

July 2020

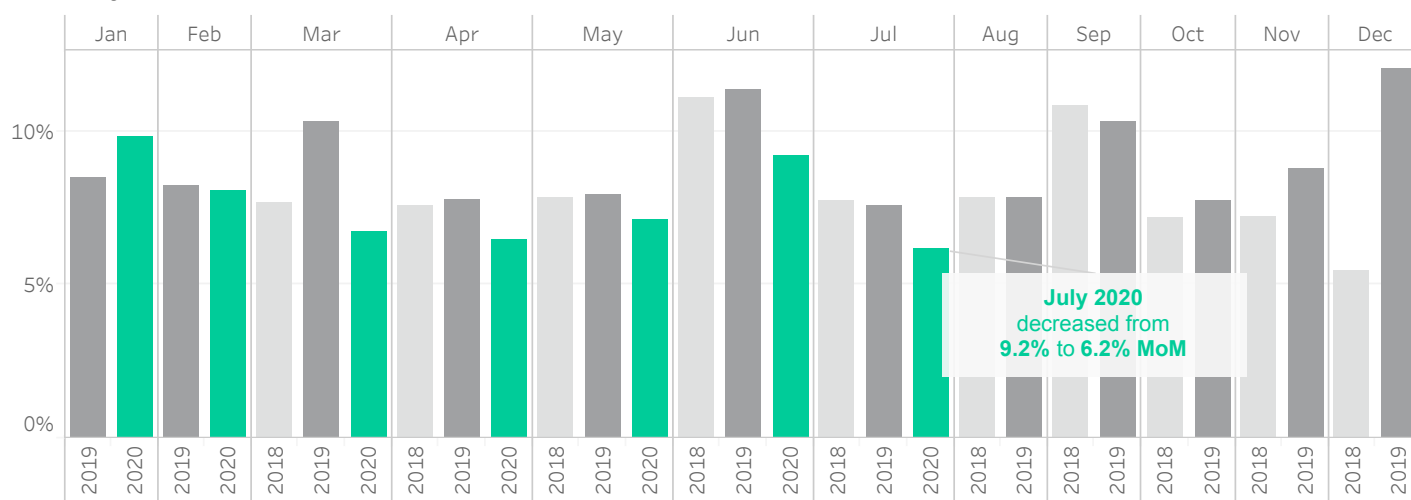
US Market Structure Monthly



US Market Microstructure Observations

- Average daily volume in US equities was 10.5B shares in July 2020, down 20% month over month and up 67% year over year.
- Trade Reporting Facility (TRF) market share reached a record 43.2% in July 2020, up 1% month over month, marking the fourth consecutive monthly increase. NYSE market share decreased 0.9% month over month to 9.6%. A major contributing factor to the decrease in market share is the close auction. For NYSE listed symbols, the close auction volume, as a proportion of day's total volume, decreased from 9.2% to 6.2% month over month in July 2020.

NYSE Symbols Close Auction as a % of Total Volume



Source data: Virtu Financial

- Excluding the first and last half hour of trading, the median size at the National Best Bid and Offer (NBBO) increased by 3.9% and 4.1% month over month for S&P 500 and RUS 2000 symbols respectively in July 2020, marking it the fourth consecutive monthly increase.
- Median spreads decreased by 9.4% and 13.3% month over month for S&P 500 and RUS 2000 symbols respectively in July 2020. Spreads for S&P 500 and RUS 2000 symbols are still 17.1% and 23.0% higher respectively versus February 2020.
- Consistent with the trends in spreads, intraday volatility decreased in July 2020. Excluding the first and last half hour of trading, intraday volatility for S&P 500 and RUS 2000 symbols decreased by 21.6% and 20.8% respectively month over month.
- Proportion of volume traded in the close auction volume for S&P 500 symbols decreased by 0.4% month over month to 9.9%.



Market Structure News

Cboe Global Markets Proposes to Bring Periodic Auctions to US Equity Markets

Cboe announced its plans to introduce a periodic auction book on its BATS Y exchange, subject to SEC's approval. In contrast to continuous trading, periodic auctions work by aggregating buy and sell stocks and executing at discrete time intervals, limiting the advantages of speed. Since 2018 MiFID II rules related to capped trading on dark venues came into effect, periodic auctions have garnered increased usage in Europe.

<http://ir.cboe.com/~media/Files/C/CBOE-IR-V2/press-release/2020/cboe-global-markets-plans-to-bring-periodic-auctions-to-u-s-equity-markets-final.pdf>

New York State Proposes Tax on Stock Trades

With state revenues falling by one-fifth and an economic deficit projected to reach US\$61B due to the coronavirus pandemic, Democrats in New York State have proposed a state tax on stock trading. The proposed bill calls for a tax of 1.25cps on the sale of stock under \$5, to 5 cents for stock priced at \$20 or more.

<https://www.bloomberg.com/news/articles/2020-07-20/new-york-sees-push-to-tax-stock-trades-with-revenue-in-free-fall?sref=DK3y4h9m>

SEC Proposes to Raise the Size Threshold for Asset Manager Holding Reporting

The SEC has proposed to raise the assets under management threshold for assets managers to report their quarterly holdings to \$3.5B, from the current level of \$100M. The quarterly reports, known as 13F reports, reveal the details of portfolios of asset managers. This rule-change would eliminate the need for 90% of asset managers to report their quarterly holdings, but over 90% of the dollar value of equity holdings would still be reported, according to the SEC. The SEC said the goal of this change is to provide cost relief to small asset managers. The proposal is subject to a 60-day comment period before potential SEC approval.

<https://www.wsj.com/articles/sec-rule-proposal-would-slash-number-of-investment-managers-that-need-to-report-quarterly-holdings-11594429438>

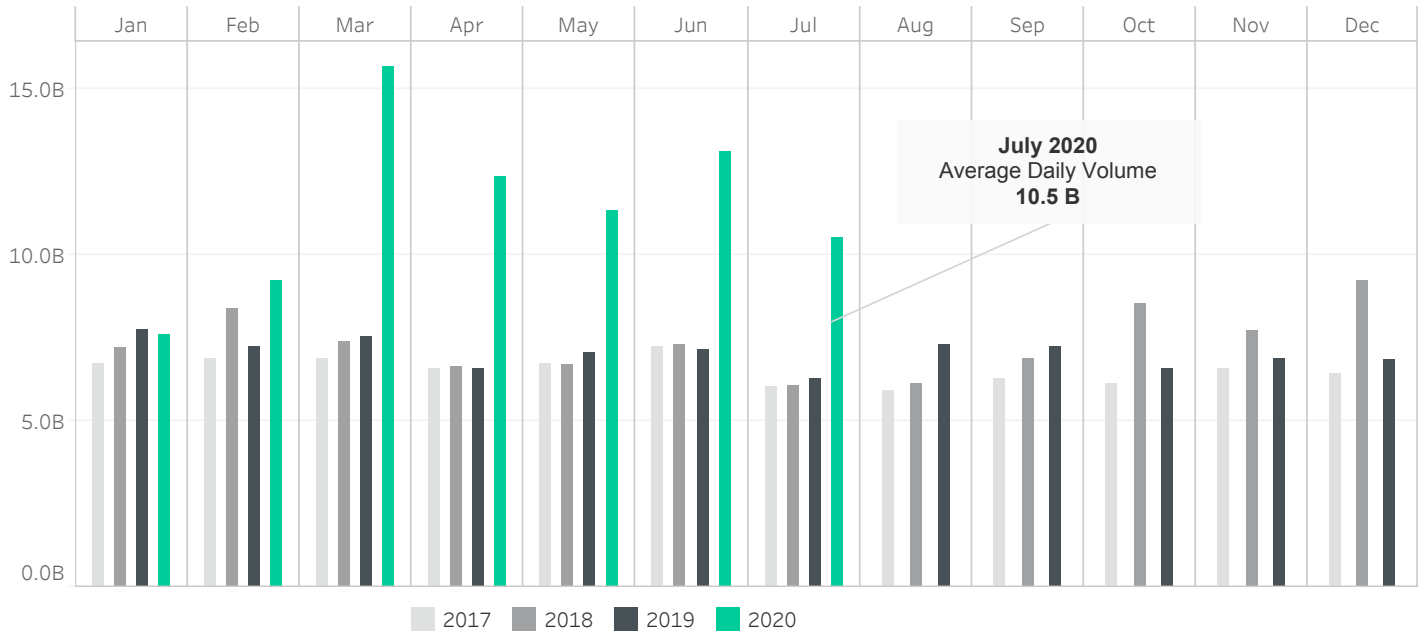
Asset Managers and Exchanges Push Back on Threats to De-list Chinese Firms

During a panel discussion hosted by the SEC, asset managers and exchanges raised concerns over a bill currently being reviewed by the House of Representatives that could lead to the de-listing of Chinese firms from US stock exchanges, arguing that it could prompt these firms to move their listing from the US to overseas exchanges. The bill seeks to force the de-listing of Chinese based firms if their accounting records are not examined by the US Public Company Accounting Oversight Board (PCAOB), a requirement that China has long rejected. Supporters of the bill argue that the Chinese companies' lack of adherence to US accounting rules creates an "unlevel playing field" for US investors.

<https://www.bloomberg.com/news/articles/2020-07-09/vanguard-nyse-set-to-weigh-in-on-u-s-crackdown-on-china-firms?sref=DK3y4h9m>

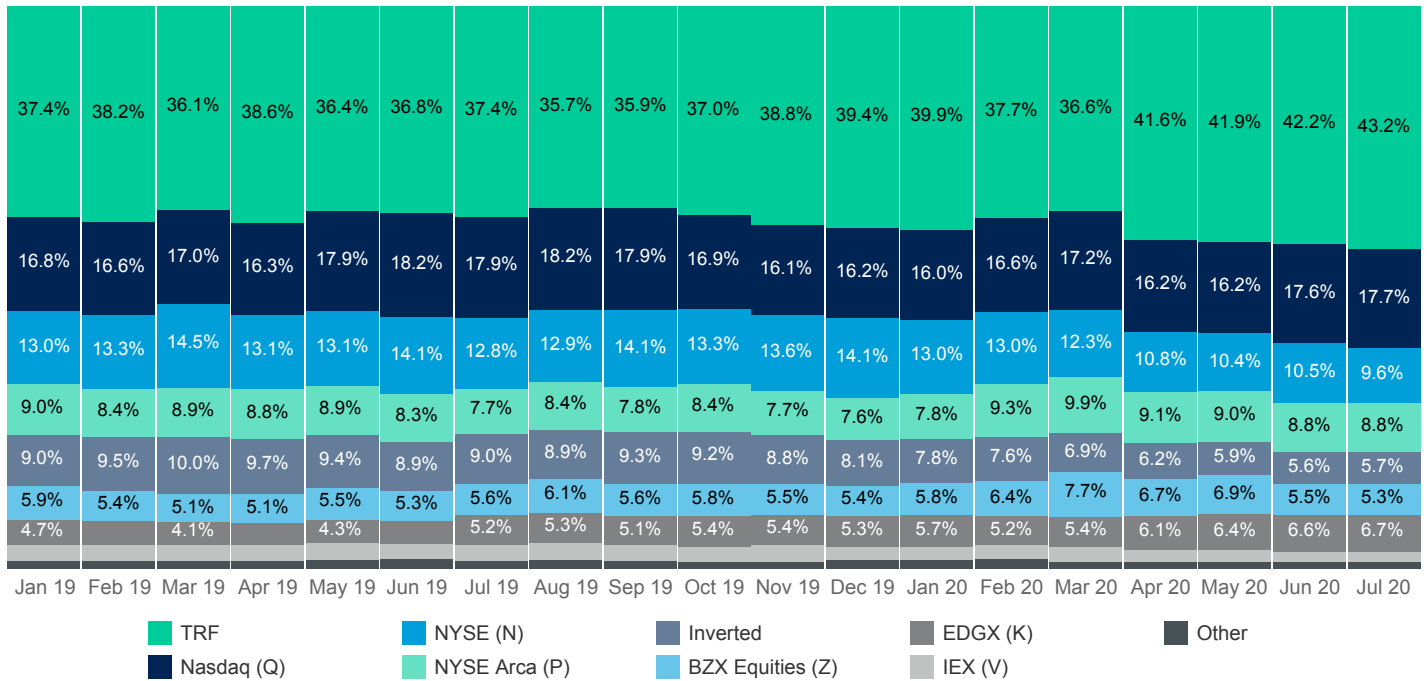


Average Daily Market Volume



Source data: Cboe Global Markets

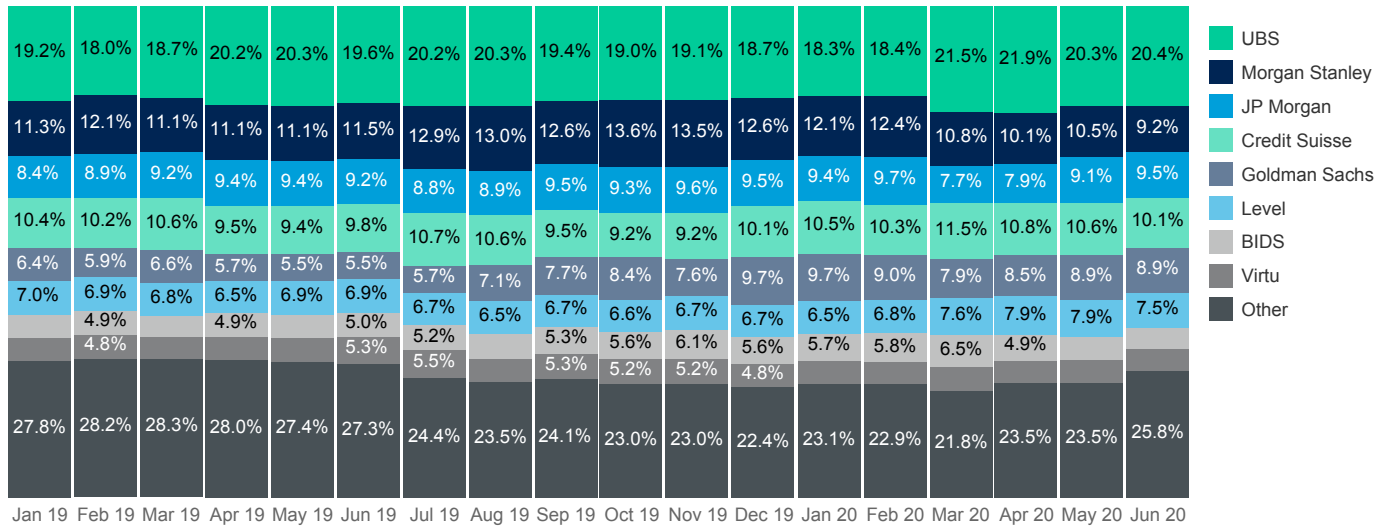
Venue Market Share



Source data: Cboe Global Markets

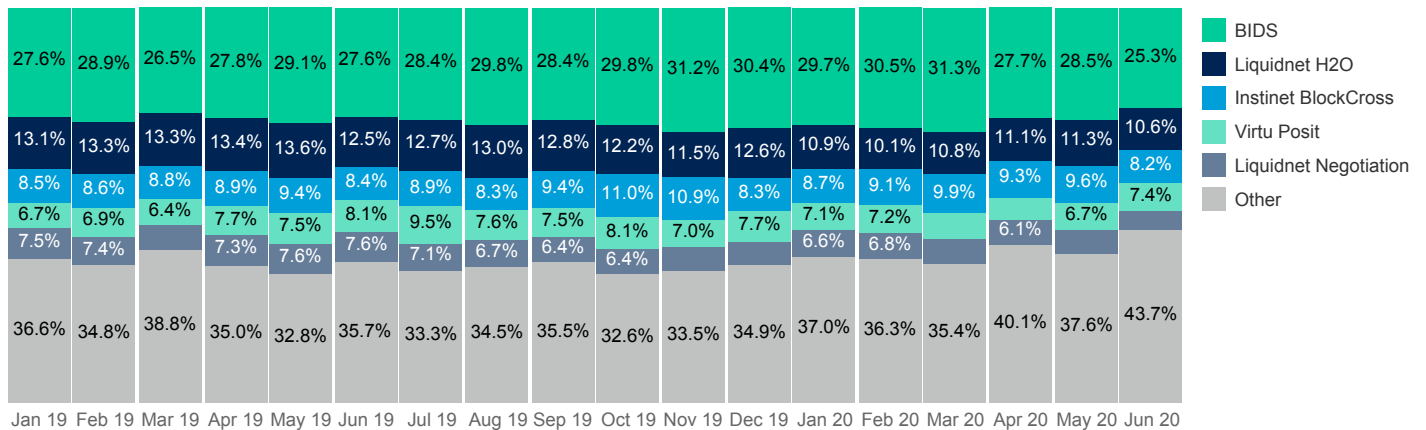


ATS Market Share



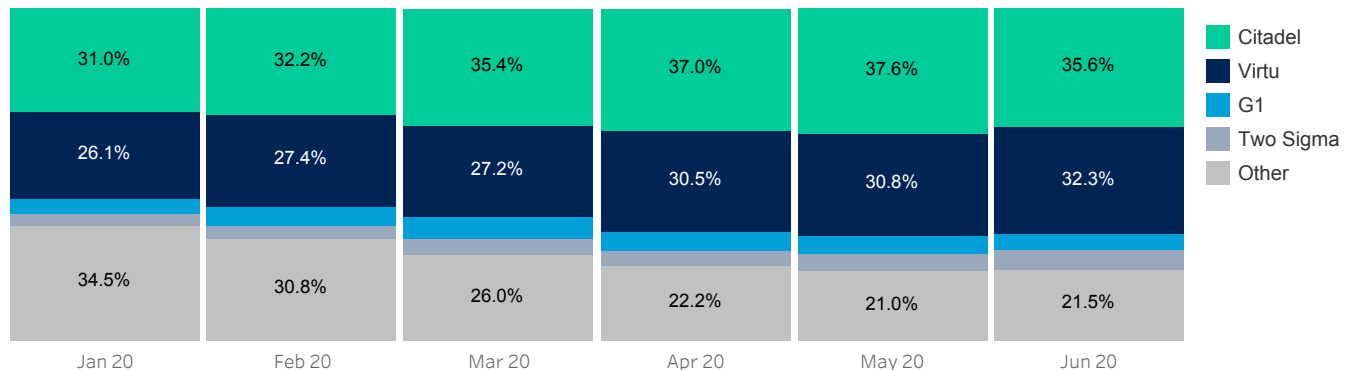
Excludes Dealerweb, OTC; Venues rolled up to firm level; Source data: FINRA

ATS Block Volume Market Share



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

OTC Non-ATS Market Share



Source: FINRA, NMS Tier 1 & 2 Securities



Quotesize in Shares

| | 3Q 19 | | | 4Q 19 | | | 1Q 20 | | | 2Q 20 | | | 3Q 20 |
|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Jul 19 | Aug 19 | Sep 19 | Oct 19 | Nov 19 | Dec 19 | Jan 20 | Feb 20 | Mar 20 | Apr 20 | May 20 | Jun 20 | Jul 20 |
| First 30 Min SP500 | 179 | 174 | 173 | 175 | 178 | 178 | 176 | 185 | 185 | 184 | 196 | 200 | 207 |
| RUS2000 | 200 | 200 | 192 | 200 | 200 | 195 | 193 | 204 | 200 | 194 | 200 | 206 | 209 |
| Mid Day SP500 | 219 | 201 | 202 | 201 | 210 | 212 | 199 | 194 | 174 | 177 | 197 | 204 | 212 |
| RUS2000 | 224 | 227 | 219 | 219 | 224 | 219 | 210 | 216 | 200 | 198 | 209 | 218 | 227 |
| Last 30 Min SP500 | 331 | 266 | 296 | 277 | 302 | 290 | 254 | 240 | 193 | 200 | 229 | 229 | 242 |
| RUS2000 | 285 | 281 | 272 | 268 | 279 | 266 | 250 | 264 | 233 | 228 | 239 | 243 | 264 |

Spread Bps

| | | | | | | | | | | | | | |
|--------------------|------|------|------|------|------|------|------|------|-------|------|------|------|------|
| First 30 Min SP500 | 7.4 | 9.5 | 8.6 | 8.9 | 8.2 | 7.5 | 7.7 | 9.8 | 28.1 | 19.4 | 11.8 | 11.0 | 10.4 |
| RUS2000 | 39.5 | 48.3 | 45.7 | 44.3 | 41.0 | 36.4 | 36.3 | 43.7 | 108.1 | 87.0 | 65.2 | 56.7 | 50.6 |
| Mid Day SP500 | 3.0 | 4.1 | 3.7 | 3.7 | 3.2 | 3.1 | 3.4 | 4.1 | 13.1 | 8.4 | 5.7 | 5.3 | 4.8 |
| RUS2000 | 14.3 | 17.3 | 17.2 | 16.5 | 15.3 | 14.0 | 14.5 | 16.4 | 42.5 | 34.8 | 25.0 | 23.3 | 20.2 |
| Last 30 Min SP500 | 2.0 | 2.6 | 2.2 | 2.4 | 2.1 | 2.1 | 2.3 | 2.5 | 9.7 | 5.8 | 4.2 | 3.8 | 3.3 |
| RUS2000 | 10.4 | 12.5 | 12.0 | 11.7 | 11.1 | 10.8 | 10.9 | 11.2 | 33.2 | 25.1 | 19.3 | 18.2 | 15.4 |

One Minute Volatility Bps

| | | | | | | | | | | | | | |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| First 30 Min SP500 | 11.8 | 15.7 | 13.3 | 12.5 | 11.6 | 10.6 | 11.2 | 14.6 | 53.4 | 32.8 | 24.5 | 23.3 | 19.5 |
| RUS2000 | 13.6 | 17.5 | 16.6 | 15.2 | 16.1 | 14.8 | 15.4 | 16.9 | 45.1 | 40.8 | 33.2 | 31.3 | 25.3 |
| Mid Day SP500 | 4.1 | 6.0 | 4.8 | 4.6 | 3.9 | 3.4 | 4.3 | 5.6 | 27.7 | 14.4 | 9.6 | 9.7 | 7.6 |
| RUS2000 | 4.2 | 5.2 | 5.3 | 4.8 | 4.2 | 3.8 | 4.7 | 5.7 | 21.8 | 16.4 | 11.9 | 11.5 | 9.1 |
| Last 30 Min SP500 | 4.6 | 6.7 | 4.7 | 5.1 | 4.1 | 4.0 | 5.1 | 6.1 | 36.1 | 17.0 | 11.5 | 11.5 | 8.9 |
| RUS2000 | 4.5 | 5.8 | 5.0 | 5.1 | 4.3 | 4.4 | 5.3 | 5.8 | 28.0 | 20.1 | 15.0 | 14.8 | 10.2 |

Percent ADV by Time of Day

| | | | | | | | | | | | | | |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Open SP500 | 1.0% | 1.0% | 0.9% | 1.0% | 1.0% | 1.1% | 1.1% | 1.1% | 1.0% | 1.1% | 1.0% | 1.1% | 1.0% |
| RUS2000 | 0.7% | 0.8% | 0.8% | 0.8% | 0.8% | 0.8% | 0.9% | 0.9% | 0.8% | 0.8% | 0.9% | 0.9% | 0.8% |
| First 30 Min SP500 | 8.4% | 8.0% | 8.0% | 7.6% | 8.0% | 7.7% | 7.9% | 8.6% | 8.2% | 8.7% | 9.4% | 9.1% | 9.6% |
| RUS2000 | 6.7% | 6.9% | 6.8% | 6.6% | 7.2% | 7.1% | 7.3% | 7.2% | 6.3% | 7.0% | 7.9% | 7.3% | 7.6% |
| Last 30 Min SP500 | 18.9% | 18.4% | 18.3% | 18.7% | 18.8% | 18.4% | 18.0% | 17.9% | 18.3% | 17.7% | 17.7% | 17.9% | 18.3% |
| RUS2000 | 19.7% | 19.4% | 18.9% | 19.5% | 19.5% | 19.3% | 18.8% | 18.6% | 19.9% | 18.9% | 18.7% | 18.5% | 20.0% |
| Close SP500 | 9.9% | 11.4% | 11.6% | 10.4% | 11.4% | 13.5% | 13.8% | 12.0% | 9.9% | 9.8% | 9.0% | 10.3% | 9.9% |
| RUS2000 | 7.8% | 8.8% | 9.0% | 8.0% | 7.8% | 10.0% | 9.4% | 8.1% | 9.0% | 8.9% | 8.3% | 8.9% | 9.4% |

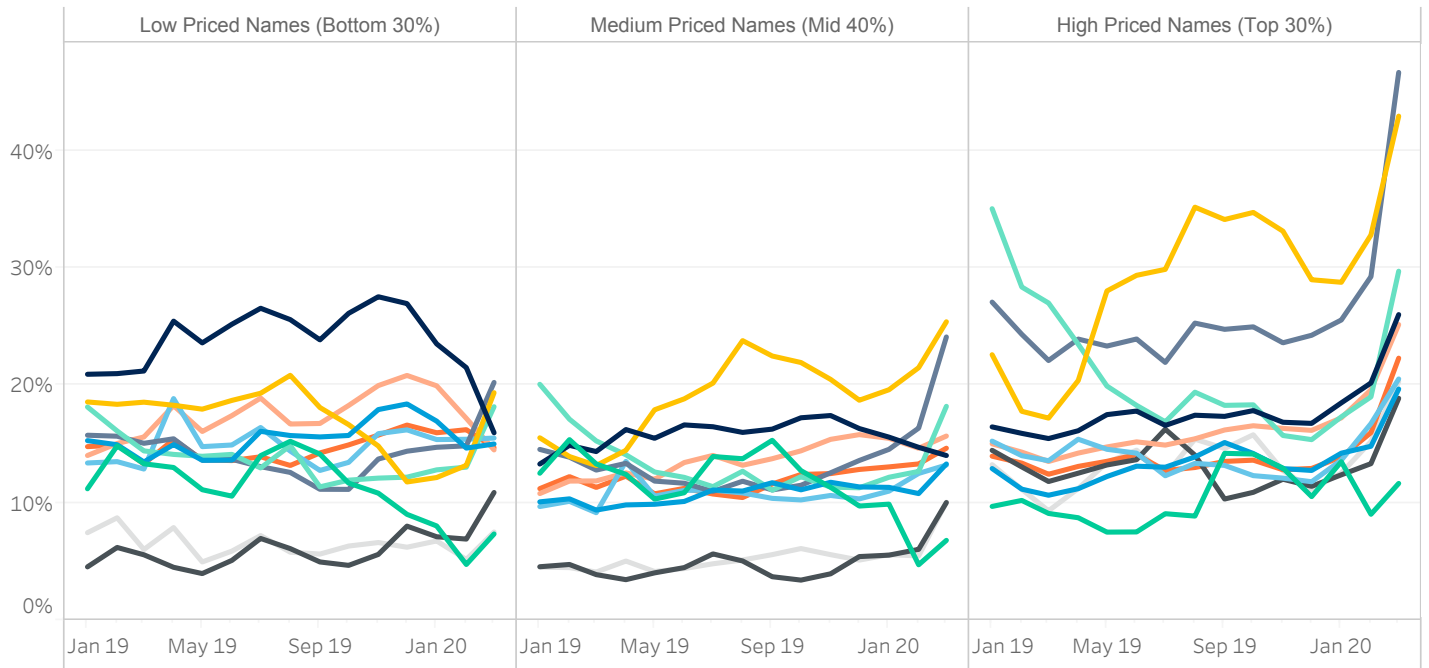
Median used for all metrics

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

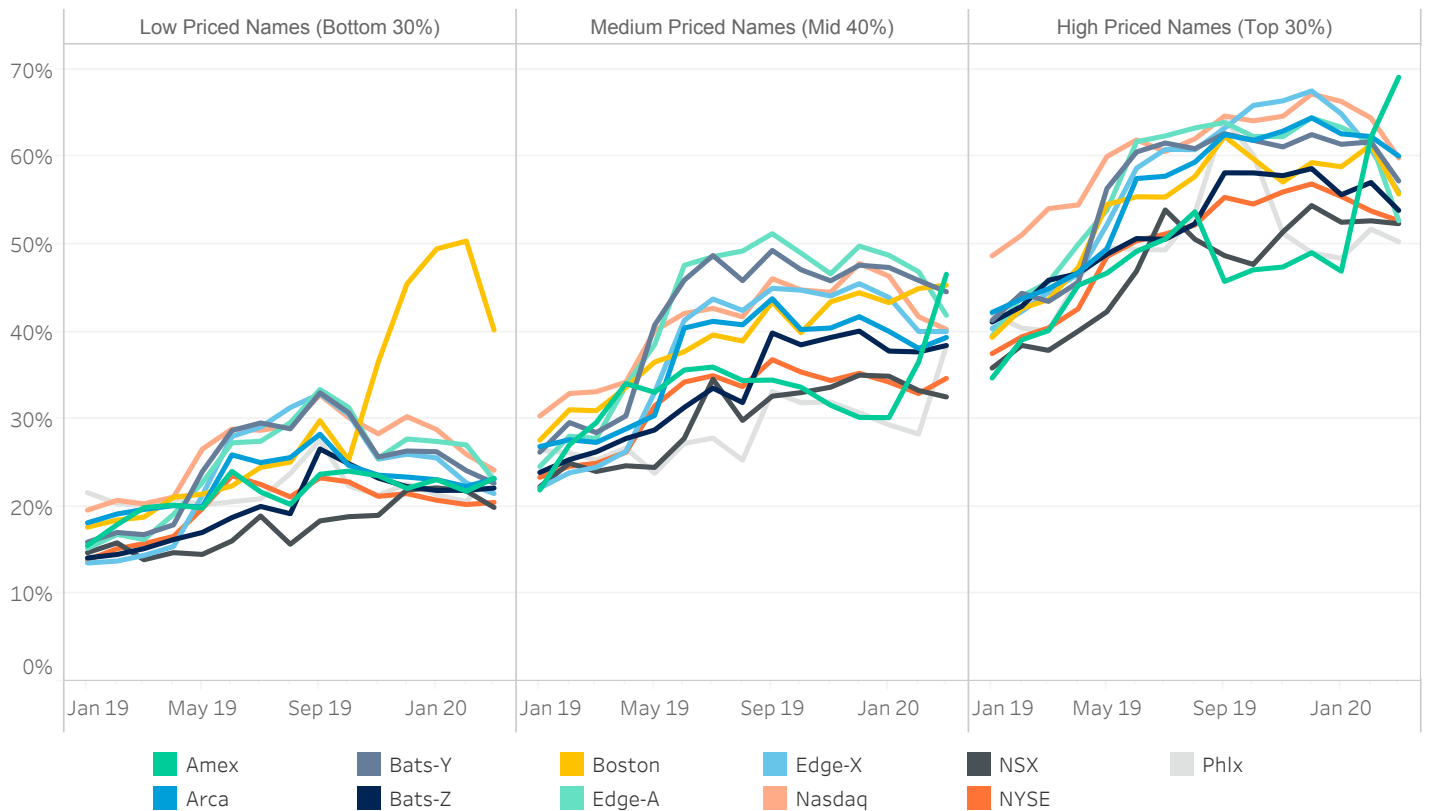
Source data: Virtu Financial



Hidden Trades Proportion by Price and Venue



Oddlot Trades Proportion by Price and Venue



Source data: SEC



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