

HFTs and Retail Order Flow¹

Anna Pavlova, London Business School

¹based on Bryzgalova, Pavlova and Sikorskaya (2023)

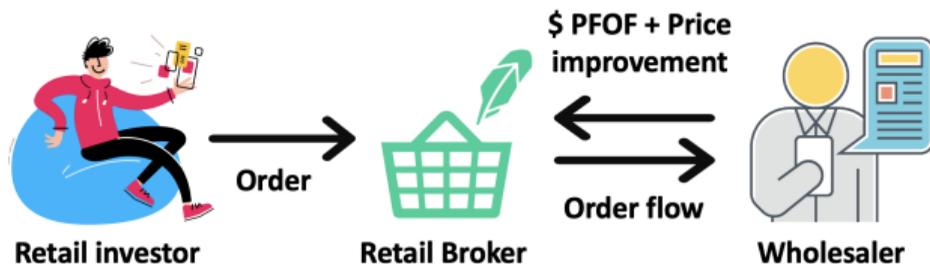
Current Trends

“Democratization” of retail investing worldwide, led by investing app Robinhood

- Zero-commission trading in stocks and options
- Bored young investors receiving stimulus payments during the pandemic

Zero commissions are made possible by **payment for order flow (PFOF)**

- PFOF comes from the so-called **wholesalers/internalizers** – market makers who execute order flow for retail brokerage



Do Retail Investors Benefit from Execution by Internalizers?

Retail orders in equities are “internalized” off exchanges, on private trading platforms

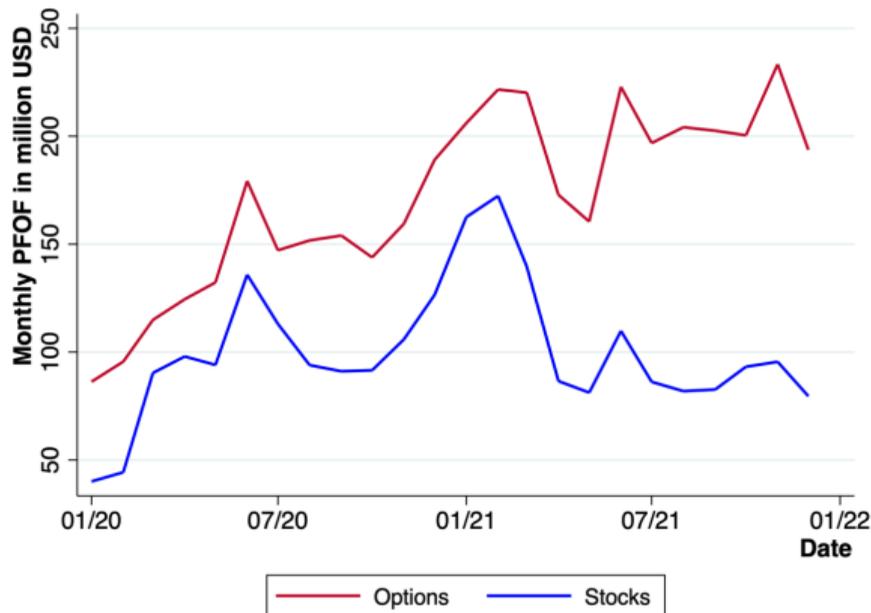


PFOF and Retail Order Flow

- ▶ PFOF is a controversial practice: it is **banned** in the UK but not in Germany/U.S.
- ▶ Good data on PFOF in the U.S.
 - ▶ Retail brokers are required to file Rule 606 reports with the SEC (routing of orders)
 - ▶ Reporting to FINRA of internalized volume in each name
- ▶ PFOF is quite opaque in Europe; clear need for better reporting requirements
 - ▶ Aramian and Comerton-Forde (2023), “Retail Trading in European Equity Markets”

Payment for Order Flow in the U.S.: Options versus Stocks

New regulatory reports under the SEC's Rule 606 (routing of orders)

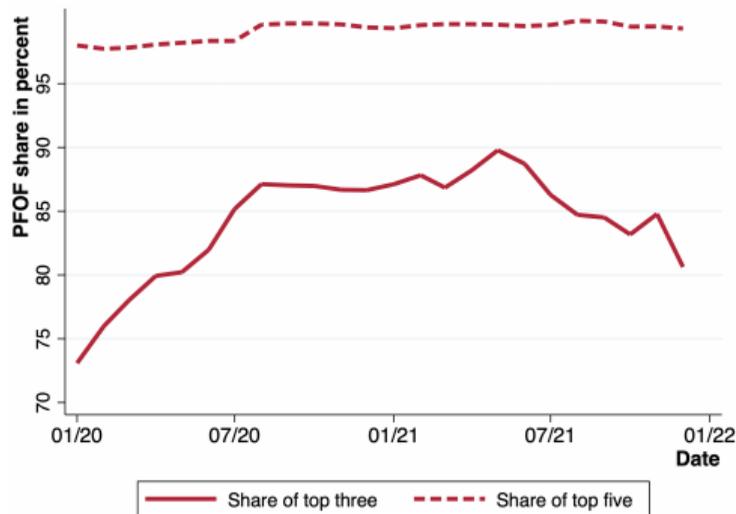


PFOF is much higher for options than for stocks: \$2.5 bln vs. \$1.3 bln in 2021

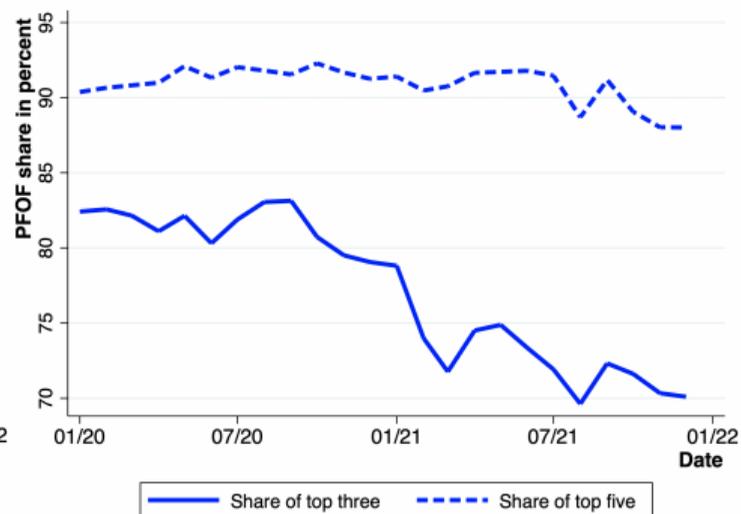
Payment for Order Flow in the U.S.: Options versus Stocks

The Big Three wholesalers in options: Citadel, Susquehanna, and Wolverine

The Big Three internalizers in stocks: Citadel, Virtu, and Susquehanna



(a) Options



(b) Stocks



How to Detect Internalized Retail Trades in Equities

- ▶ Influential paper: Boehmer, Jones, Zhang, and Zhang (2021), “Tracking Retail Investor Activity”
- ▶ Use TAQ (transaction-level U.S. data)
- ▶ Identify trades that execute at share prices with fractional pennies:
 - ▶ retail buys if the transaction price is slightly below the round penny
 - ▶ retail sells if the transaction price is slightly above the round penny
- ▶ Institutional trades cannot receive this type of fractional penny price improvement
- ▶ Cautionary notes: Barber, Huang, Jorion, Odean, and Schwarz (2022), Battalio and Jennings (2022)

Are Retail Investors Getting Good Execution in Equities?

- ▶ Ernst and Spatt (2022), “Payment for Order Flow and Asset Choice”
 - ▶ YES
- ▶ Fractional pennies add up
- ▶ Wholesalers/brokers/exchanges agree with this assessment

The SEC Disagrees

Bloomberg, 8 June 2022

SEC Chief Takes Aim at Payment for Order Flow in Sweeping Plans for Stock Markets



In what would be one of the most significant changes, Gensler asked staff to consider **creating an order-by-order auction mechanism** intended to help retail traders obtain the best pricing for their orders. **The structure would draw on practices now in place in the options market.**

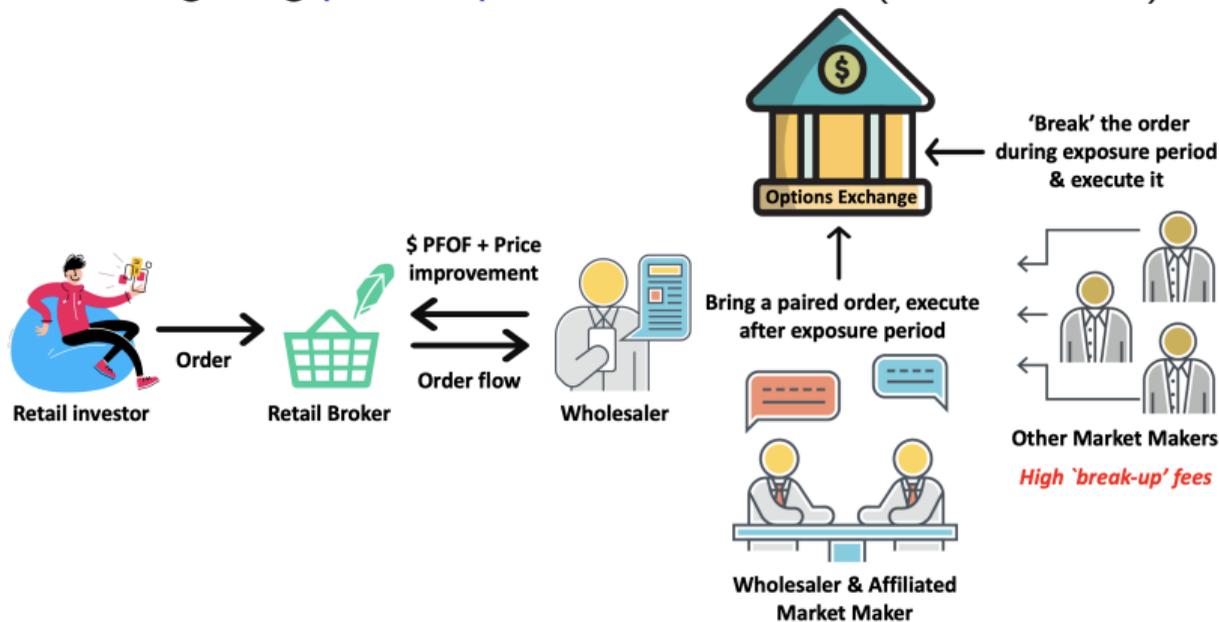
Public consultation to close on 31 March 2023

New Way to Detect Wholesaler Trades in Options in the U.S.

Bryzgalova, Pavlova and Sikorskaya (2023)

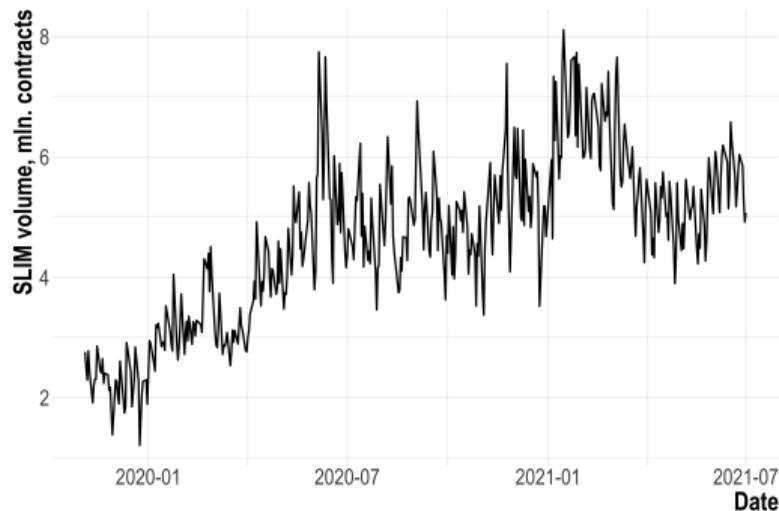
Use new detailed transaction-level flags in OPRA data (from Nov'19)

⇒ We focus on single-leg price improvement auctions (**SLIM** trades)



Retail Investor Trading in Options

Significant growth, especially in 2020



(a) SLIM trade volume – up 104%



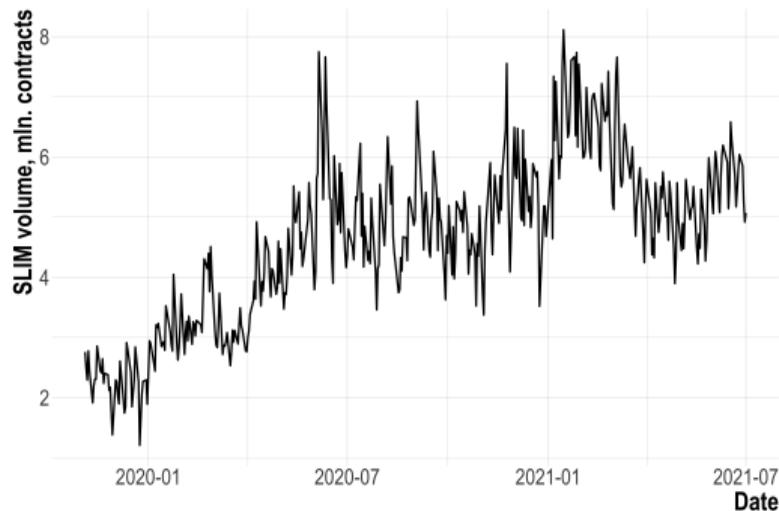
(b) Small trade volume – up 139%

During the same time period, PFOF in options increased by 158%

More than 48% of trading volume (in contracts) in the U.S. options market is retail

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Retail versus All Trades in Options

Characteristic	Category	SLIM trades			Non-SLIM trades		
		Volume share, %	Quoted spread, %	Effective spread, %	Volume share, %	Quoted spread, %	Effective spread, %
Type	Call	69.3	13.5	6.6	61.4	10.9	8.4
	Put	30.7	14.0	6.9	38.6	12.6	8.7
Moneyness	Below -2	0.2	54.1	28.4	0.3	47.4	32.2
	-2 to -1	0.4	50.8	25.6	0.4	43.9	27.4
	-1 to -0.1	23.9	28.7	13.9	24.9	21.1	15.0
	At the money	71.8	8.7	4.2	69.6	8.3	6.2
	0.1 to 1	3.5	8.6	4.8	4.4	5.8	7.0
	1 to 2	0.1	9.0	7.7	0.2	6.5	15.1
	Above 2	0.1	16.8	11.6	0.1	12.0	27.0
Time to expiration	Less than a week	50.3	12.6	6.6	42.8	13.1	10.1
	1-2 weeks	13.0	12.4	6.0	13.4	9.9	7.2
	2-4 weeks	15.1	15.2	7.1	16.6	11.1	7.6
	1-3 months	13.4	14.0	6.2	16.0	9.7	6.6
	3-12 months	7.1	18.4	7.8	9.3	10.1	7.9
	Over a year	1.2	17.7	9.4	1.9	12.6	11.9
ETF	No	72.4	14.9	7.2	70.6	12.1	9.0
	Yes	27.6	8.4	4.4	29.4	8.9	6.7

In **bold** are features of SLIM trades that are significantly different from non-SLIM trades at 1% level in daily data.

Zero Commission Does not Mean Zero Trading Costs



Revealed Preferences of Retail Traders in Options

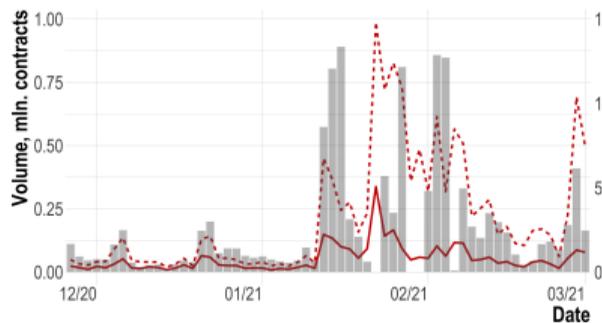
Retail investors

- ▶ Love attention-grabbing names (most traded and liquid)
- ▶ Prefer cheap names
- ▶ Like leverage (leverage is 70-80 for short-term options they buy)
- ▶ Trade contracts with lottery-like features
- ▶ Often use cheap micro-trades (up to \$250)

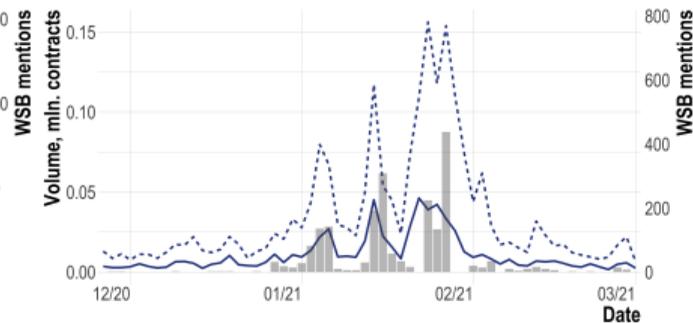
Validation for the Measure of Retail Activity in Options

- ▶ Drops during outages on major retail investing platforms (Robinhood, TD Ameritrade/Schwab)
- ▶ Drops during trading restrictions on major retail investing platforms in 2021
- ▶ Related to other measures of retail activities: WSB mentions, internalized volume in the underlying, small trades, Robinhood ownership breadth

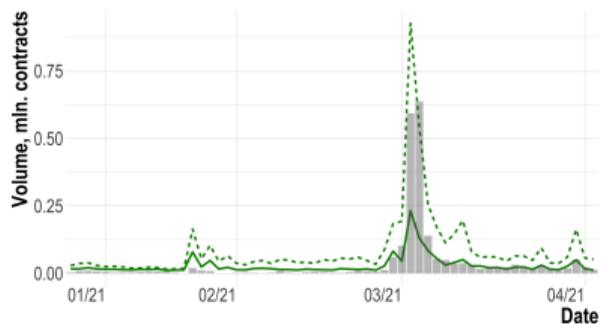
Retail Trading in Options on “Meme” Stocks in 2021



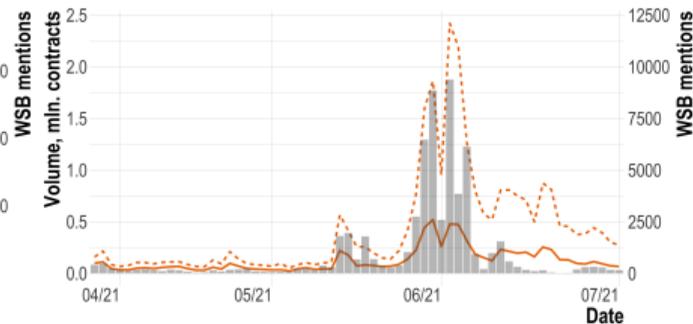
(a) GameStop



(b) Bed Bath & Beyond



(c) Rocket Companies



(d) AMC Entertainment Holdings



Performance of Retail Trades in Options (Net), \$ bln

	Intraday	1 day	2 days	5 days	10 days	Expiration
Panel A: All contracts	-2.18	-1.58	-1.98	-2.02	-2.13	-0.67
Panel B: By trade direction						
Sell	1.62	4.06	5.73	5.07	3.65	-28.58
Buy	-3.80	-5.64	-7.71	-7.09	-5.78	27.91
Panel C: By contract type						
Call	-1.53	-1.17	-1.63	-1.81	-2.08	-0.56
Put	-0.64	-0.40	-0.35	-0.21	-0.05	-0.11
Panel D: By time to expiration						
Less than a week	-0.95	-0.85	-1.13	-1.31	-1.31	-1.31
1-2 weeks	-0.20	-0.18	-0.26	-0.46	-0.57	-0.57
2-4 weeks	-0.28	-0.16	-0.21	-0.23	-0.37	-0.51
1-3 months	-0.31	-0.14	-0.16	-0.04	-0.01	0.13
3-12 months	-0.31	-0.17	-0.16	0.02	0.13	0.07
Over a year	-0.13	-0.07	-0.05	-0.01	0.00	1.53

Total indirect transaction costs for SLIM: **\$6.5 billion** (actual trading costs) Total direct transaction costs for SLIM: **\$0.9 billion** (commissions, when charged)

GameStop and AMC Entertainment are among the worst-performing tickers

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Heterogeneity in Retail Gains and Losses in Options

Time to expiration	Trade direction			
	Buy		Sell	
	Call	Put	Call	Put
Less than a week	Loss	Loss	Gain	Gain
More than a week	Gain	Loss	Loss	Gain

Before and after trading costs,

- ▶ Retail buyers of short-term options lose money
- ▶ Writers of short-term options make money
- ▶ Same patterns for broader measures of retail trading

Takeaways

- ▶ Flood of bored retail investors into equity and options markets during the pandemic
- ▶ Is internalization of retail order flow good or bad for investors?
 - ▶ Debates in academia, in the industry, and in policy circles
- ▶ Lessons from retail investor activity in options