2023 Q Group's Spring Seminar

Tracking Retail Investor Activity

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Retail Investors' Role in the Economy

- Theoretical:
  - Black (1986): retail investors, noise traders. Noise traders can be quite useful to make trades happen.
  - Shleifer and Summers (1990): Some investors are not fully rational, and sentiments that are not fully justified by fundamental news.

- Empirical: Conflicting results
  - Barber and Odean (2000, 2008)
  - Kaniel, Saar, and Titman (2008), Barber, Odean, and Zhu (2009), Kelley and Tetlock (2013), Barrot, Kaniel and Sraer (2016)

Research Questions Regarding Retail Investors

- Are retail investors informed?
- Do they make systematic mistakes in their trading decisions?
- Can they predict future returns?
- …

  - **The challenge: How to track retail investors?**

Tracking Retail Investors: Trade Size

- When we were younger…small trades were much more likely to come from retail customers, while institutions were likely behind the larger reported trades
  - Lee and Radhakrishna (2000) use a $20,000 cutoff

- Once algorithms become an important feature of institutional order executions in the early 2000's, "slice and dice" becomes the norm of institutional trades.
  - During our recent sample period retail order flow actually has a slightly larger average trade size compared to other order flow.

- **Problem: trade size doesn't seem to be a good proxy nowadays.**

Tracking Retail Investors: Proprietary Datasets

- Barber and Odean (2000) analyze data from a single U.S. retail brokerage firm.
- Kaniel, Saar and Titman (2008) and Boehmer, Jones and Zhang (2008) use proprietary account-type data from the NYSE during the early 2000's.
  - A small market share of overall retail order executions.
- Kelley and Tetlock (2013) have data from a single U.S. wholesaler.
- Barrot, Kaniel and Sraer (2016) have data from one French brokerage firm.

- **Problem 1: These datasets are not publicly available.**
- **Problem 2: Relatively small subsets of overall retail order flow.**

Our Data

- Publicly available
- Covers substantial amount of retail order flow
- Easily implementable
- Can be used to study retail investors with respect to:
  - Behavioral biases
  - Amount and nature of their information
  - Seasonality and time-series properties

Handling of Retail Market Orders

- Most equity orders initiated by retail investors never go to the NYSE, Nasdaq, or another exchange.

- The vast majority of marketable retail orders are executed by:
  - *Internalization*: filled from the broker's own inventory
  - *Wholesalers*: broker has made arrangements to route orders to an entity such as Knight, Citadel, UBS.

- Off-exchange orders executed internally or by wholesalers are reported to a FINRA Trade Reporting Facility (TRF)
  - included in the "consolidated tape" of all reported transactions as exchange code "D".

Subpenny Price Improvement

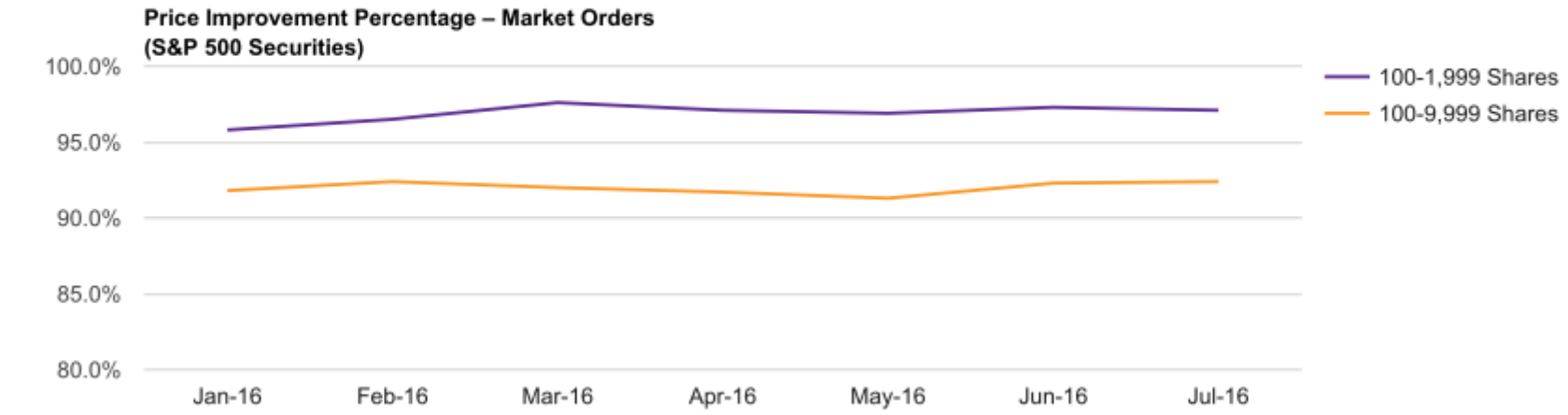
- For orders executed internally or by a wholesaler, the retail customer often receives a price that is a fraction of a penny per share better than the prevailing NBBO (national best bid or offer price).
  - Ex: for a retail sell, the internalizing or wholesaling counterparty often agrees to pay slightly more than the National Best Bid.
  - This price improvement is typically only a small fraction of a cent. Common price improvement amounts: 0.01, 0.1 cents.
  - Allows broker to claim that the customer did better than if the order had been sent to an exchange.

- But broker still makes money on this:
  - Receives payment for order flow from wholesaler
  - On internalized trades, broker is likely to earn some bid-ask spread even with price improvement.

Ex: From the Scottrade Website

Most retail orders are price-improved.

Price improvement reflects real savings passed on to you and underscores our commitment to providing a consistent, quality execution experience.

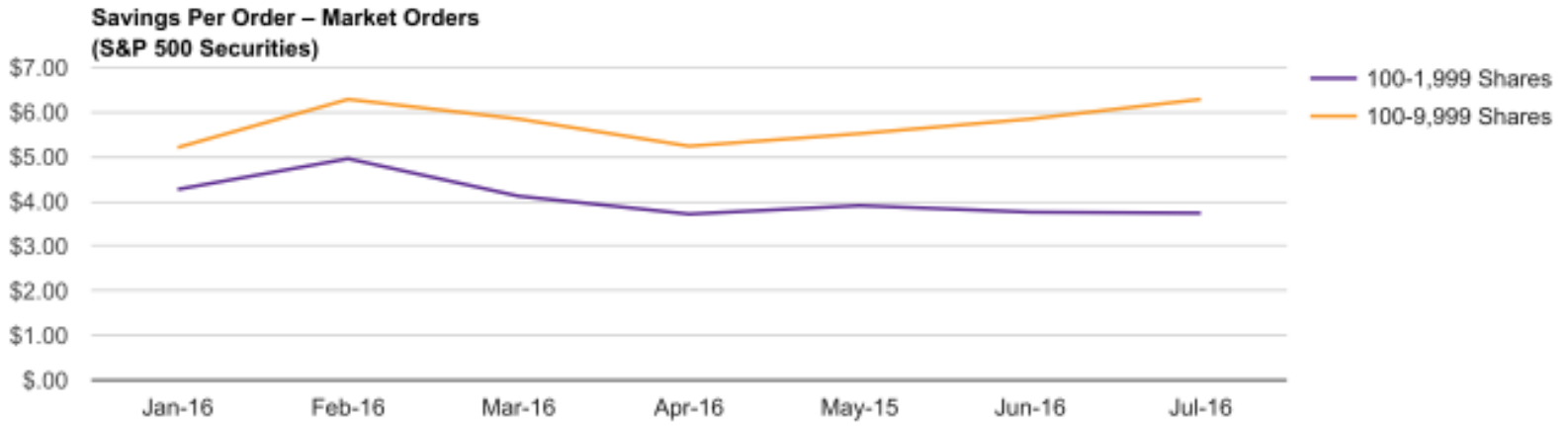


Other on-line discount retail brokers provide very similar statistics.

More from the Scottrade Website

This metric captures both the frequency and amount of price improvement received on an order basis. It is calculated using the following formula:

[(Net Improvement Cents/Share * Executed Shares) / Executed Orders] ⟶ This savings can represent a significant percentage discount versus a standard commission.



Unfortunately there's not enough detail to calculate the improvement in cents per share.

Retail vs. Institutional Subpennies

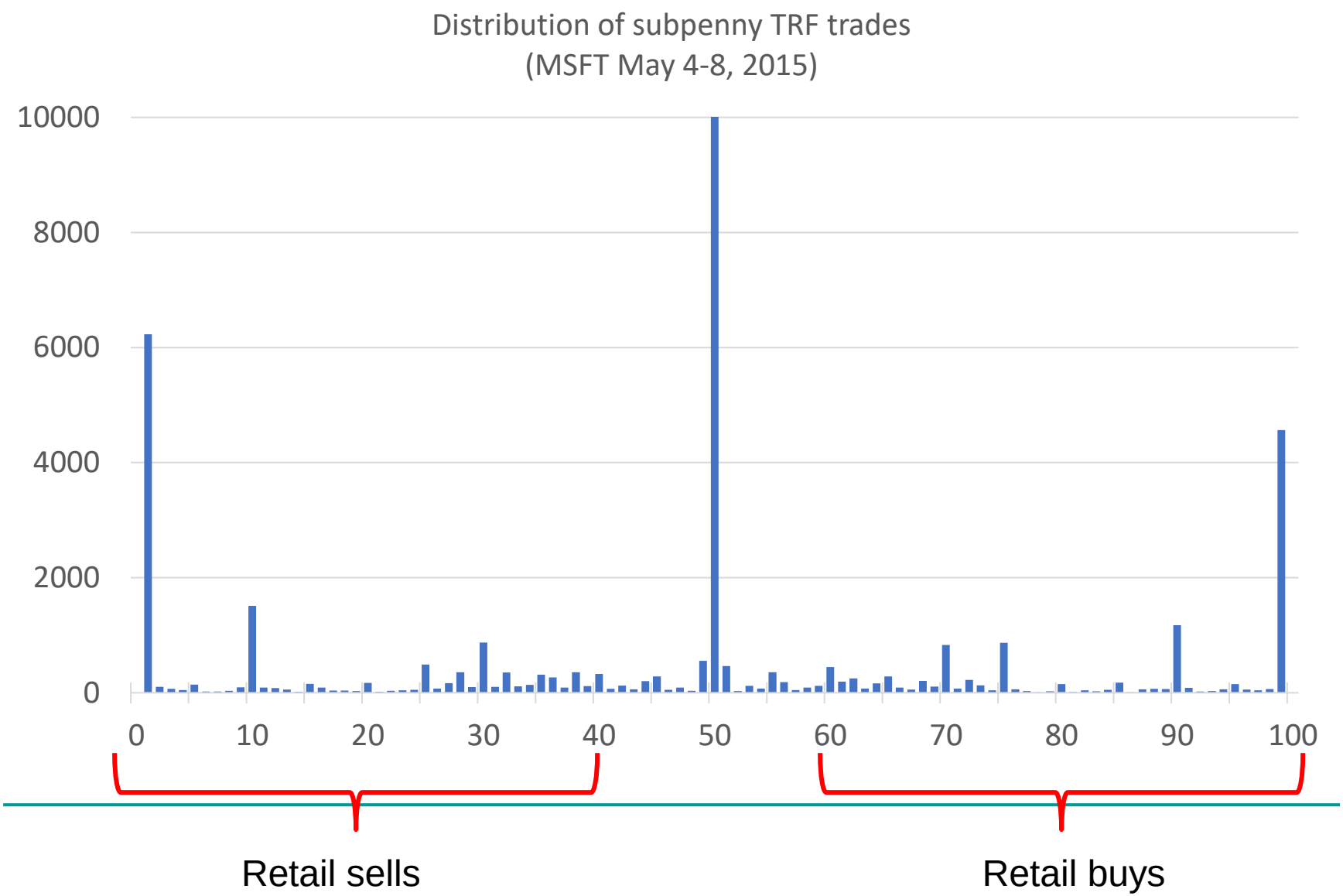
- Subpenny price improvements are not a feature of institutional order executions.
  - Reg NMS prohibits orders from having subpenny limit prices.
  - Internalizers and wholesalers go to great lengths to avoid interacting with institutional order flow.

- Exception: Reg NMS allows executions at the quote midpoint.
  - As a result, institutions often use crossing networks and midpoint peg orders that generate transactions at the midpoint price.
  - Quoted spread is now typically 1c per share, so many transactions are reported at a half-penny.
  - Some dark pools and crossing networks also allow negotiation around the midquote, so "midpoint" prints can be 0.4-0.6 cents.

Our Retail Identification Strategy

- For all trades reported to a FINRA TRF (exchange code 'D' in TAQ)
  - Suppose Z_{it} is the fraction of a penny associated with transaction price P_{it}.
  - If Z_{it} is in the interval (0,0.4), it indicates a retail seller-initiated transaction.
  - If Z_{it} is in the interval (0.6,1), it indicates a retail buyer-initiated transaction.
  - Transactions at a round penny ($Z_{it} = 0$) or near the half-penny ($0.4 \leq Z_{it} \leq 0.6$) are not assigned to the retail category.

Ex: Fractional Cents in MSFT Prints



Cross Validation

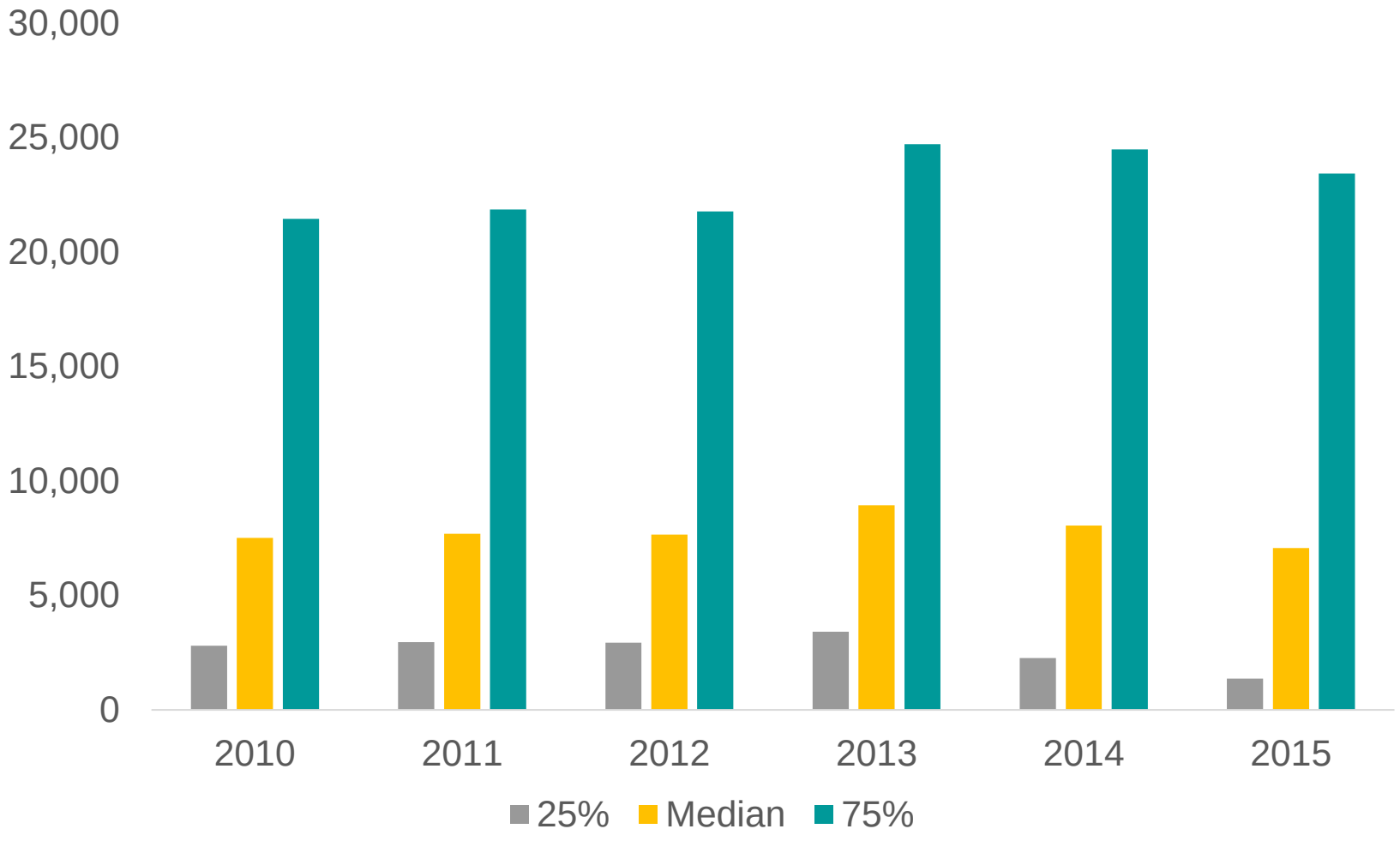
- The proprietary data in Kelley and Tetlock (2013)
  - The correlation between our order imbalance measures and Kelley and Tetlock (2013)'s observed trade directions is average at 0.45.
  - In a regression horse race, our order imbalance measures and those of Kelley and Tetlock (2013) both significantly predict future stock returns positively.

- The proprietary NASDAQ data: all intraday transactions on its TRF for 100 stocks during October 2010.
  - For stocks with a share price below $100, our subpenny approach matches the TRF's correct buy/sell sign 98.2% of the time.

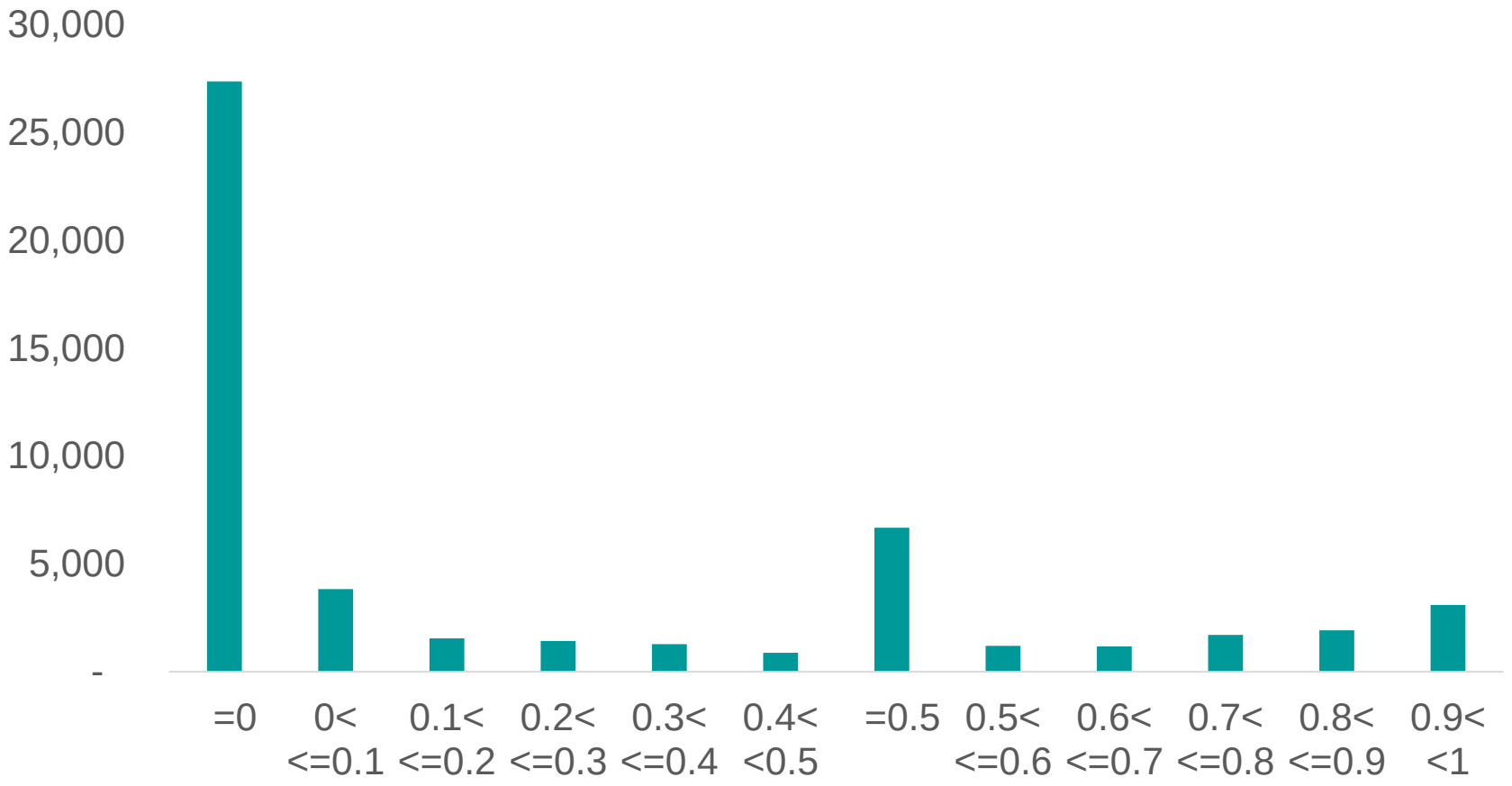
More on Data

- We merge TRF transaction data from TAQ with stock return data and accounting data from CRSP and Compustat, respectively.
- We only include common stocks with share code 10 or 11 (which excludes mainly ETFs, ADRs, and REITs) listed on the NYSE, NYSE MKT (formerly the AMEX), or Nasdaq.
- We remove low-priced stocks by requiring the minimum stock price to be $1 from previous month-end.
- Our sample period is from January 3, 2010 to December 31, 2015.
- On each day, we have on average 3200 firms included in the sample.

Order Size


30,000
25,000
20,000
15,000
10,000
5,000
0
2010
2011
2012
2013
2014
2015
25%
Median
75%

Distribution of Share Volumes



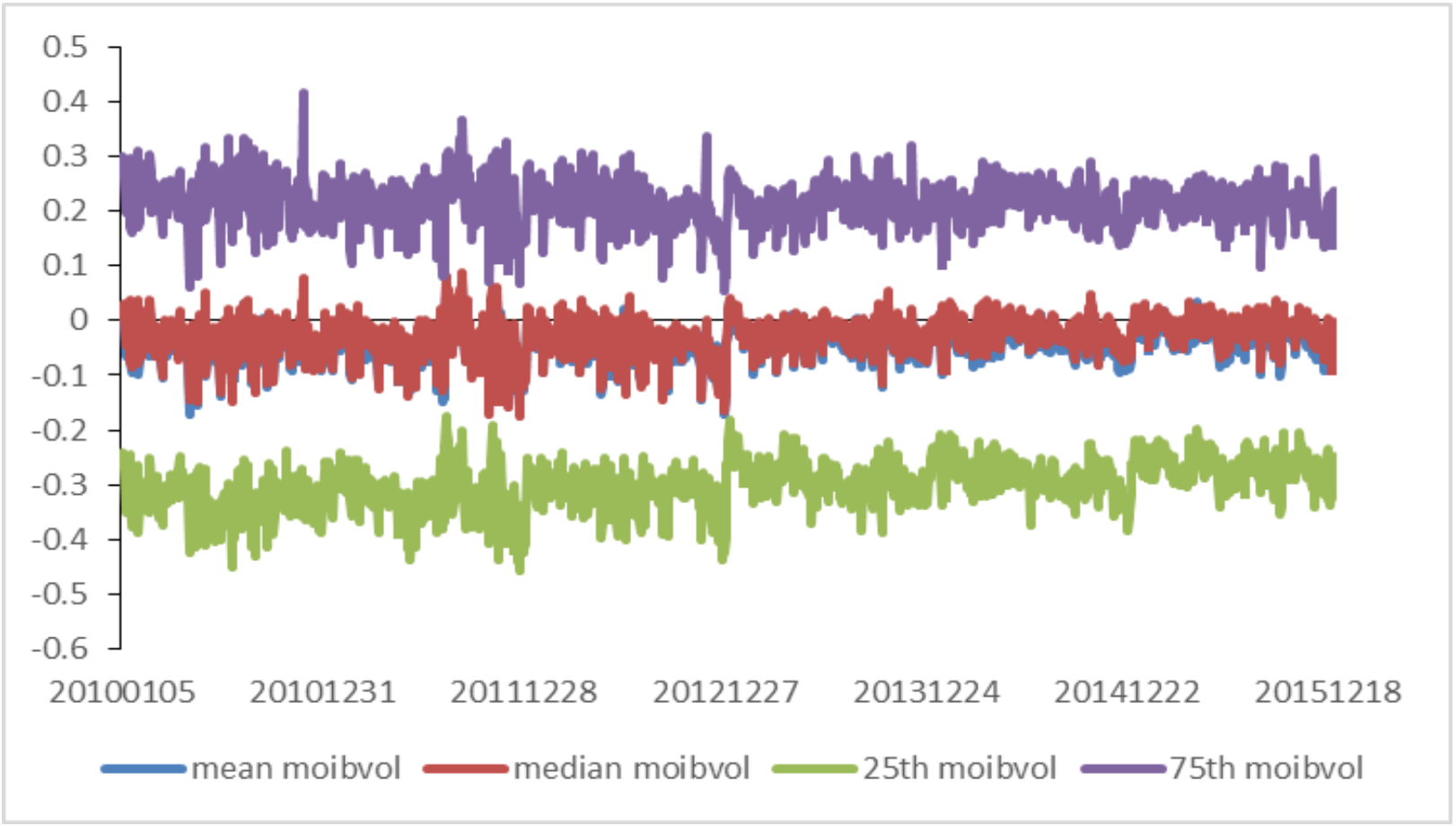
Retail Volume and Order Imbalance

- Marketable retail order imbalance

$$order\_imbalance(i,t) = \frac{retail\_buy\_volume(i,t) - retail\_sell\_volume(i,t)}{retail\_buy\_volume(i,t) + retail\_sell\_volume(i,t)}$$

	Mean	Std
Total volume	1,229,004	6,849,849
Retail buy volume	42,481	280,474
Retail sell volume	42,430	264,704
Retail order imbalance	-0.038	0.464

Time Series and Cross-Section of Retail Order Imbalance



What Drives Retail Trading?

- Drivers of marketable retail order flow
  - **Persistence**: Retail trading are persistent, and correlated with previous trading (Barber, Odean, and Zhu, 2009)
  - **Past return (Momentum/Contrarian)**: Kaniel, Saar, and Titman (2008) find retail trading are contrarian over weekly horizon, while Kelley and Tetlock (2016) find retail trading are momentum over daily horizon.
  - **Firm characteristics**: Retail investors may prefer specific stock characteristics, such as turnover, volatility, turnover, and book to market ratio.

What Explains Retail Trading?

Hypotheses		Coef.	*t*-stat
Persistence	Previous retail order imbalance	0.2200	92.53
Momentum /Contrarian	Previous week return	-0.9481	-40.60
	Previous month return	-0.2778	-19.24
	Previous six month return	-0.0586	-11.49
Firm characteristics	Previous month turnover	0.0003	5.31
	Previous month volatility	0.8100	8.37
	Previous market capitalization	0.0154	12.06
	Previous month book to market	-0.0275	-17.66

Can Retail Trading Predict Future Stock Returns?

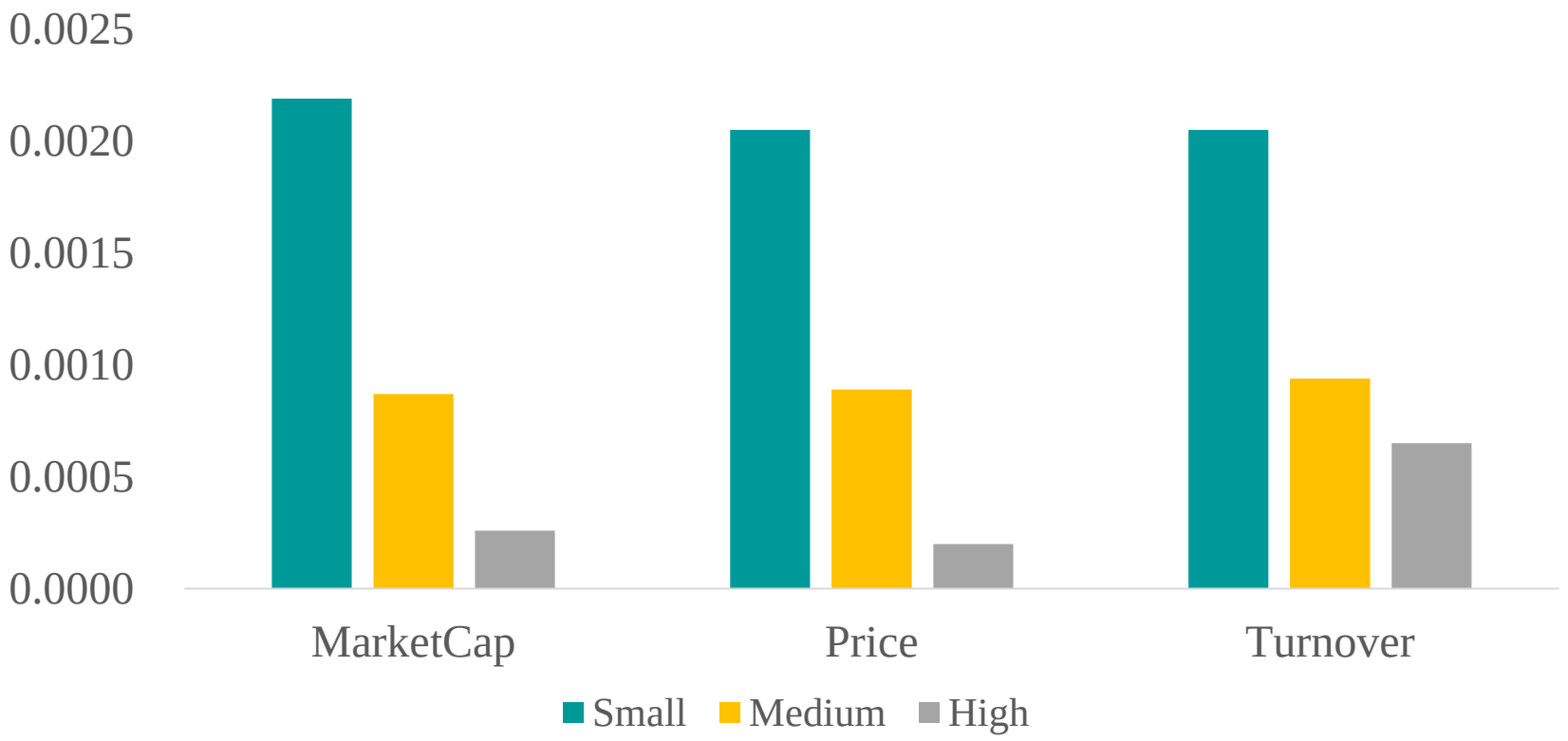
- Hypotheses:
  - Retail order flows cannot predict future stock returns
    - Barber and Odean (2000; 2008)
  - Retail order flows might predict future stock returns
    - Kaniel, Saar, and Titman (2008), Barber, Odean, and Zhu (2009), Kelley and Tetlock (2013), Barrot, Kaniel and Sraer (2016)

Retail Trading Predicts Future Stock Returns

- Retail order flows positively and significantly predict stock returns

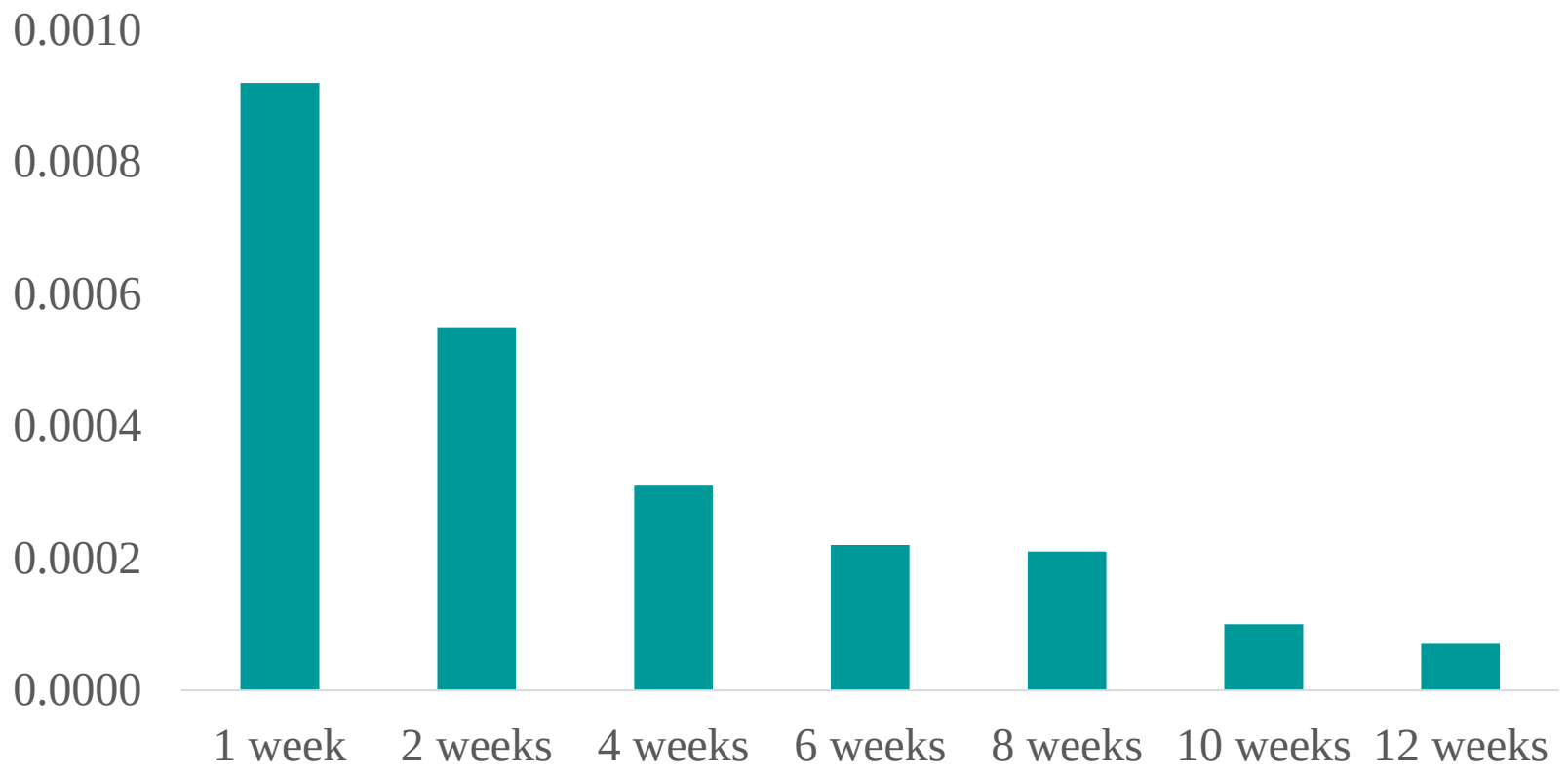
Dependent variable	Return	
	Coef.	*t*-stat
Retail Order Imbalance from previous week	0.0009	15.60
Interquartile return difference	0.1089%	

Retail Predictive Power for Different Types of Stocks



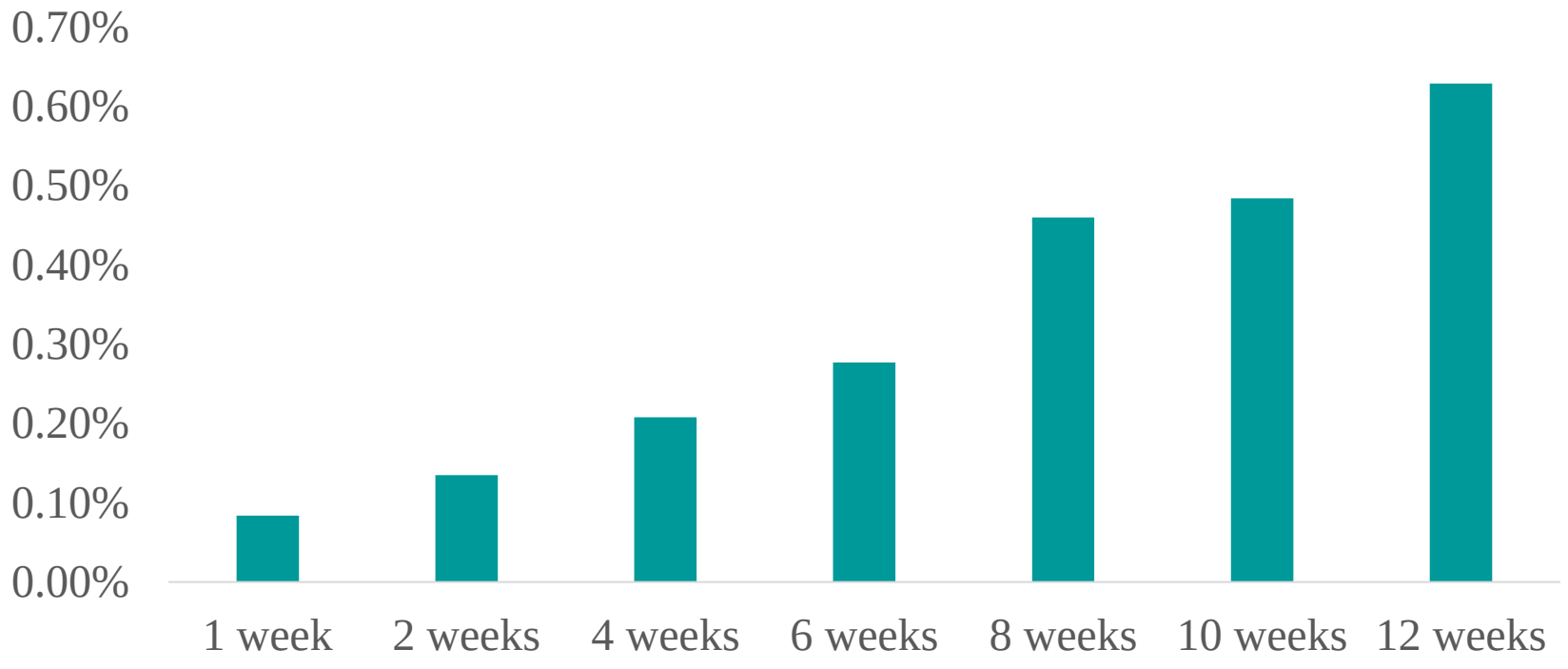
Predictive Power Decays over Time

- Predict *k*th weeks ahead return



Long-Short Portfolios

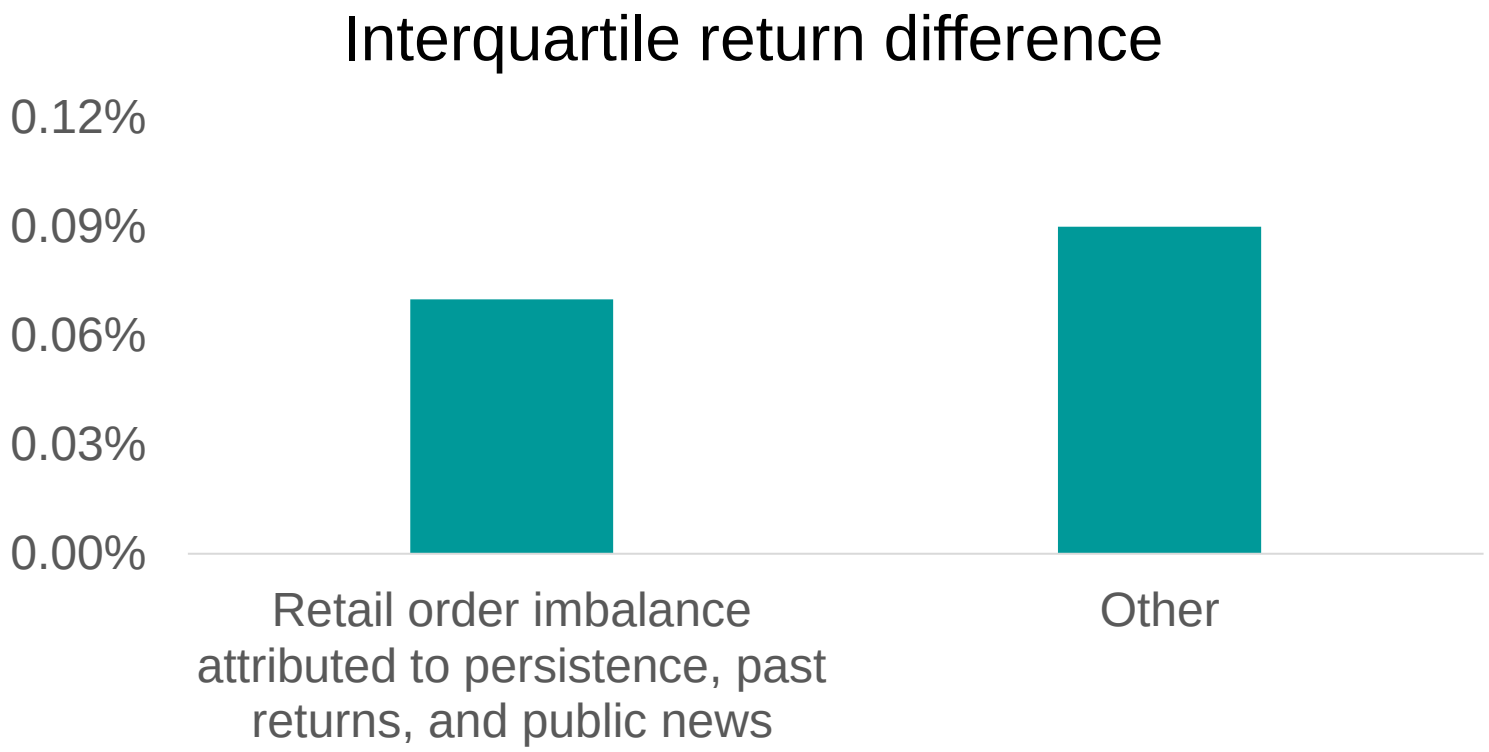
- We long stocks with the highest 20% retail order imbalances, short stocks with the lowest 20% retail order imbalances, and hold for 12 weeks.



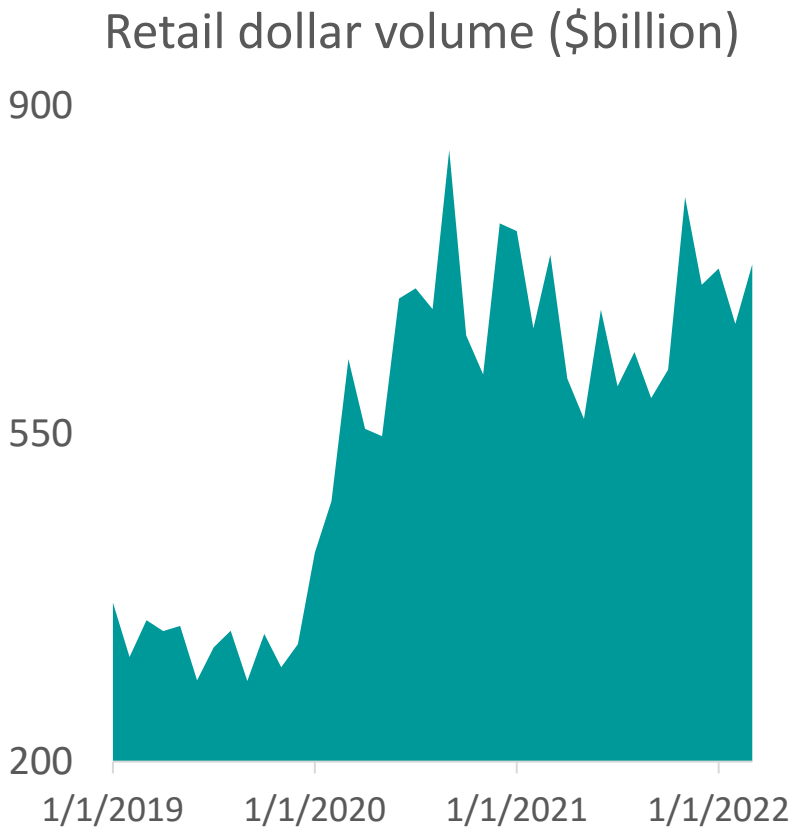
Why Retail Order Flows Predict Future Returns?

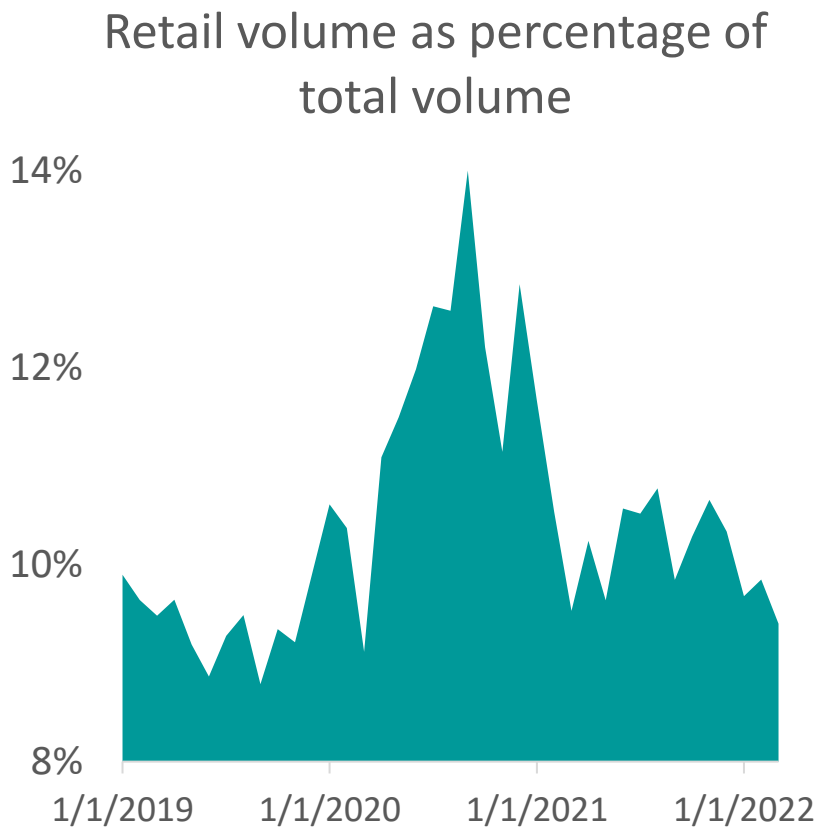
- Hypotheses:
  - **Order flows persistence**: Persistent buy (sell) order flows create price pressure, and increase (decrease) future stock prices (Chordia and Subrahmanyam, 2004)
  - **Liquidity provision**: Retail investors are contrarian, provide liquidity to the market, and are compensated for liquidity provision (Kaniel, Saar, and Titman, 2008)
  - **Informative trading**: Retail investors have information that is not yet incorporated into prices and thus can predict returns (Kelley and Tetlock, 2013)

Why Retail Order Flows Predict Future Returns?



Retail Investors in the Pandemic: Jones, Tan, Zhang, and Zhang (2022)



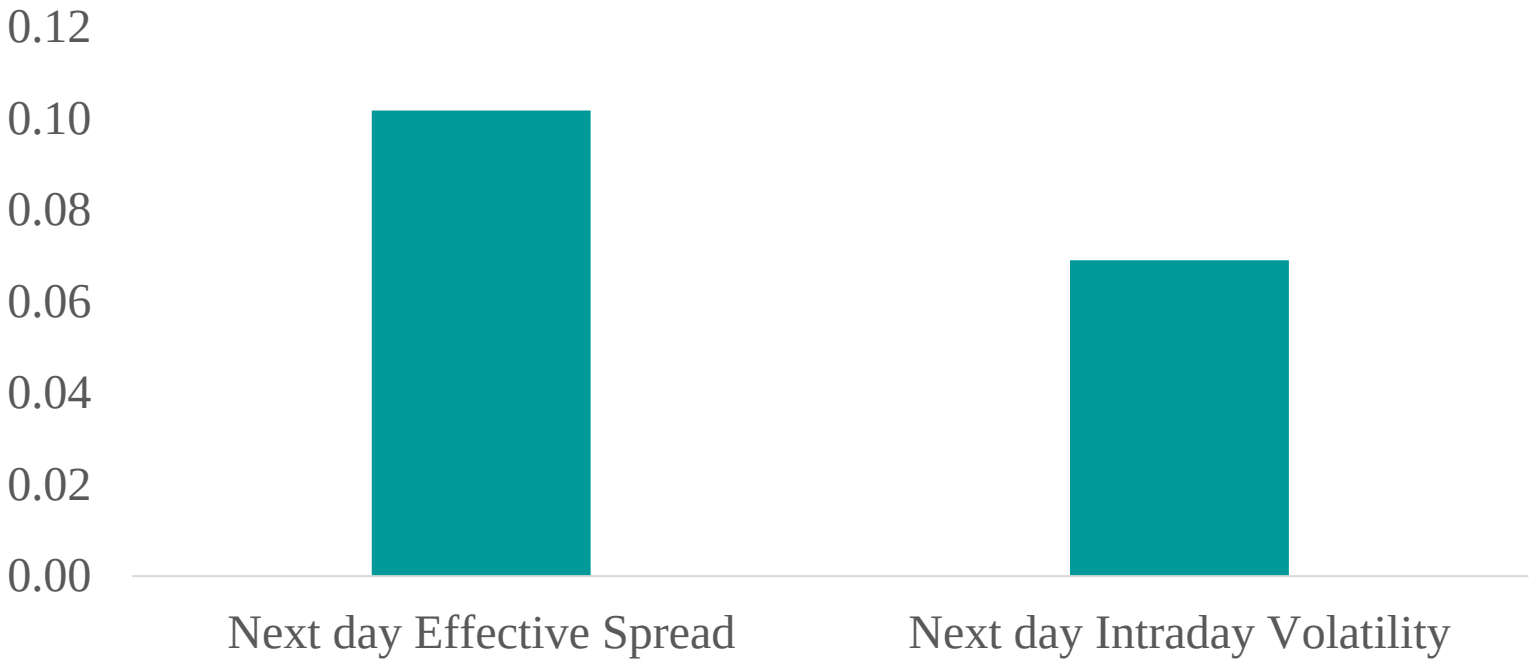


Pandemic: Can Retail Flows Still Predict Returns?

- Retail order flows positively predict cross-sectional returns

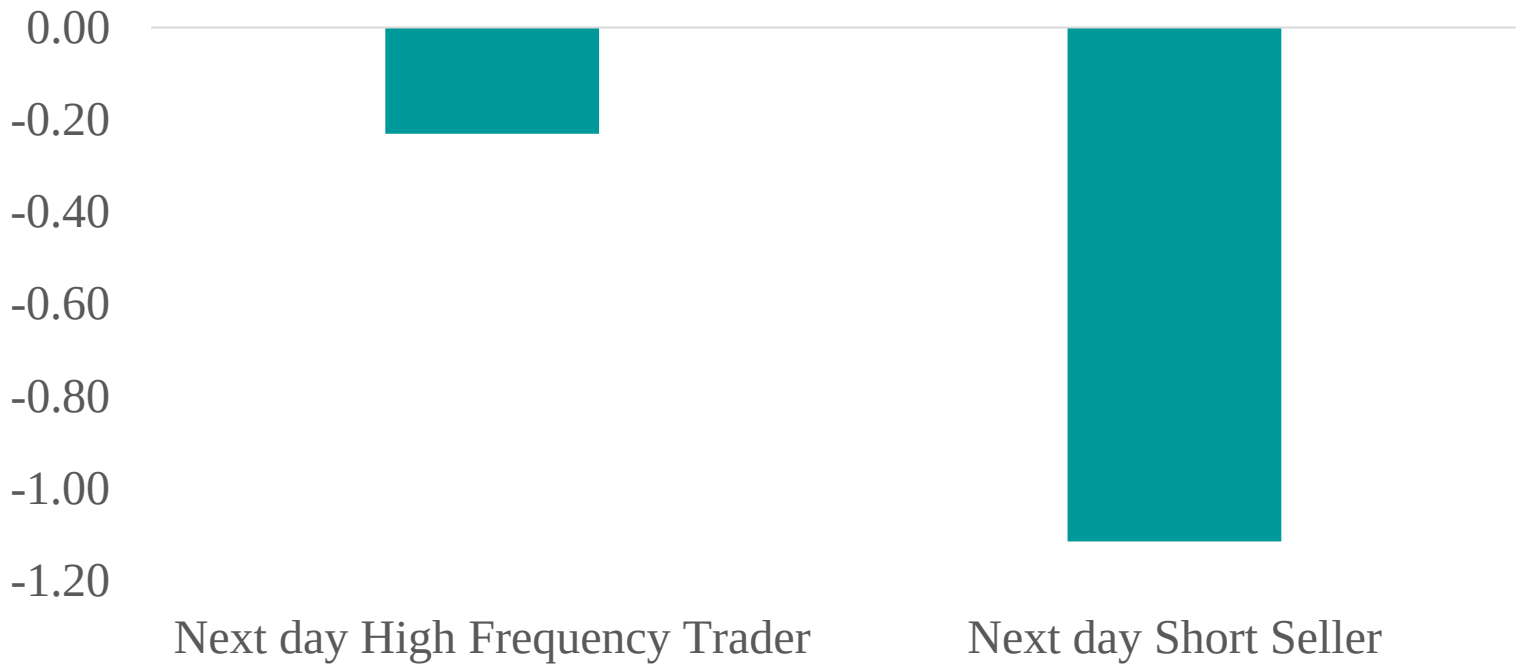
Pandemic: Do Retail Flows Improve Market Quality?

- Retail order flows are associated with wider future effective spreads and higher future volatilities



Pandemic: Retail Investors vs. Other Market Participants

- Retail order flows are associated with less market participations by high frequency traders and short-sellers



Latest SEC Proposed Rules

- SEC proposed 4 rules on Dec 14, 2022 to protect retail order:
  - Regulation Best Execution
  - **Order Competition Rule:** require retail orders to be exposed to competition in fair and open auctions before executed internally
    - ***BJZZ is cited by SEC for the Order Competition Rule***
  - Regulation NMS: Minimum Pricing Increments, Access Fees, and Transparency of Better Priced Orders
  - Disclosure of Order Execution Information

Algorithm Modifications

- BJZZ works the best when the bid-ask spread is less than 1 cent:
  - True for most of stocks during 2010-2015 sample period;
  - Bid ask spreads widen for a subset of stocks after 2016-2018 tick size pilots.

- Barber, Huang, Jorion, Odean, Schwarz (2022) modifications:
  - Still use subpenny prices for retail identification;
  - Sign buy and sell by the quote midpoints instead of 40bps and 60bps.

- BJZZ results are robust to BHJOS modification.

Conclusions

- We provide an easy method to identify marketable retail purchases and sales use recent, publicly available U.S. equity transaction data.
- Individual stocks with net buying by retail investors outperform stocks with negative imbalances by 10 bps over the following week.
- Order flow persistence, contrarian trading or public news sentiment can partly explain the return predictive power, and provide suggestive evidence that retail investors may be informed.
- Retail investors trading increase in the Pandemic, positive predict future returns, are associated with wider effective spreads, higher volatilities, as well as less high frequency trading and short-sellers