

# Sep 2023

## US Market Structure Monthly

### MICROSTRUCTURE OBSERVATIONS

- The average daily share volume in US equities was 10.3B shares in September 2023, which was down 2% month over month (MoM) and down 10% year over year (YoY).
- Trade reporting facility (TRF) share volume as a percent of total consolidated share volume was 44.1% in September 2023, compared to 45.4% the prior month.
- Quoted spreads in S&P 500 stocks narrowed in September 2023 compared to the prior month but widened for Russell 2000 stocks. Excluding the first and last half hour of the trading day, the median S&P 500 stock's spread narrowed 4% to 4.6bps in September 2023 from 4.8bps in August 2023, while the median Russell 2000 stock's spread widened 1% to 17.4bps in September 2023 from 17.2bps the prior month.

### US MARKET STRUCTURE NEWS

#### **SEC Approves New Funding Model for CAT**

In a 3-2 vote, the Securities and Exchange Commission (SEC) approved a revised funding model for the Consolidated Audit Trail (CAT). The new model, called the Executed Share Model, mandates that CAT fees are divided evenly between exchanges, executing brokers representing buyers, and executing brokers representing sellers. Many commentators raised concern on the new model and the growing cost of CAT. SEC Commissioner Mark Uyeda, in his dissent, expressed concern on the growing cost of CAT, citing that 2023 CAT operating costs will be 5.3 times the cost in the original plan's projections. Both the Securities Industry and Financial Markets Association (SIFMA) and American Securities Association in separate statements said the new funding model provides inequitable allocation of CAT costs between broker dealers and exchanges.

In July 2023, Virtu submitted a comment letter to the SEC highlighting that the funding model would have industry members and investors paying the majority of the CAT costs and provides no mechanism for controlling the growth in future costs. Virtu's comment letters on CAT appear below.

<https://www.sec.gov/files/rules/sro/nms/2023/34-98290.pdf>

<https://www.pionline.com/regulation/sec-approves-new-funding-model-consolidated-audit-trail>

[https://virtu-www.s3.us-east-](https://virtu-www.s3.us-east-1.amazonaws.com/uploads/documents/Virtu%20CAT%20Comment%20Letter%20%2807132023%29.pdf)

[1.amazonaws.com/uploads/documents/Virtu%20CAT%20Comment%20Letter%20%2807132023%29.pdf](https://virtu-www.s3.us-east-1.amazonaws.com/uploads/documents/Virtu%20CAT%20Comment%20Letter%20%2807132023%29.pdf)

#### **Nasdaq Receives SEC Approval for AI Driven Order Type**

In early September, Nasdaq received approval from the SEC for an artificial intelligence (AI) driven order type. The order type, called Dynamic Midpoint Extended Life Order (M-ELO), will use a reinforcement learning technique that takes in various inputs from the market to determine how long a Dynamic M-ELO

order should rest on the order book before it is eligible for execution. Under the current M-ELO order type, an order must rest for a fixed 10 milliseconds before it is eligible to interact with other order flow.

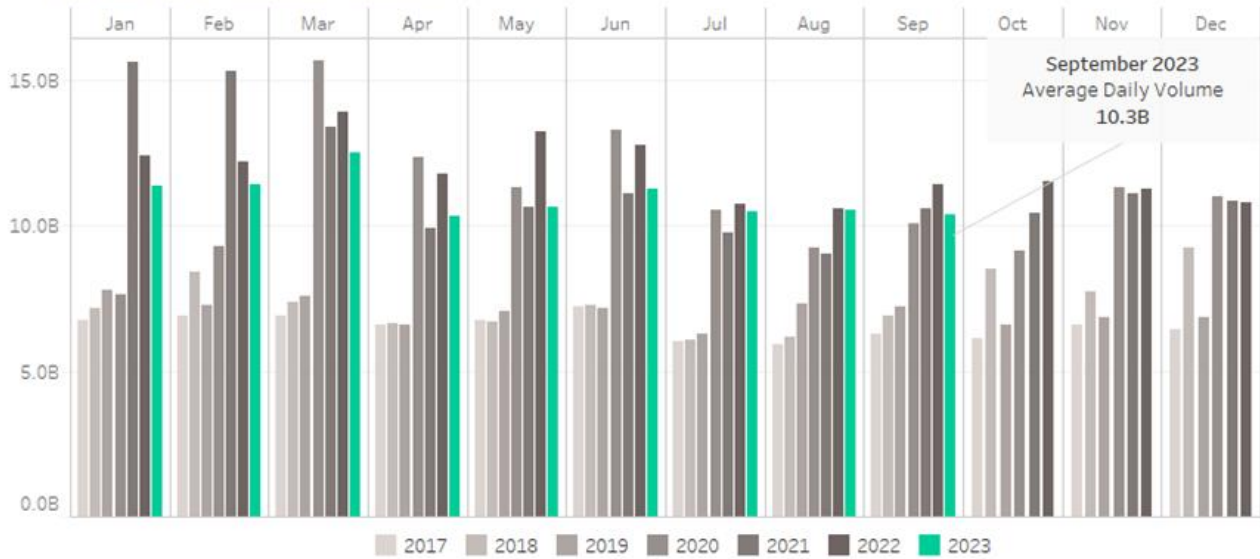
<https://www.reuters.com/technology/nasdaq-gets-sec-nod-first-exchange-ai-driven-order-type-2023-09-08/>

### **MEMX Launches an Options Exchange**

Members Exchange (MEMX) announced in late September 2023 that it has launched an options exchange called MEMX Options. The new options exchange began trading with three symbols the week of September 27<sup>th</sup> and plans to begin trading all multi-list symbols in the coming weeks.

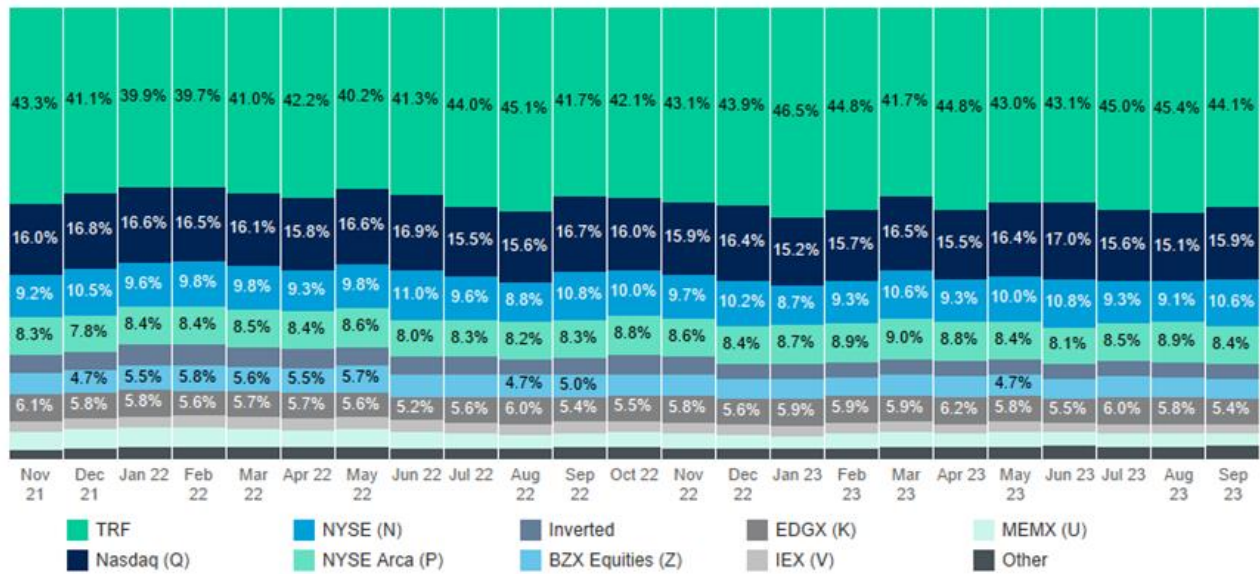
<https://www.businesswire.com/news/home/20230927139354/en/MEMX%E2%80%99s-Options-Exchange-Successfully-Launches>

### Average Daily Market Volume



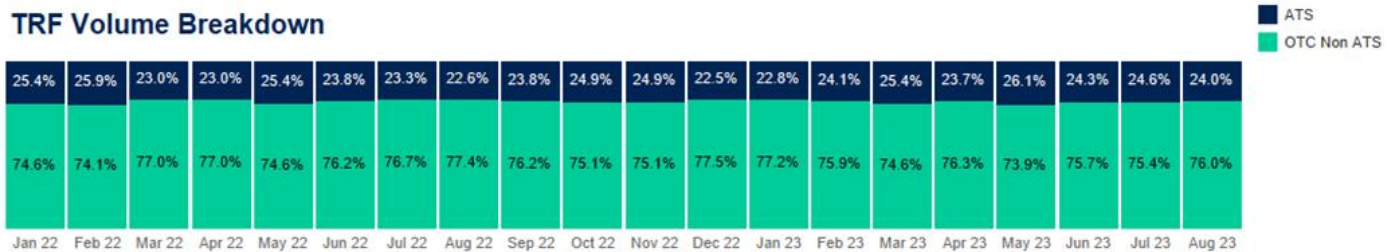
Source data: Cboe Global Markets

### Venue Market Share



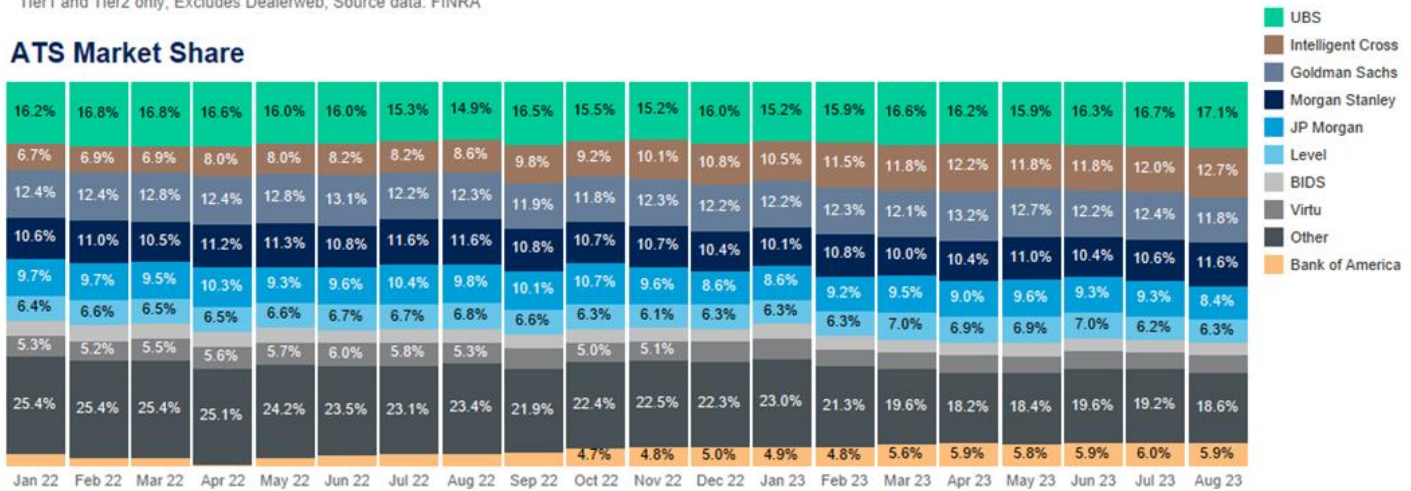
Source data: Cboe Global Markets

### TRF Volume Breakdown



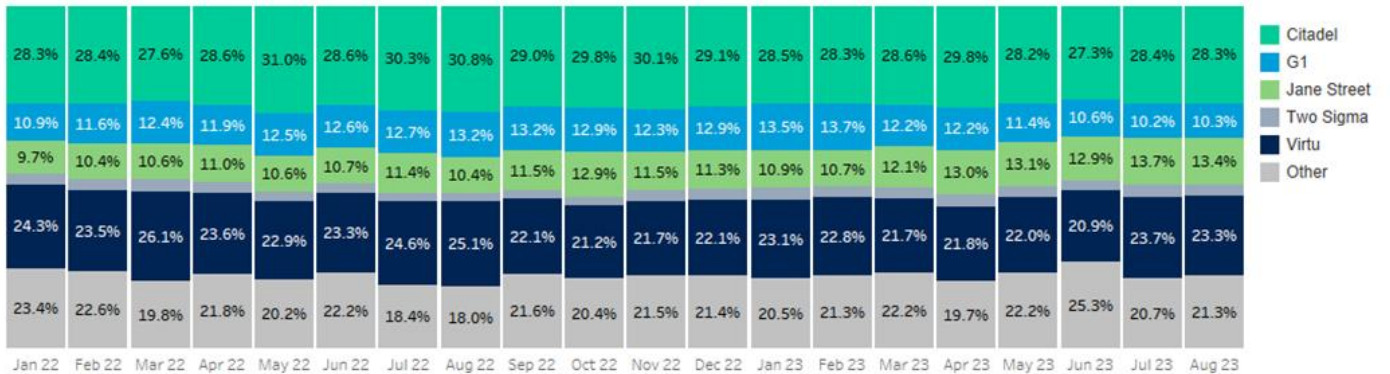
Tier1 and Tier2 only; Excludes Dealerweb, Source data: FINRA

### ATS Market Share



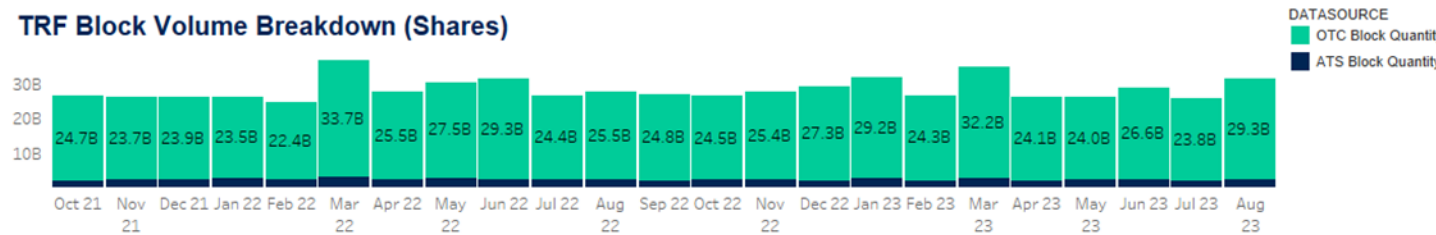
Excludes Dealerweb, OTC; Venues rolled up to firm level; Source data: FINRA

### OTC Non-ATS Market Share

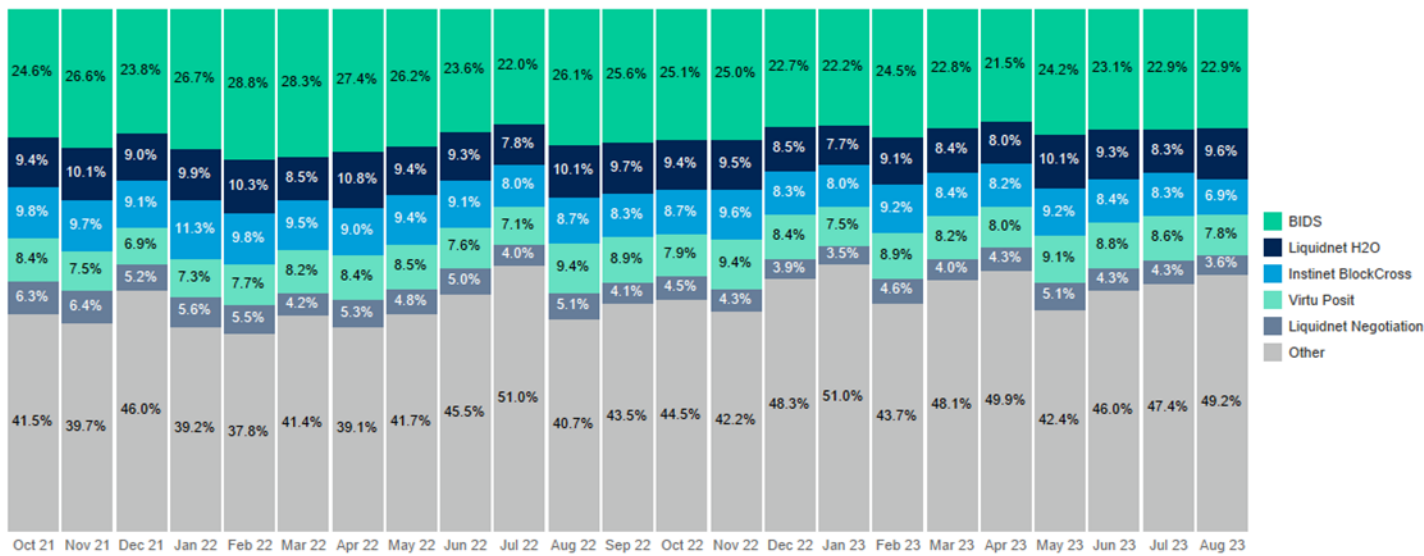


Source: FINRA, NMS Tier 1 & 2 Securities

### TRF Block Volume Breakdown (Shares)

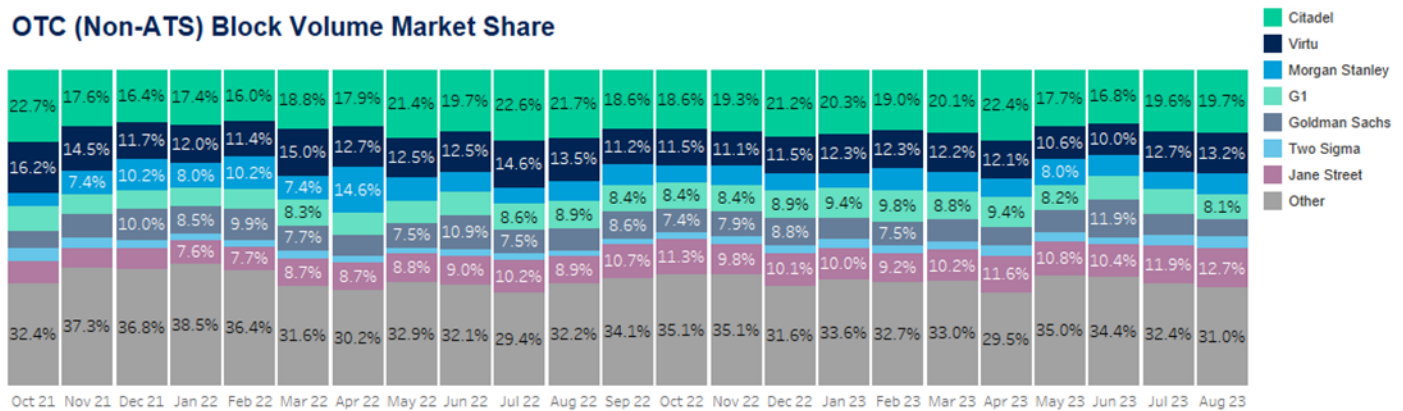


### ATS Block Volume Market Share



Excludes Dealerweb; Blocks defined as >10K shares; Source data: FINRA

### OTC (Non-ATS) Block Volume Market Share



Blocks defined as >10K shares; Source data: FINRA

### Quotesize in Shares

|                    | 2Q 22  |        |        | 3Q 22  |        |        | 4Q 22  |        |        | 1Q 23  |        |        | 2Q 23  |        |        | 3Q 23  |        |        |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                    | Apr 22 | May 22 | Jun 22 | Jul 22 | Aug 22 | Sep 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 |
| First 30 Min SP500 | 180    | 196    | 195    | 188    | 185    | 183    | 187    | 186    | 189    | 194    | 218    | 235    | 229    | 227    | 226    | 222    | 224    | 222    |
| RUS2000            | 236    | 250    | 243    | 232    | 228    | 225    | 232    | 226    | 231    | 250    | 271    | 300    | 300    | 298    | 290    | 278    | 288    | 288    |
| Mid Day SP500      | 176    | 186    | 190    | 181    | 179    | 184    | 189    | 192    | 194    | 199    | 214    | 228    | 224    | 217    | 216    | 213    | 212    | 211    |
| RUS2000            | 232    | 234    | 246    | 237    | 234    | 235    | 245    | 248    | 250    | 257    | 262    | 279    | 283    | 280    | 275    | 270    | 275    | 283    |
| Last 30 Min SP500  | 190    | 190    | 198    | 197    | 201    | 201    | 212    | 210    | 210    | 216    | 222    | 230    | 231    | 222    | 226    | 222    | 212    | 217    |
| RUS2000            | 255    | 259    | 276    | 267    | 265    | 263    | 274    | 279    | 291    | 289    | 283    | 300    | 309    | 300    | 304    | 289    | 288    | 303    |

### Spread Bps

|                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| First 30 Min SP500 | 13.4 | 15.1 | 13.5 | 13.2 | 11.8 | 10.7 | 12.5 | 12.9 | 12.3 | 11.7 | 11.4 | 10.7 | 9.6  | 10.7 | 10.9 | 10.1 | 10.8 | 10.3 |
| RUS2000            | 51.3 | 57.0 | 50.4 | 48.1 | 45.3 | 43.2 | 49.2 | 51.1 | 49.8 | 47.8 | 47.1 | 48.9 | 44.7 | 47.7 | 45.4 | 40.3 | 40.9 | 39.7 |
| Mid Day SP500      | 5.5  | 6.5  | 5.7  | 5.2  | 4.7  | 4.9  | 5.4  | 5.5  | 5.1  | 4.9  | 5.0  | 5.1  | 4.4  | 5.0  | 4.6  | 4.2  | 4.8  | 4.6  |
| RUS2000            | 22.5 | 25.0 | 21.6 | 20.4 | 19.1 | 18.7 | 19.9 | 21.2 | 18.6 | 18.1 | 18.3 | 19.6 | 18.0 | 19.6 | 17.8 | 16.3 | 17.2 | 17.4 |
| Last 30 Min SP500  | 3.6  | 3.9  | 3.5  | 3.2  | 2.9  | 3.2  | 3.4  | 3.2  | 3.2  | 3.1  | 3.2  | 3.2  | 3.0  | 3.3  | 3.0  | 2.8  | 3.1  | 3.1  |
| RUS2000            | 16.6 | 18.1 | 16.2 | 15.4 | 14.1 | 14.1 | 14.7 | 15.5 | 14.2 | 13.6 | 14.1 | 14.7 | 14.2 | 15.2 | 13.8 | 13.0 | 13.3 | 13.2 |

### One Minute Volatility Bps

|                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| First 30 Min SP500 | 20.2 | 24.0 | 21.4 | 20.7 | 15.6 | 17.5 | 20.4 | 17.7 | 14.4 | 14.5 | 13.9 | 14.9 | 12.9 | 13.8 | 14.8 | 14.6 | 12.7 | 12.3 |
| RUS2000            | 21.7 | 26.9 | 24.1 | 26.6 | 21.0 | 20.8 | 23.1 | 21.4 | 16.2 | 16.2 | 17.0 | 17.2 | 14.6 | 15.9 | 16.5 | 16.2 | 15.0 | 14.0 |
| Mid Day SP500      | 8.2  | 9.9  | 8.3  | 7.5  | 6.2  | 8.6  | 8.1  | 6.8  | 5.8  | 5.7  | 5.9  | 6.7  | 4.9  | 5.4  | 4.8  | 4.6  | 4.9  | 4.1  |
| RUS2000            | 6.8  | 9.0  | 6.8  | 6.1  | 5.5  | 7.4  | 6.7  | 5.4  | 4.1  | 3.8  | 4.5  | 5.5  | 2.9  | 3.6  | 3.3  | 3.0  | 2.8  | 1.6  |
| Last 30 Min SP500  | 9.1  | 10.8 | 9.0  | 7.9  | 6.2  | 9.3  | 8.8  | 7.1  | 6.5  | 6.3  | 6.9  | 7.4  | 5.9  | 6.0  | 5.5  | 5.4  | 5.7  | 5.1  |
| RUS2000            | 8.8  | 9.8  | 8.1  | 6.9  | 6.2  | 8.9  | 7.2  | 6.8  | 5.7  | 5.4  | 6.9  | 7.9  | 5.4  | 5.9  | 5.2  | 4.9  | 5.0  | 3.8  |

### Percent ADV by Time of Day

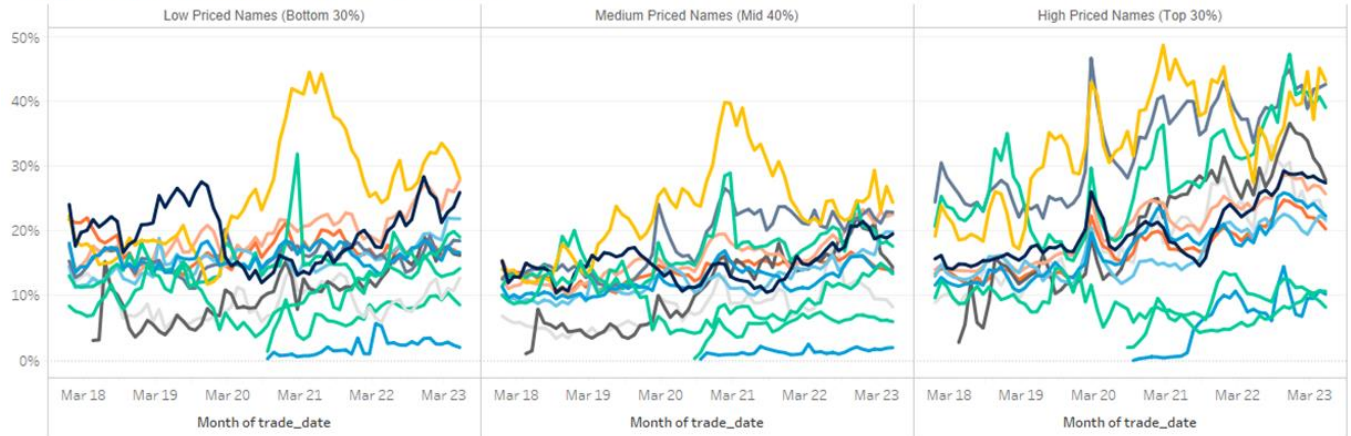
|                    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Open SP500         | 1.1%  | 1.0%  | 1.0%  | 1.1%  | 1.0%  | 0.9%  | 0.9%  | 0.9%  | 1.1%  | 0.9%  | 1.0%  | 0.9%  | 1.1%  | 1.0%  | 1.0%  | 1.0%  | 0.9%  | 0.9%  |
| RUS2000            | 0.7%  | 0.7%  | 0.7%  | 0.7%  | 0.8%  | 0.7%  | 0.7%  | 0.7%  | 0.7%  | 0.7%  | 0.7%  | 0.7%  | 0.8%  | 0.7%  | 0.6%  | 0.7%  | 0.7%  | 0.6%  |
| First 30 Min SP500 | 9.3%  | 9.3%  | 9.4%  | 9.8%  | 9.6%  | 9.0%  | 9.0%  | 9.2%  | 8.6%  | 8.7%  | 8.6%  | 8.5%  | 8.7%  | 8.8%  | 8.7%  | 9.1%  | 8.3%  | 8.1%  |
| RUS2000            | 7.6%  | 8.2%  | 7.6%  | 8.1%  | 8.2%  | 7.4%  | 7.6%  | 7.5%  | 7.2%  | 7.5%  | 7.5%  | 7.2%  | 7.3%  | 7.5%  | 7.3%  | 7.5%  | 7.1%  | 6.9%  |
| Last 30 Min SP500  | 19.0% | 18.6% | 19.2% | 18.6% | 18.8% | 18.7% | 18.8% | 18.7% | 19.0% | 19.3% | 19.3% | 18.7% | 19.4% | 18.9% | 18.8% | 19.2% | 20.3% | 20.1% |
| RUS2000            | 19.6% | 19.7% | 19.8% | 20.3% | 20.4% | 20.1% | 20.0% | 21.0% | 20.0% | 20.3% | 20.6% | 19.9% | 20.4% | 19.9% | 20.1% | 20.3% | 20.9% | 21.3% |
| Close SP500        | 11.8% | 10.9% | 13.1% | 12.5% | 11.9% | 12.3% | 11.9% | 11.6% | 14.7% | 12.9% | 12.2% | 13.4% | 13.6% | 12.9% | 14.1% | 13.4% | 13.8% | 16.1% |
| RUS2000            | 10.6% | 9.1%  | 10.8% | 11.9% | 10.4% | 11.4% | 11.6% | 10.4% | 11.9% | 10.7% | 11.0% | 11.4% | 11.8% | 11.0% | 11.7% | 11.6% | 11.7% | 14.5% |

Median used for all metrics

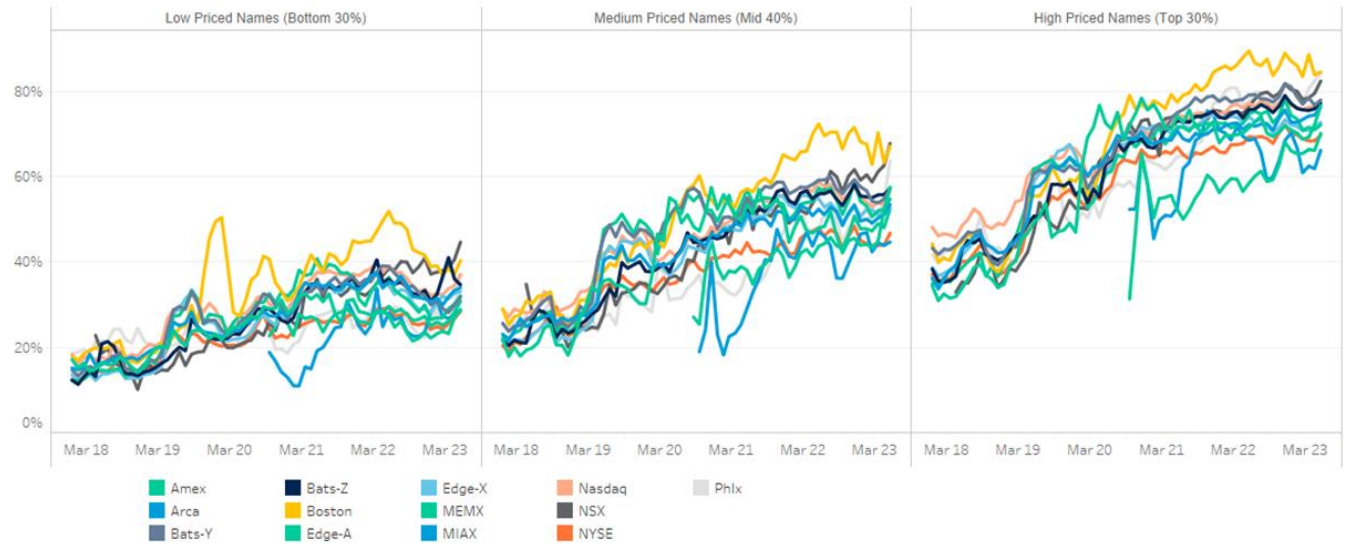
One minute volatility is calculated using the difference between the high and low price within a one minute time bin, divided by that bin's VWAP

Source data: Virtu Financial

### Hidden Trades Proportion by Price and Venue



### Oddlot Trades Proportion by Price and Venue



Source data: SEC



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