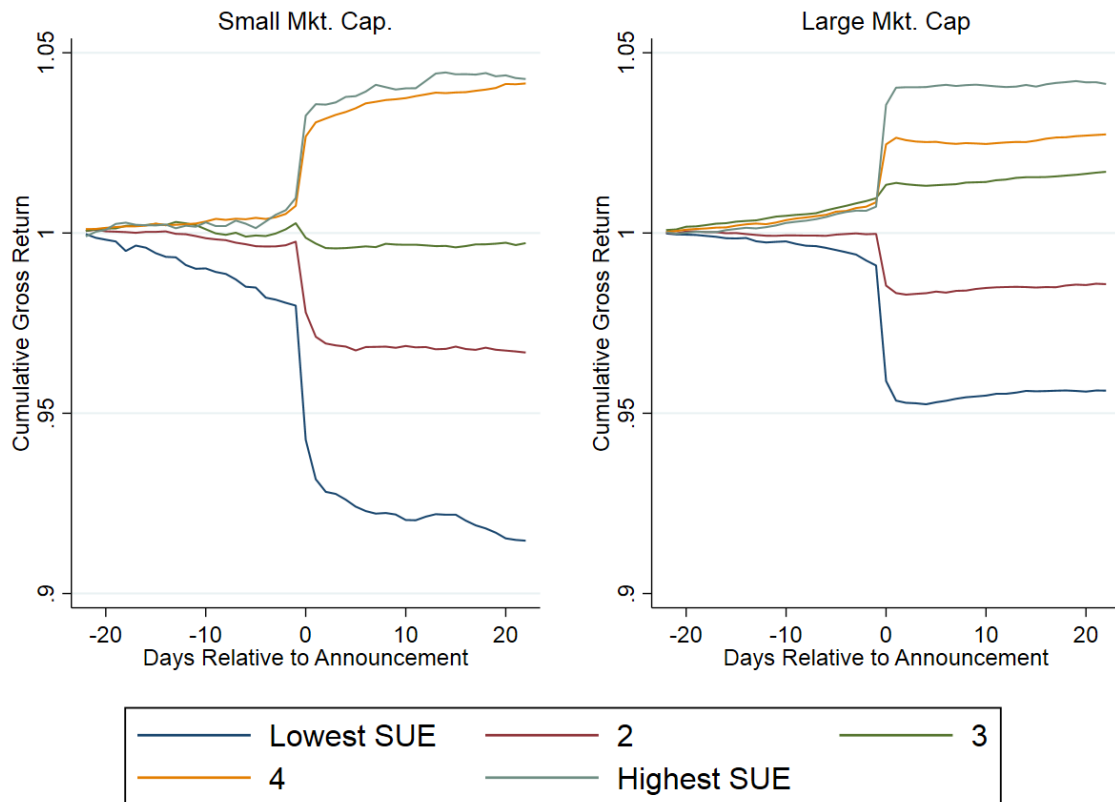| Momentum Portfolio	SUE quintile	Retail flow quintile	Cumulative return from t=0 to t==1	Cumulative return from t=1 to t==22
5	5	1	1.0326	1.0099
5	5	2	1.0305	1.0134
5	5	3	1.0294	1.0099
5	5	4	1.0297	1.0057
5	5	5	1.0275	0.9981

Cumulative gross return on the stocks with the highest past returns and the best earnings surprises

PEAD is most positive for the stocks with the biggest retail *out*flow

# LARGER PRICE JUMPS AND STRONGER PEAD IN SMALL CAP STOCKS

Notes: Each month, we break firms into two groups based on whether their 1-month-lagged market capitalization is larger or smaller than the median among NYSE firms. Then, each quarter, we sort firms into 5 groups based on their SUE. Within each of these groups, we calculate the average cumulative market-adjusted return starting at t=-22.

... AND LOW INSTITUTIONAL OWNERSHIP STOCKS
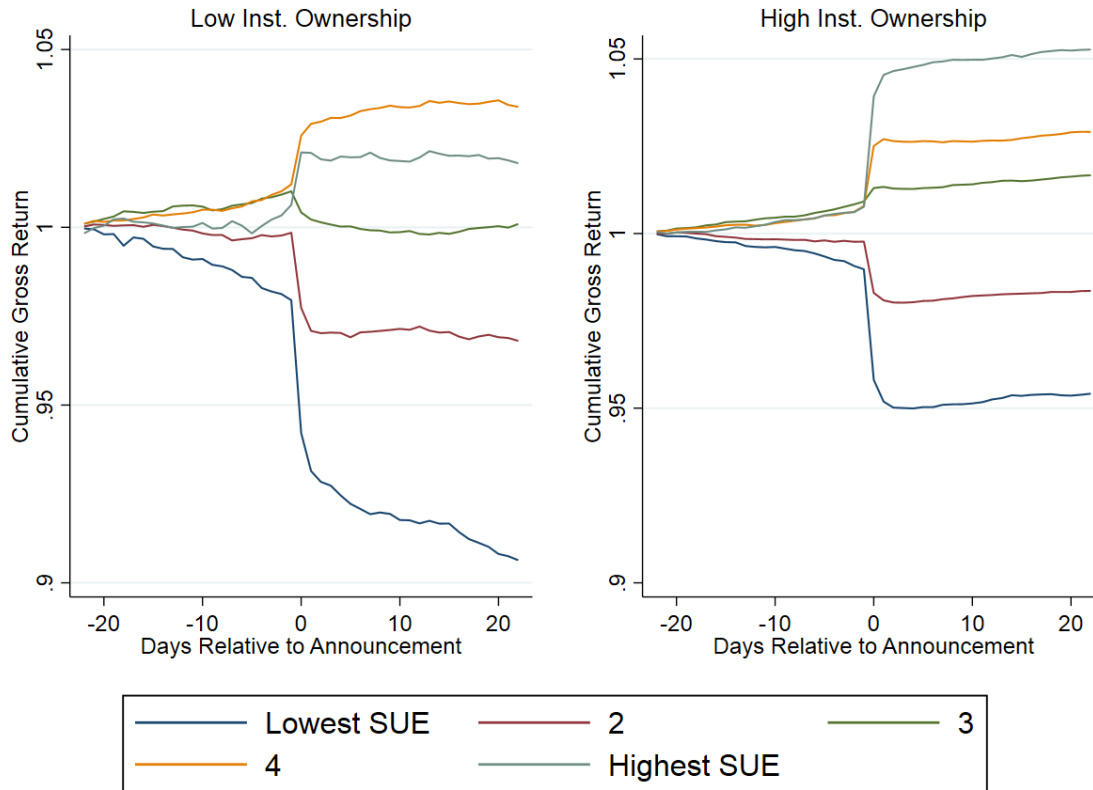
Notes: Each month, we break firms into two groups based on whether their institutional ownership – defined as the fraction of their shares outstanding held by 13-F filing institutions -- is larger or smaller than the median among NYSE firms. Then, each quarter, we sort firms into 5 groups based on their SUE. Within each of these groups, we calculate the average cumulative market-adjusted return starting at t=-22.

LONGER HORIZON RETURNS
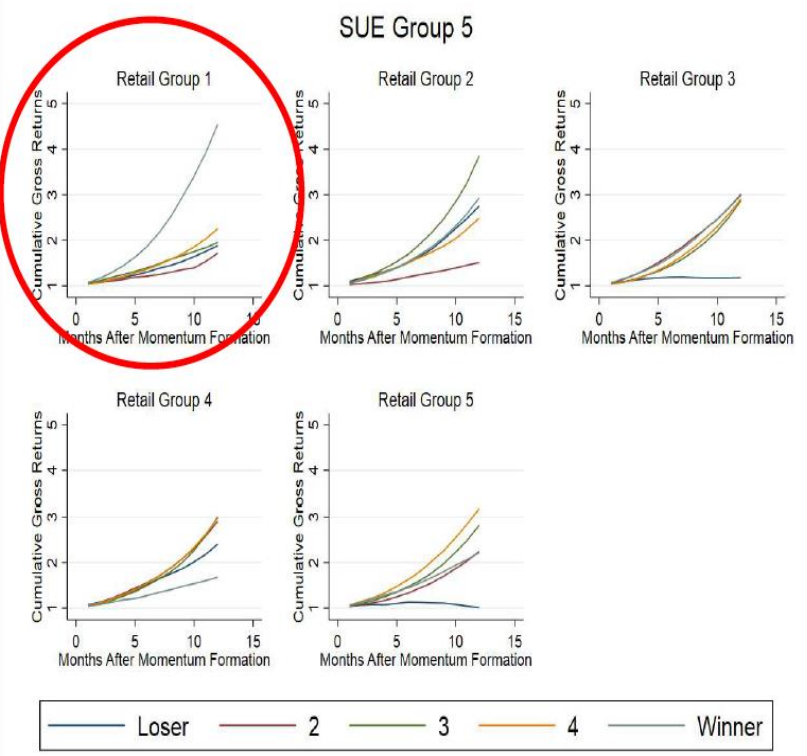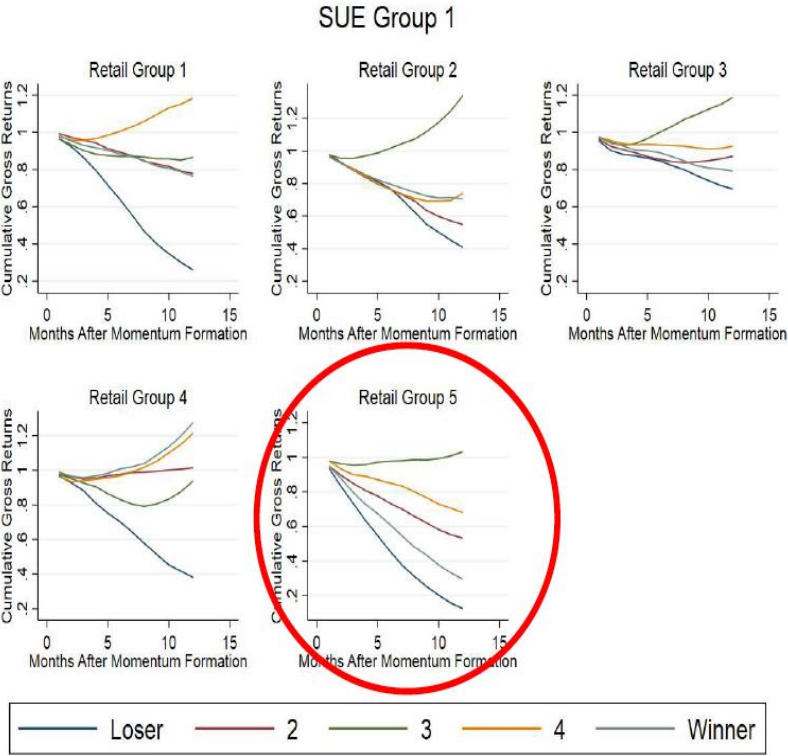
LONGER HORIZON RESULTS

Panel A
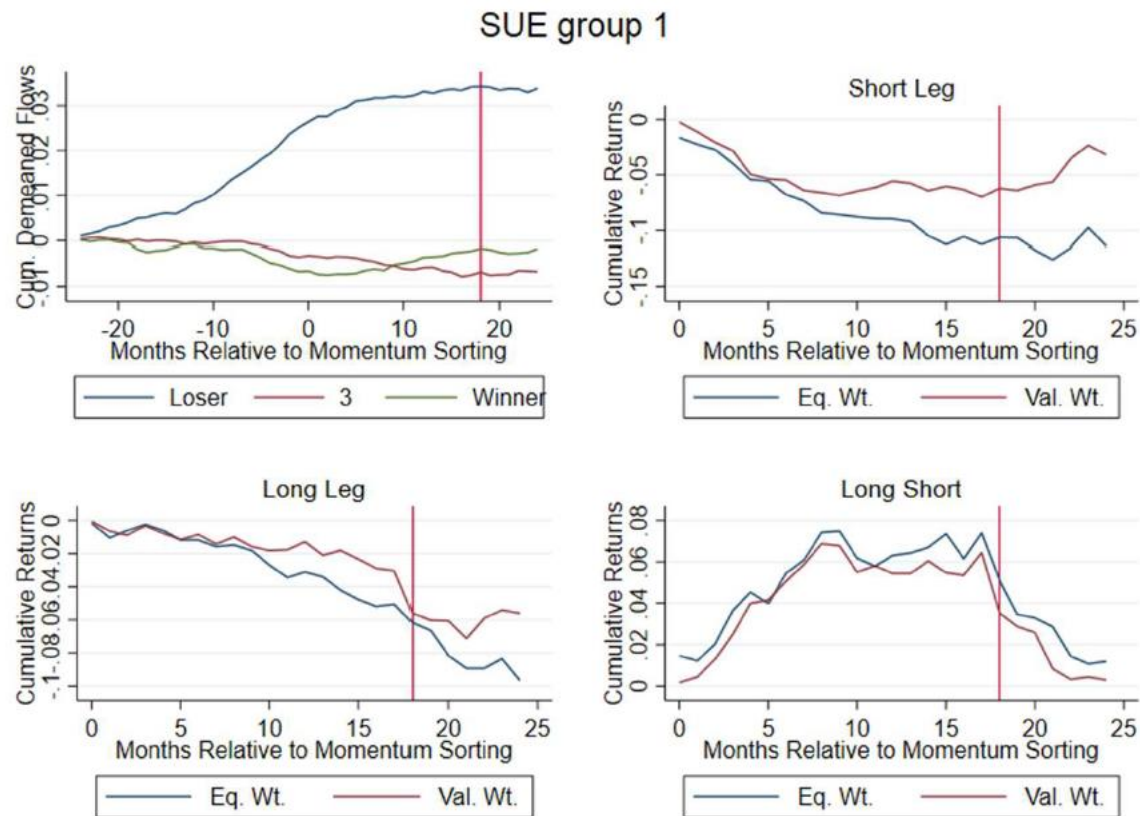
For firms with the lowest SUE, performance peaks around time flows reverse

ALTERNATIVE EXPLANATIONS: DISPOSITION EFFECT

	This Paper	Odean (1998)
Pct. Loss Realized (PLR)	15.2%	9.8%
Pct. Gain Realized (PGR)	19.5%	14.8%
Difference	-4.3%	-5.0%
t-stat	39.3	35.0

Unconditionally, investors in our sample exhibit a disposition effect: sell winners, hold onto losers

ALTERNATIVE EXPLANATIONS:
DISPOSITION EFFECT

Evidence Around Earnings Surprises: Impact on Selling Behavior

|	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	Only roundtrip trades	No roundtrip trades	All
Gain	-0.00376		-0.00366	0.0165	-0.00468	-0.00361
	[-0.287]		[-0.271]	[1.108]	[-0.346]	[-0.271]
Positive Surprise		0.0116***	0.0146**	0.306***	-0.0187***	0.0157**
		[6.338]	[2.131]	[17.87]	[-2.877]	[2.325]
Gain * Positive Surprise			-0.00609	-0.0552***	0.015	-0.00611
			[-0.554]	[-3.375]	[1.380]	[-0.561]
Other Positive Surprises						0.0405***
						[6.428]
Gain * Other Positive Surprises						-0.00831
						[-1.431]
Constant	0.0920***	0.0892***	0.0915***	0.180***	0.0877***	0.0904***
	[11.21]	[1,049]	[10.86]	[20.23]	[10.38]	[10.94]
Observations	5,023,032	5,022,816	5,022,326	213,733	4,808,593	5,022,326
Adjusted R-squared	0.199	0.199	0.199	0.282	0.188	0.199

Around earnings surprises investors act as contrarian and don't seem to display the disposition effect

CONTRARIAN INDEX

Investor-level:
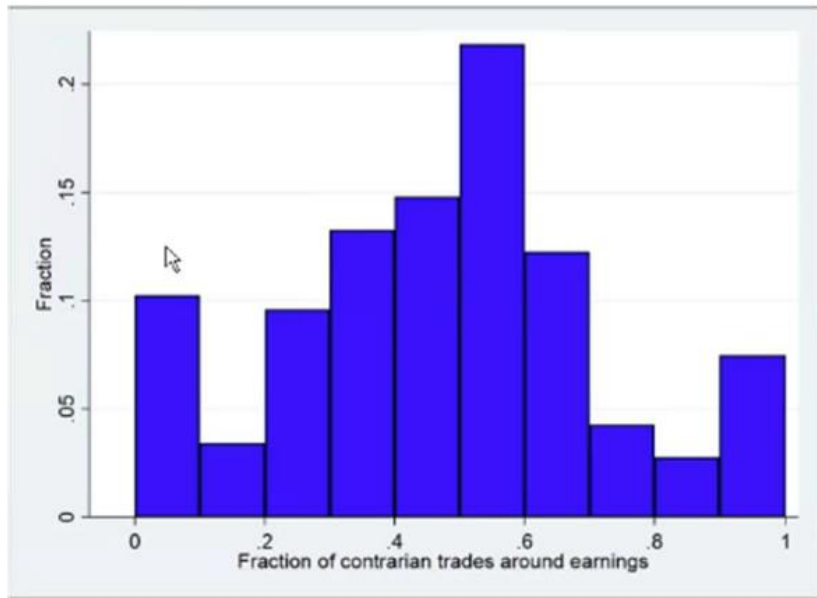
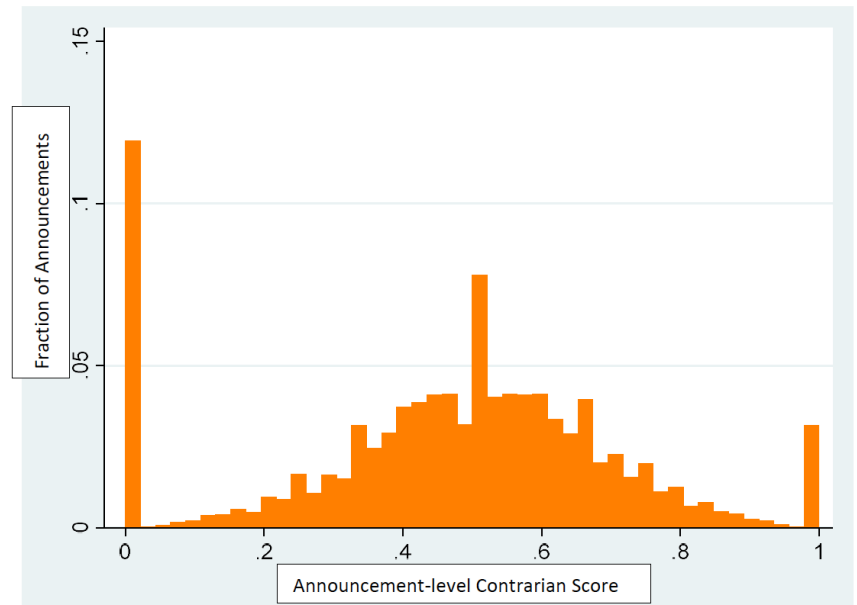## Firm-level:

More than 50% of investors trading around earnings announcements trade contrarian at least half of time, and more than 65% trade contrarian at least 40% of the time

Distribution of the fraction of trades that are contrarians for each earnings announcement. Only 12% of earnings announcements don't have any contrarian trades

Contrarian Trading Around Company Earnings Announcements

	Is Sold (1)	Is Sold (2)	Is Sold (3)	Is Bought (4)	Is Bought (5)	Is Bought (6)
Earnings Ret	0.922***	0.957***	0.838***	-0.818***	-0.798***	-0.676***
	(0.247)	(0.248)	(0.263)	(0.174)	(0.174)	(0.186)
Is Visit		0.019***	0.018***		0.011**	0.011**
		(0.007)	(0.007)		(0.005)	(0.006)
Is Visit x Earnings Ret			1.033			-1.049**
			(0.795)			(0.514)
Intercept	0.040***	0.037***	0.037***	0.029***	0.027***	0.027***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	10407	10407	10407	10400	10400	10400
R2	0.003	0.004	0.004	0.004	0.004	0.005

Attentiveness might be positively correlated with self-perceptions of expertise and beliefs in market overreaction to news.

ADDITIONAL FINDINGS: FACTOR EXPOSURES

Panel A - Full Sample

	Mean	Weighted Mean	Cross-Acct SD	25th %tile	50th %tile	75th %tile	N
MKT	0.95	0.93	0.51	0.68	0.94	1.19	2,399,149
SMB	0.22	0.08	1.02	-0.36	0.08	0.72	2,399,338
HML	-0.14	-0.14	0.96	-0.58	-0.07	0.33	2,397,796
MOM	-0.23	-0.15	0.83	-0.59	-0.15	0.14	2,397,495
Intercept	-0.0027	-0.0022	0.0146	-0.0083	-0.0016	0.0036	2,398,778

Panel B - Significant Sample

	Mean	Weighted Mean	Cross-Acct SD	25th %tile	50th %tile	75th %tile	N
MKT	0.8	0.79	0.69	0.42	0.66	1.23	591,262
SMB	0.43	0.07	1.4	-0.68	0.5	1.46	612,028
HML	-0.24	-0.33	1.37	-1.18	-0.49	0.79	508,148
MOM	-0.59	-0.34	0.97	-1.11	-0.65	-0.15	638,661
Intercept	-0.0119	-0.0093	0.0236	-0.0258	-0.0131	-0.0022	269,307
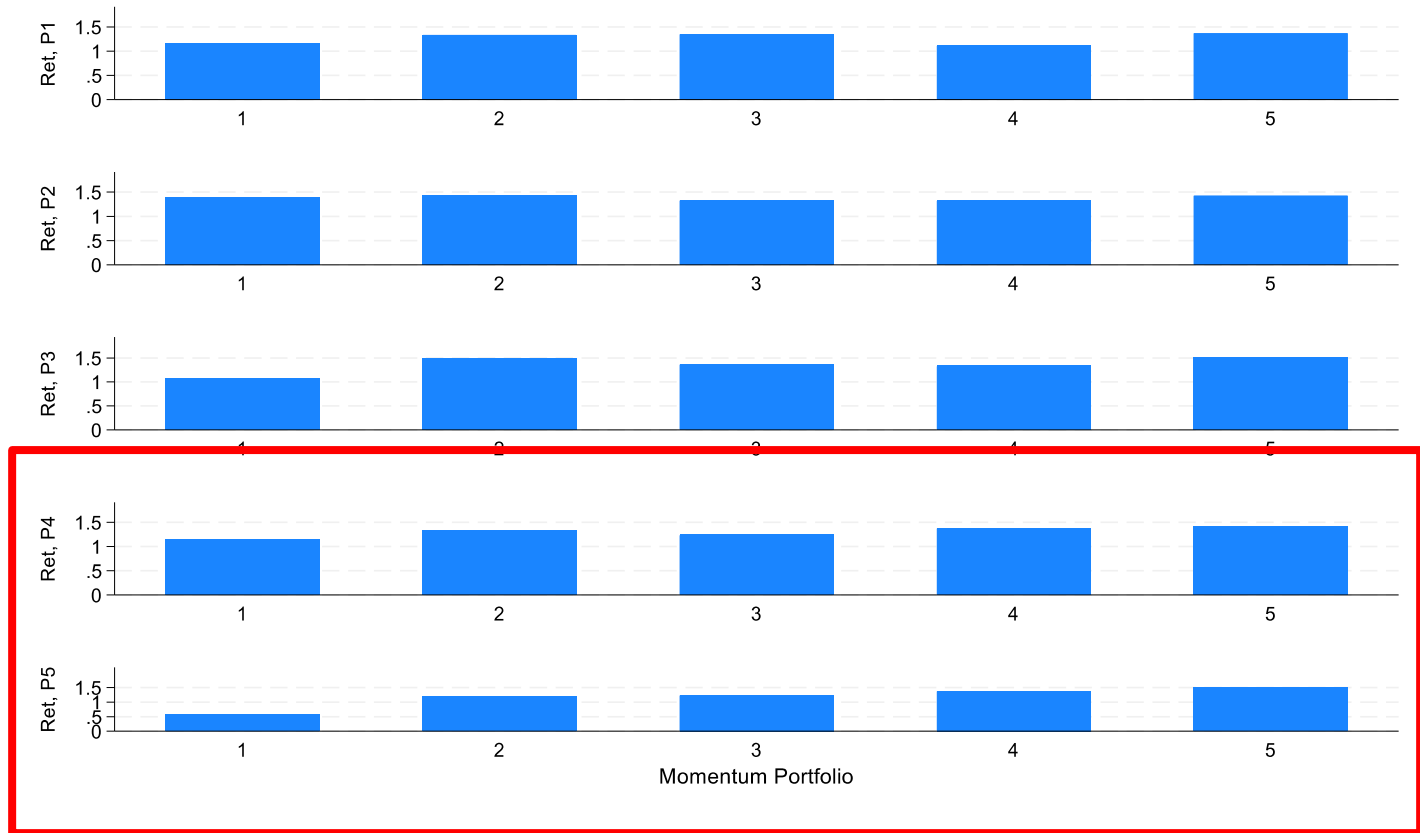
Momentum Returns by Intensity of Retail Trading for Retail Initiated Trades
Identified Through the Algorithm of Boehmer et. al. (2021)
2010-2021 Period

EXTERNAL VALIDATION
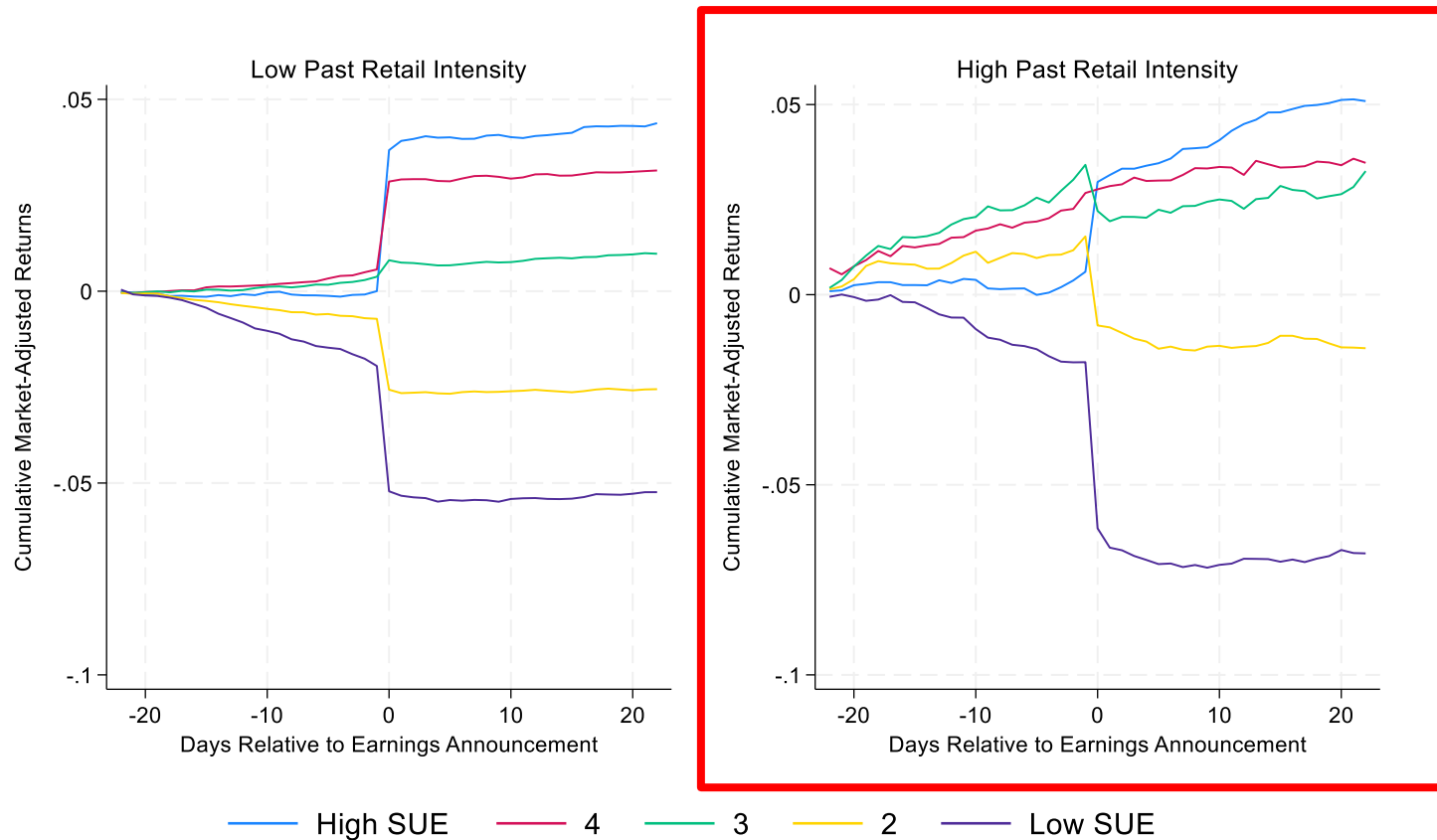
Cumulative Returns by Size of the Earnings Surprise and Gross Retail Flows
Identified Through the Algorithm of Boehmer et. al. (2021)
2010-2021 Period

TREND (2010-2014)

On balance retail investors have been decreasing their holdings of individual stocks over our sample period.

(A) Rolling 60-day Net Purchases ($B)

(B) Cumulative Net Purchases ($B)
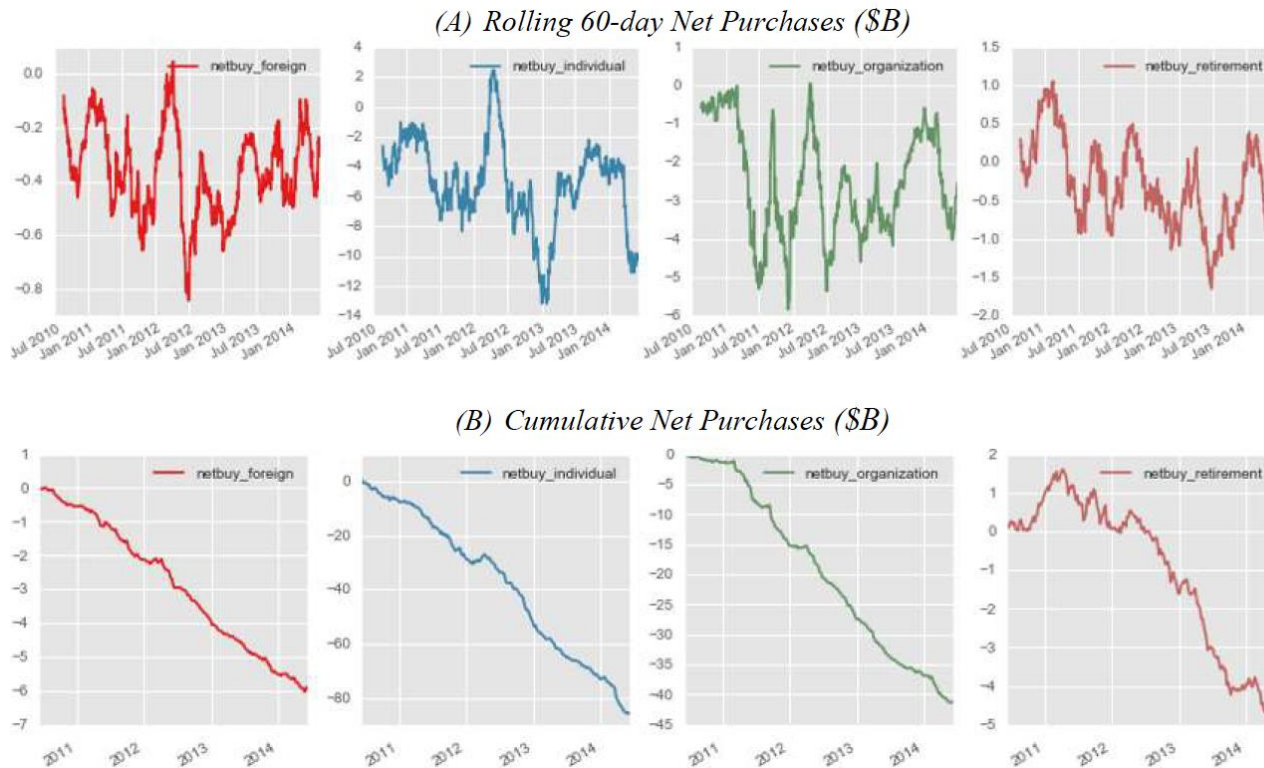
To the extent that retail investors contribute to momentum, their exit from stock trading points to a declining relevance of momentum in the years to come.

DISCUSSION

One potential interpretation for retail contrarian trading behavior: Investors' belief in the Law of Small Numbers (LSN), specifically "gambler's fallacy (Tversky and Kahneman 1971), combined with :

- Belief that after a large positive earnings announcement and the subsequent positive reaction to it, earnings are likely to mean revert and prices will adjust downwards in the future

- These investors will trade contrarian persistently if their priors are strong and/or they learn only slowly (conservatism bias)

- In our sample, investors hold only a handful of stocks and might not learn about the price under-reaction that they themselves might be causing

- This bias leads to price under-reaction (Jin and Peng, 2023)

- Investors appear to believe in mean reversion in stock prices (Laudenbach et al., 2021)

DISCUSSION

This interpretation is consistent with the fact that retail investors simultaneously exhibit contrarian trading behavior in stocks and momentum trading behavior in crypto (Kogan et al. 2023):

- Might have strong priors about stocks and diffuse priors and "hot hands" priors about crypto

CONCLUSIONS

- We provide evidence that Retail Investors trade as contrarian following large earnings surprises and in doing so contribute to momentum

- We show that the momentum effect is present only in stocks with large retail flows.

- The effect is larger in small loser stocks and in stocks with lower institutional ownership.

- Younger and day traders are more likely to be contrarian.

- Firms with high liquidity, low gross profitability and low inst. ownership experience a higher fraction of retail trades.

CONCLUSIONS

Future Research:

- Does the strength of Momentum and PEAD varies with the participation of retail in stock trading?

- Retail trading in ETFs and macro news