

Statement of Doug Cifu¹
SEC Investor Advisory Committee Meeting
June 10, 2021

Today's meeting and the important topics being discussed could not be more timely as we reflect on an unprecedented series of events that has intensified the dialogue around equity market structure. For several months, in the wake of trading volatility involving so-called "meme" stocks, various lawmakers, policymakers, market participants, academics, and the media have been questioning whether our markets are broken and calling for reforms to protect the interests of retail investors. Many are urging the SEC to consider changing the rules governing routing of order flow, enhancing disclosure requirements, and regulating how market participants get paid for the services they offer. More than ever before, there is a laser-like focus on the retail investor experience and on ensuring that our market structure protects their interests.

At Virtu, we welcome the robust dialogue that is taking place. We believe that the events of early 2021 have resulted in a healthy debate around the regulatory framework that governs our capital markets – a debate that is appropriately concerned with retail investor protection. However, we are concerned that the growing intensity of calls for reform are obscuring the fact that the U.S. equity markets are the most robust, transparent and fair in the world, and that the retail investor experience has never been better. Developments in market structure, advances in technology, and the introduction of intense competition have resulted in vastly expanded product offerings for investors, low or no cost trading, and superior execution quality. Today's retail investors also have access to remarkably sophisticated trading platforms and suites of investment tools that rival those used by institutional trading desks. Consider how far we've come – today's retail investors can pick up their smart phones, enter an order to buy or sell thousands of equities, ETFs, and other products, and get near instantaneous execution at or better than the National Best Bid or Offer ("NBBO").

While we support data-driven reform, we think it is critical to ensure that the data utilized in evaluating the current environment and any contemplated reforms accurately reflect the benefits of the current ecosystem to retail investors. To that point, we would like to address some misunderstandings concerning the operation and functionality of the current marketplace which may contribute to false narratives and could ultimately have a negative impact on retail investors. Indeed, we believe that an objective and comprehensive review of the data inevitably leads to the conclusion that retail investors would continue to be best served by the transparent and highly competitive existing market ecosystem which provides investors with choice. Therefore, reforms should likely focus on incremental improvements to the existing market structure via enhanced transparency and more accurate measurements that reflect benefits received by retail investors.

¹ Doug Cifu is Co-Founder and Chief Executive Officer of Virtu, a leading financial firm that leverages cutting edge technology to deliver liquidity to the global markets and innovative, transparent trading solutions to its clients. Virtu operates as a market maker across numerous exchanges in the U.S. and is a member of all U.S. registered stock exchanges. Virtu's market structure expertise, broad diversification, and execution technology enables it to provide competitive bids and offers in over 25,000 securities, at over 235 venues. As such, Virtu broadly supports innovation and enhancements to transparency, fairness, and competition which enhance liquidity to the benefit of all marketplace participants.

As the Commission and Investor Advisory Committee begin the process of evaluating what if any responsive steps the agency should consider taking in the market structure space, Virtu would welcome the opportunity to be a resource. Virtu is committed to market transparency and fairness for all market participants and would embrace the chance to work with the Commission and staff to provide data to dispel misconceptions and rhetoric. To that end, we offer a few thoughts below as to why we believe that while certain improvements can and should be made, why the current regulatory framework is the right foundation for protecting investors and their investing experience, and why drastic, misplaced reforms are not warranted and would likely result in worse outcomes for retail investors.

* * *

Substantial Benefits to Retail Investors: The result of current market structure

The current U.S. equity market structure ecosystem is the result of regulatory mandates, technological advances, intense competition and is *highly inter-connected*. A vast network of national securities exchanges and alternative trading systems (“ATs”), as well as wholesalers, all strenuously compete to interact with retail orders on a regular basis. This model fosters deep competition among market participants and market centers for order flow - this translates into unparalleled benefits for retail investors and resiliency in the ecosystem. Because of this competition, investors have enjoyed greater execution certainty, significantly lower execution costs over time, better ancillary services from retail and online broker-dealers, and meaningful and substantial executions that are better than what is available at the NBBO. Because of the competitive forces at play in today’s equity markets, retail orders are typically filled at better prices and often in larger sizes than what is available at the NBBO posted on exchanges.

The benefits of today’s market structure to retail investors are quantifiable, and the supporting evidence is striking. For example, under the current model, wholesalers fill marketable orders at prices typically better than the NBBO – regardless of the quantity of shares displayed and available at the NBBO. When an order is filled at a price that is better than the NBBO, we refer to this as price improvement (or “PI”). When an order is filled for more shares than are available at the NBBO, we refer to this a size improvement. Taken together, this combination of “price” and “size” improvement offered by wholesalers – which we refer to as real price improvement (or “Real PI”) – translates into real dollars for retail investors. In 2020 alone, Virtu contributed approximately \$3 billion of Real PI to retail customers’ orders it handled.² Retail investors received this benefit because their orders were routed to Virtu, and this Real PI benefit is about 3 times greater than the PI benefit that is reflected in the data required to be disseminated under Rule 605.

We note that certain critics of the current market structure have focused on the omission of odd-lot quotes available in the market data from price improvement calculations under current Rule 605 as a reason to discount reported price improvement figures. We agree that odd-lot orders, both resting and marketable orders, should be accounted for in computing execution quality - as should marketable short sell orders, which are also currently excluded. We describe proposed

² Virtu’s supporting calculations are detailed in the attached presentation.

methodological enhancements in further detail below. However, we note that while including these quotes and orders in the calculation would marginally change Virtu's 2020 PI (a reduction of about 3% from including resting odd-lot quotes, an increase of about 11% from including marketable odd-lot orders, and an increase of about 3% from including marketable short sell orders)³, properly accounting for the number of shares available relative to the size of the marketable order when calculating price improvement *would increase Virtu's 2020 PI by approximately 210%*.⁴ This is striking evidence that price improvement figures reported under current Rule 605 substantially *understate* the benefits to retail investors provided by the current market structure.

Current Equity Market Structure: Some Misconceptions

While we believe there are certain disclosure-based enhancements that should be considered and which we discuss below, we worry that a dramatic overhaul of the existing model runs the risk of providing retail investors with worse outcomes. Drastic transformation could also bring about unintended consequences that would actually degrade the retail investor experience. What's more, much of the rationale underpinning calls for reform is based on a number of myths and misunderstandings about how our markets work. Taking a data-driven approach, we attempt to clarify and correct some of these myths and misunderstandings below.

Some have asserted that too much retail order flow goes to wholesalers and thus does not interact with the broader market. This argument rests on an incorrect assumption. Approximately 40% of retail orders handled by Virtu interact with displayed, hidden and midpoint liquidity on exchanges and ATs or are displayed on lit exchanges. This includes both market orders and non-marketable limits orders whose price and size are reflected on exchanges. In this way these orders are available for interaction with investors of all types and contribute to price formation. The argument that too much retail order flow goes to wholesalers ignores these facts, and also ignores beneficial effects of the already existing and widespread competition in the marketplace. There are sixteen (16) stock exchanges, over thirty (30) ATs, and at least eight (8) wholesale market making firms – all of which compete to provide better execution than each other. Entry into the space is unencumbered and competitors are welcome. While Virtu strongly supports competition in the marketplace and would welcome responsible, data driven reforms that would enhance competition, the fact is that our marketplace is already intensely competitive and investors benefit greatly as a result.

Another narrative that has been advanced is that wholesalers have an information advantage concerning retail orders. This simply is not true. Wholesalers receive orders from retail broker-dealers which contain limited information (namely – symbol, side, size, and order type with no information about the retail investor that placed the order). Further, orders arrive without any advanced notice or information. Marketable orders are promptly executed and printed to the tape – providing full transparency to the public marketplace, while nonmarketable limit orders are reflected on lit exchanges beyond what is required under the “Limit Order Display” rule, where they are visible via publicly or commercially available market data feeds.

³ Id.

⁴ Id.

We also reject the notion that an alternative structure is needed to protect investors from conflicts of interest allegedly embedded in today’s market structure. Much of the narrative over the past several months has focused on potential conflicts of interest associated with broker-dealers routing order flow to wholesalers in return for payment, or to exchanges in return for rebates. While we agree that actual conflicts of interest should and must be addressed, we believe they generally are under the current structure. There are already substantial disclosure requirements in connection with order flow payments and execution quality and broker-dealers (including retail brokerage firms *and* the wholesalers to whom they route order flow) have a duty of best execution. Despite all of the recent noise and public debate, we have seen no evidence that the current market structure ecosystem is giving rise to widespread, unchecked conflicts that are harming retail investors.

Improved Disclosure and Transparency: Additional Enhancements

While we assert that the current market structure provides substantial benefits, we have been advocating in meetings and discussions with the SEC staff since 2018 for enhanced order routing and execution quality reporting requirements to more accurately reflect the benefits of the existing system to investors. For example, in an attempt to measure fill quality, Rule 605 reports compare the fill price on marketable orders to the NBBO. This has significant limitations. First, the rule ignores the *size* of the marketable order relative to the number of shares available at the NBBO. Second, the benchmark (NBBO), by definition does not include unprotected, displayed odd lot quotes. Third, covered orders under Rule 605 do not include orders for less than 100 shares or sell orders marked as short sell, and therefore price improvement relative to the NBBO provided to these marketable orders is not included in Rule 605 reports. As a consequence, we believe that these reports provide an incomplete picture of execution quality. We would support updates to these requirements to more accurately reflect how wholesalers allocate price improvement dollars, and how they offer size improvement. To truly and accurately measure execution quality, Rule 605 disclosures should be updated to compare fill prices for all orders to the average price in the market to fill the same number of shares considering all displayed quotes – including NBBO, depth of book, and odd lots.

Notably, we are not alone in advocating for changes to Rule 605 disclosures. Just two weeks ago, NASDAQ published a blog post⁵ examining deficiencies in the current rule and calling on the SEC to update it. There is a growing consensus across the industry that we need better and more accurate reporting of execution quality in order to better measure the benefits to retail investors. On this topic, we would also like to call your attention to an initiative launched by the Financial Information Forum⁶ to provide retail investors with more visibility into execution quality measures. Under the initiative, participating broker-dealers may voluntarily publish statistics on execution quality for retail investor orders that are more refined and comprehensive than what is included in existing Rule 605 and 606 reports, and the group has proposed taking into account order size in measuring execution quality. We are engaged in this program and strongly support

⁵ NASDAQ, Modern Retail Needs Modern Rules (May 27, 2021), available at <https://www.nasdaq.com/articles/modern-retail-needs-modern-rules-2021-05-27>

⁶ Financial Information Forum, Retail Execution Quality Initiative, available at <https://fif.com/index.php/retail-execution-quality/retail-execution-quality-overview>.

its objectives. We believe that the program could be a model for reforms to the SEC’s existing reporting requirements to better reflect the benefits investors receive under the existing market structure.

Current Equity Market Structure: Important Features

As we have indicated throughout this letter, while they are not fully reflected in the existing reporting framework, the current equity market structure provides substantial benefits to retail investors. Below we provide a deeper review of several key benefits and features enjoyed by retail investors and the market place at large today.

Price and Size Improvement

Under the current market structure, wholesalers compete against each other and other liquidity sources, including exchanges and ATSS, to deliver the most price improvement to their customers. As mentioned above, in 2020, Virtu provided over \$3 billion in Real PI to retail orders, through a combination of (i) trading at prices better than the NBBO and (ii) “size improvement” in the form of transactions executed for quantities greater than available at the NBBO yet still at prices better than the NBBO. Unfortunately, because “size improvement” is not a reportable component in Rule 605 filings, existing disclosures do not fully reflect the scale of the benefits we and other wholesalers provide, but the benefits to investors are **real**, and they are very substantial.

What’s more, wholesalers like Virtu reflect the prices and size of non-marketable limit orders on exchanges and acquire a substantial percentage of inventory on exchanges. This inventory is applied directly to fill retail orders at the price obtained by the wholesaler on the exchanges, or in many cases at better prices than what was obtained on the exchanges. Approximately 40% of all retail volume handled by Virtu interacts in this manner on exchanges and ATSS. If we assume that these figures are reasonably consistent for other wholesalers, the proportion of market volume internalized by wholesalers away from exchanges and ATSS would fall to approximately 12.6% in 2020.⁷

Execution Certainty

Virtu and other wholesalers commit capital to fill most marketable orders at prices that are better than the NBBO – regardless of the quantity of shares displayed at the NBBO. As a consequence, retail customers benefit from consistently achieving executions that are at least as good **and**, more often than not, are better than the NBBO. We do this by committing capital and internalizing approximately 70% of marketable orders and by sourcing inventory from other market centers to fill the remaining 30%. These retail orders indirectly interact with liquidity on exchanges and ATSS when wholesalers go to these market centers seeking midpoint or other price improvement. These retail orders similarly interact with displayed liquidity on exchanges when price improving liquidity is not found on exchanges. As for non-marketable orders, Virtu reflects a substantial percentage of these orders on lit exchanges and all wholesalers must reflect such orders in accordance with the requirements of the “Limit Order Display” rule. These displayed

⁷ Based on publicly reported Rule 605 executed volumes as a percentage of total market volumes.

orders are available for any market participant to interact with and contribute to displayed price formation.

We believe that under any other model this level of consistency and certainty would not be available. The notion that retail orders could be comparably serviced if sent to an exchange is not supported by the data. In our experience we could not achieve the high levels of Real PI that retail broker-dealers have come to expect if we were to only acquire inventory from exchanges and ATSS. We know this because when we route orders to exchanges, ATSS and other market centers, we only find price improvement for approximately 18% of these shares.

Overall, the level of execution quality obtained when routing to exchanges and ATS, including when we obtain PI on approximately 18% of approximately 30% of marketable shares, is significantly below the level of execution quality we must deliver to retail broker-dealers in order for us to remain competitive with other wholesalers. Accordingly, in order to remain competitive, Virtu incurs significant expenses annually to provide supplemental price improvement by improving the execution prices for shares filled on exchanges and ATSS. To be clear, this supplemental PI that Virtu provides is paid out of Virtu's own pocket.

In addition to the expense to provide supplemental PI that Virtu incurs to improve the execution quality of retail orders, Virtu also incurs significant trading fees to execute the orders at exchanges and ATS – expenses that we expect would fall to retail broker-dealers if they routed the orders directly to these market centers.

While the current Rule 605 calculation method does not capture it fully, it is our view that the existing ecosystem affords better execution quality for retail investors than at any point in the history of our capital markets and is consistent with the duty of best execution.

Competition among Market Participants

Retail investors also benefit from the intense competition among various market participants fostered by the current regulatory framework. Time and again, it has been demonstrated that investors win when brokers compete against each other on trading costs and services, and when wholesalers compete against each other as well as exchanges and ATSS on execution quality, price improvement, and execution services. In mature and efficient markets, like the US equity markets where firms compete for order flow, enhancements to the investor experience happen naturally due to intense competition. Virtu has long been a proponent of competition in the broader marketplace because it lowers costs, enhances liquidity, and contributes to greater transparency, all of which benefit the retail investor.

For example, by utilizing wholesale execution providers, broker-dealers can leverage the risk management capabilities and economies of scale from wholesalers and pass on the benefits to their customers. In addition to lowering or eliminating commissions for retail investors, the existing wholesale execution model reduces barriers for new broker-dealers to enter the marketplace. It also allows broker-dealers to compete on other factors – research, trading tools, investor education, trading interfaces, and financing rates, among others.

Payment for Order Flow

Over the past several months, much of the debate around market structure reform has focused on the potential for conflicts of interest associated with payment for order flow. Under the wholesale execution model, broker-dealers are able to offer retail investors low or no-cost trading because wholesalers absorb all of the lit exchange and ATS costs, which would otherwise be passed on in some form to retail investors. Some commentators have taken aim at this model because allegedly broker-dealers could be incentivized to place their own interests ahead of their customers.

We acknowledge that in any market structure framework and indeed in just about any agent/principal commercial relationship, there is the *potential* for conflicts of interest to arise and therefore submit that eliminating payment for order flow would not eliminate the possibility of conflicts, and could potentially incentivize or enable other, less transparent conflicts to arise. It is our view that the competition among wholesalers, exchanges, and ATSs, as well as the benefits of competition and innovation in the retail broker-dealer space - all of which are enabled under the existing regime - inures substantial benefits to retail investors that far outweigh any potential reduction in conflicts by eliminating the practice. Furthermore, broker-dealers are already obligated by law to disclose and address such conflicts. And let's not forget that retail brokers have a legal obligation of best execution, which they meet by routing to the venues or wholesalers that provide the best price and size executions, not the one that offers the highest payment for order flow.

Importantly, we think it is telling that a large number of broker-dealers who do not accept payment for order flow still route their orders to wholesalers, including Virtu, because of the execution quality and customer service they receive under the existing wholesaler structure. Using wholesalers also allows broker-dealers to reduce operational risk, achieve cost savings, and focus on other areas of importance to their business and clients. These brokers are sending us their order flow because we are able to offer their customers best execution. We compete for these orders and understand that our success critically depends on the quality of our execution. As we have explained, we vigorously compete with other highly qualified marketplace participants and the data shows how competition has resulted in a 750% increase in the average PI per share provided to retail in the last 8 years.⁸

Competitive and Resilient Execution Ecosystem

Finally, we believe that the current regulatory construct engenders a resilient execution ecosystem that is the byproduct of ever-increasing competition in the marketplace. Broker-dealers concurrently route to many (often up to a dozen or more) execution partners and exchanges, mitigating single-point-of-failure risk. Moreover, the intense competition among wholesalers and exchanges to attract order flow improves the level of service that brokers-dealers receive and incentivizes technological advancement and enhancements to the marketplace generally. This translates into safer and more resilient markets, and into enhanced competitiveness and transparency that benefits retail investors. While we would support smart and sound regulatory enhancements to make our markets more transparent and safer for investors, we worry that

⁸ Net price improvement based on Rule 605 reports for 2013-2020

sweeping reforms could have unintended consequence of impinging competition and threatening the resiliency of the markets.

* * *

At this critical inflection point in the evolution of our markets, it is of paramount importance to keep in mind the immense benefits the existing system offers to retail investors. While there are changes that should be considered, it is important to proceed cautiously and deliberatively to ensure that these benefits are not compromised. We urge the Commission to consider the enhancements to Rule 605 that we and others have proposed to better reflect the benefits that retail investors receive today. Virtu looks forward to being a resource to the Committee and Commission on these important initiatives.

Measuring Real Execution Quality

Benefits to Retail Are Significantly Understated

Douglas Cifu
Chief Executive Officer
Virtu Financial

U.S. Securities and Exchange Commission
Investor Advisory Committee
June 10, 2021



Benefits of Current Market Structure



The current US equities market structure provides meaningful and measurable benefits to retail investors

Significant Price and Size Improvement

- Wholesalers provided over \$3.6B in price improvement to retail investors in 2020, based on Rule 605's calculation method; however, this method greatly understates the value provided to retail investors
- Wholesalers fill marketable orders at prices typically better than the NBBO, regardless of the quantity of shares displayed at the NBBO. This improvement to both displayed price **and size** - or "Real Price Improvement" - is not captured by Rule 605 figures¹
- **Virtu alone provided over \$3B in Real Price Improvement to retail investors in 2020¹**

Order Handling and Execution

- Wholesalers commit capital to execute marketable retail orders
- The price and size of non-marketable limit orders are reflected on exchanges²
- In total, approximately 40% of total retail flow handled by Virtu interacts with public and / or lit markets

Robust Broker Competition

- The wholesale service model lowers entry barriers for new retail brokers and therefore bolsters competition
- Leveraging wholesaler partnerships allows retail brokers to offer more services at lower costs

Competitive and Resilient Execution Ecosystem

- Wholesalers compete against other liquidity sources, including over 40 exchanges and ATSs
- Brokers concurrently route to many execution partners and exchanges, mitigating single-point-of-failure risk

¹ Virtu Americas 2020, see appendix for methodology and example; ² Beyond the requirements of the Limit Order Display Rule;

Benefits to Retail Are Significantly Understated



A more fulsome measure of execution quality is necessary to accurately quantify the experience of retail investors

Real PI Provided by Virtu Is Over 3x Greater Than What Is Measured by Rule 605¹



Real PI improves on Rule 605 by including odd lot and short sell orders and updating the benchmark price to be the average price available for the same quantity of shares considering all displayed quotes – NBBO, depth of book and odd lots

¹ Virtu Americas 2020 activity; see appendix for methodology and example

² All displayed quotes includes odd lots, NBBO, and depth of book from all lit exchanges

³ Includes Short Sell marked orders when not 201-restricted

Rule 605 Recommended Reforms



We advocate for changes that enhance execution quality metrics and disclosures to retail investors and encourage vigorous competition

In an attempt to measure fill quality on marketable orders, Rule 605 reports compare the execution price of those orders to the NBBO price, regardless of the order size relative to the quantity of shares displayed at the NBBO

- This measurement dramatically understates actual net PI provided to retail investors when the marketable order size is larger than the number the shares displayed at the NBBO
- The current benchmark (NBBO), by definition, does not include unprotected, displayed odd lot orders

We believe reform to Rule 605 could result in more accurate measurements that reflect the price improvement and execution quality benefits received by retail investors

- Current Rule 605 price improvement reports have four major shortcomings:
 1. Unprotected odd lot quotes are not included in the benchmark reference price
 2. Marketable odd lot orders are omitted
 3. Marketable short sell orders are omitted
 4. Rule 605 assumes there is always sufficient quantity of shares to fill marketable orders at the NBBO

Addressing these shortcomings in Rule 605 reports would help the market to better understand the actual benefits received by retail investors

Separating Fact From Fiction



Myth

Reality

Retail flow is not accessible

- **Approximately 40% of total retail flow handled by Virtu interacts with displayed, hidden and midpoint liquidity on public exchanges and ATs or are displayed on lit exchanges**
- Most retail brokers are capable of routing directly to exchanges and many do – but retail brokers also route to wholesalers to obtain price and size improvement over what’s available elsewhere¹

Wholesalers have information advantage

- Marketable orders are promptly executed and printed to the tape with full transparency to the marketplace, while non-marketable limit orders are reflected on lit exchanges where they are visible publicly²
- Wholesalers receive retail orders without any advanced notice or information about the retail investor that placed the order

Price improvement is not real

- Wholesalers effectively narrow the NBBO for retail investors – taken as a whole, all wholesalers provided over \$3.6B in price improvement in 2020, as measured by current Rule 605
- NBBO is only the ‘top of the book’ price and size – when Virtu’s performance is compared to all displayed quotes for the quantity of shares to fill the order, Virtu alone provided over \$3B in price improvement³

Wholesaling is not competitive

- **Competition among wholesalers drove a 750% increase in net PI per share since 2013⁴**
- Virtu competes with at least 7 other wholesaler firms⁵ as well as the entire ecosystem of over 40 exchanges and ATs to provide the best price improvement to retail investors; barriers to entry are minimal and there are new entrants on a regular basis

Exchanges & ATs would provide better executions

- **Wholesalers provide execution in all market conditions;** exchanges do not have best execution obligations
- When Virtu seeks liquidity on exchanges and ATs it achieves price improving fills on only ~18% of routed shares. To remain competitive, Virtu provides Supplemental Price Improvement at significant expense to itself by improving the execution prices for shares filled on exchanges and ATs. This Supplemental PI is paid out of Virtu’s own pocket. Virtu also incurs meaningful trading fees to execute orders at exchanges and ATs, an expense we expect would fall to retail brokers if they routed orders directly to these market centers

¹ See brokers’ Rule 606 Reports; ² beyond the requirements of the Limit Order Display Rule; ³ See appendix for methodology and example; ⁴ See slide 7;

⁵ Citadel Securities, G1 Execution, Goldman Sachs, Jane Street, Two Sigma Securities, UBS Securities, Wolverine;

⁶ Supplemental Price Improvement reflects enhancements

Wholesalers Are Part of a Broad Ecosystem



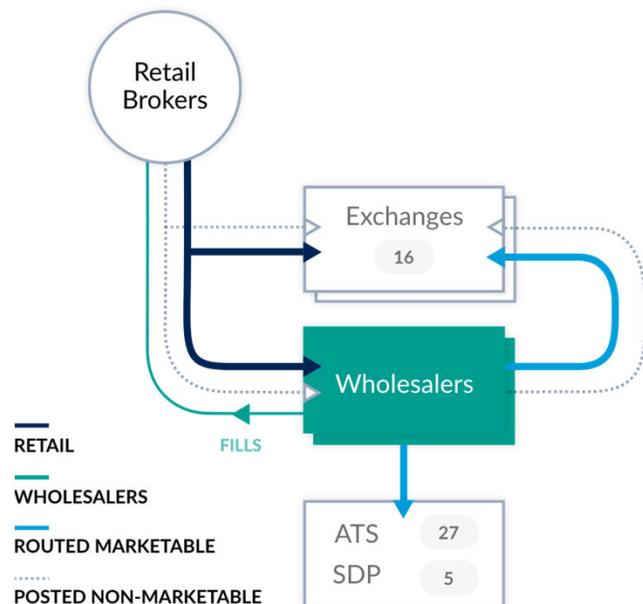
Brokers leverage wholesalers for execution and order handling

Brokers evaluate wholesalers based on overall execution quality obtained, which incentivizes wholesalers to seek price improving liquidity for the broker, including accessing better prices on exchanges and ATs where available

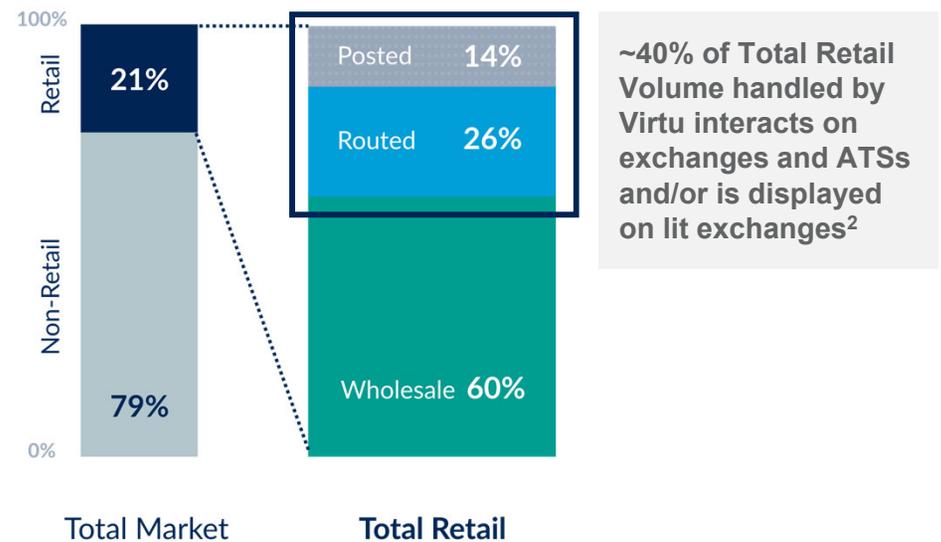
- Wholesalers typically incur and absorb trading fees on this flow when seeking liquidity; absent wholesaling arrangements, these substantial costs would ultimately be paid by retail investors

Retail is Accessible: About 40% of retail orders handled by Virtu interact with displayed, hidden and midpoint liquidity on exchanges and ATs or are displayed on lit exchanges

Retail Brokers Leverage Wholesalers for Routing and Executing Orders



Total Retail Volume Represents About 21% of Total Market Volume Traded in US Equities¹



¹ Per Rule 605 Reports from wholesalers for 2020;

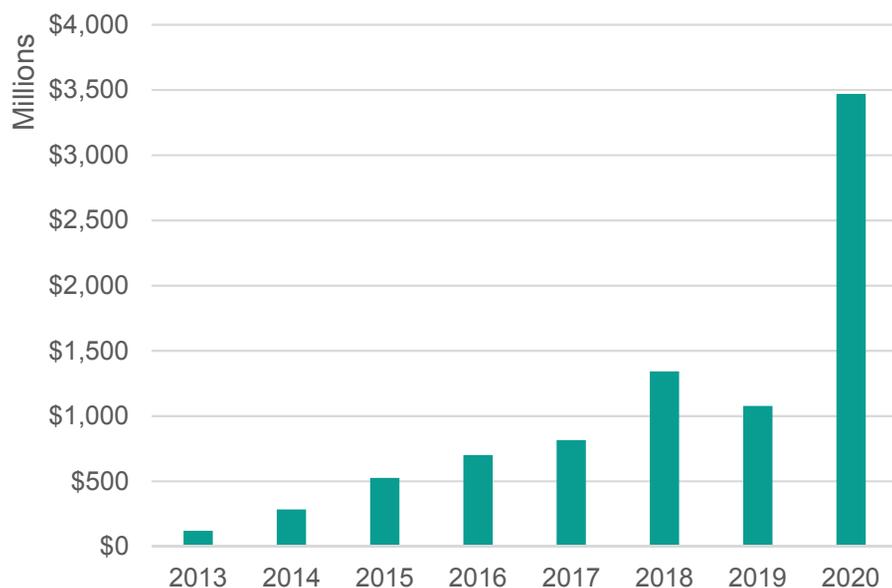
² Extrapolating from Virtu's activity, excludes marketable and non-marketable orders routed directly to exchanges by retail brokers

Strong Competition Benefits Retail

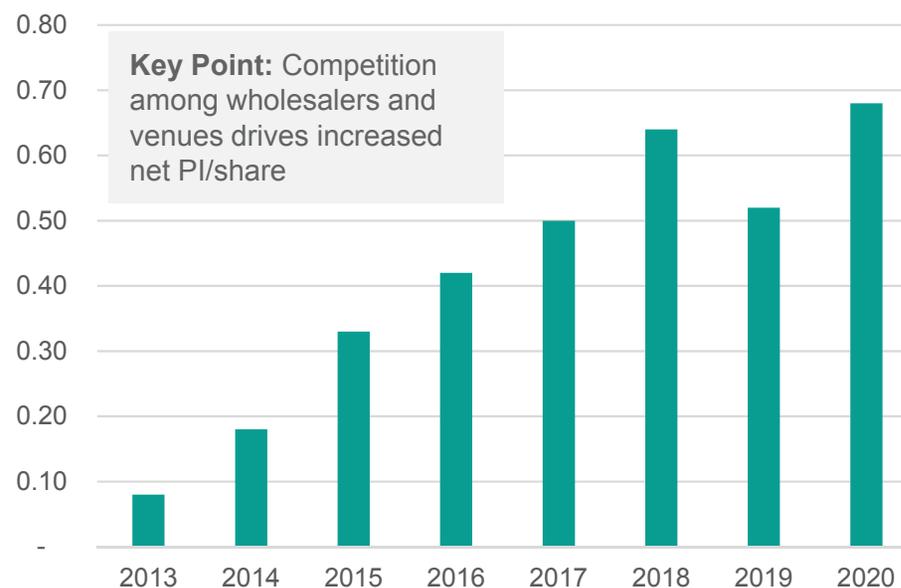


- Wholesalers compete against each other and over 40 other liquidity sources (exchanges, ATs) for the opportunity to provide execution and routing of orders for retail brokers
- Retail brokers measure liquidity sources based on the amount of price improvement provided
- This structure puts wholesalers in competition to provide the best execution for the retail broker on all orders handled, including incentivizing wholesalers to access better prices on exchanges and ATs (where available) at the wholesalers' own expense to remain competitive

Total Net Price Improvement¹ Provided to Retail Investors by All Wholesalers



Average Net Price Improvement¹ Provided by All Wholesalers (*¢ per share*)



Though significant, these figures substantially understate benefits to retail investors²

¹ Net price improvement based on Rule 605 reports; ² See appendix for methodology and example

Appendix



Benefits to Retail Are Significantly Understated (con't)



Current Rule 605 method ignores odd lot quotes, odd lot orders, short sell orders and the size of covered orders relative to the amount of shares available at the NBBO

| # | Method | Net Price Imp. (2020) ¹ | Covered Order Sizes | Benchmark | Limitations / Notes |
|---|---|---|---|--|--|
| 1 | Current Rule 605 | \$953M | 100 – 9999 Excl. Short Sell orders | The price at the NBBO, assuming infinite size at the NBBO. | <ul style="list-style-type: none"> Doesn't consider unprotected odd lots in the market data Omits marketable orders for 1-99 shares Doesn't consider the size of the incoming order Omits marketable orders marked as Short Sell |
| 2 | Add Odd Lot quotes to benchmark | \$926M -3% vs. Current Rule 605 | 100 – 9999 Excl. Short Sell orders | The volume weight average price (VWAP) for the number of shares required to fill the marketable order based on all displayed odd lots in the market data plus infinite size at the NBBO for the size not satisfied by odd lots. | <ul style="list-style-type: none"> Omits marketable orders for 1-99 shares Doesn't consider the size of the incoming order Omits marketable orders marked as Short Sell |
| 3 | Add Odd Lot orders to universe of covered orders | \$1,031M +8% vs. Current Rule 605 | 1-9999 Excl. Short Sell orders | The volume weight average price (VWAP) for the number of shares required to fill the marketable order based on: <ul style="list-style-type: none"> all displayed odd lots in the market data, plus infinite size at the NBBO for the size not satisfied by odd lots. | <ul style="list-style-type: none"> Doesn't consider the size of the incoming order Omits marketable orders marked as Short Sell |
| 4 | Add Short Sell marked orders to universe of covered orders | \$1,055M +11% vs. Current Rule 605 | 1-9999 ³ | The volume weight average price (VWAP) for the number of shares required to fill the marketable order based on: <ul style="list-style-type: none"> all displayed odd lots in the market data, plus infinite size at the NBBO for the size not satisfied by odd lots. | <ul style="list-style-type: none"> Doesn't consider the size of the incoming order |
| 5 | “Real PI” Considers the size of the covered order vs. all displayed quotes² | \$3,062M +221% vs. Current Rule 605 | 1-9999 ³ | The volume weight average price (VWAP) for the size of the covered order based on all displayed quotes (NBBO, depth, and unprotected odd lots in the market data). Note: The VWAP price is capped at 5% from the inside price to limit for instances where the incoming marketable order (a) would have exhausted all displayed liquidity in the market and/or (b) would have traded through enough price levels to trigger an Limit-Up/Limit-Down halt. | |

¹ See slide 10 for example calculation

² All displayed quotes includes odd lots, NBBO, and depth of book from all lit exchanges

³ Includes Short Sell marked orders when not 201-restricted

Example: Why PI Calculation Matters



Ignoring size of orders understates the benefits retail receives

Consider the following scenario

Wholesaler receives a market order to sell long 600 shares.
 The aggregate size on the bid looks like the illustration below.
 Wholesaler fills the sell order for 600 shares at \$99.9700.

| Price (\$) | Aggregate Size of Quotes on the Bid (across all exchanges) | Benchmark Calculation | | |
|------------|--|-----------------------|-----------------|-----------|
| | | Rule 605 | 605 + OL Quotes | "Real PI" |
| \$99.99 | 6 | | 6 | 6 |
| \$99.97 | 9 | | 9 | 9 |
| \$99.95 | 125 <-- NBB | 600 | 585 | 125 |
| \$99.94 | 27 | | | 27 |
| \$99.92 | 175 | | | 175 |
| \$99.90 | 100 | | | 100 |
| \$99.85 | 275 | | | 158 |
| \$99.80 | 325 | | | |

| | | | |
|----------------------|------------|------------|------------|
| Avg Benchmark Price: | \$ 99.9500 | \$ 99.9507 | \$ 99.9068 |
| Fill Price | \$ 99.9700 | \$ 99.9700 | \$ 99.9700 |
| PI per Share | \$ 0.0200 | \$ 0.0193 | \$ 0.0632 |
| Total PI Received | \$ 12.00 | \$ 11.58 | \$ 37.90 |

Price improvement calculations should reflect actual benefits received by investors

- #1 Current Rule 605**
 Under the current Rule 605 methodology, this fill is price improved by \$0.0200 per share, or a total of \$12.00 on the trade.
 i.e., fill price of \$99.97 vs. the benchmark \$99.9500 (NBB)
This ignores odd lots and the fact the incoming order is over 4 times greater than the size of the NBB
- #2 Rule 605 + Odd Lot Quotes**
 If displayed odd lot quotes are considered, this fill is price improved by \$0.0193 per share, or a total of \$11.58 on the trade.
 i.e., fill price of \$99.97 vs. the benchmark of \$99.9507 (volume weighted average price of odd lots + unlimited size at NBB)
This ignores the fact the incoming order is over 4 times greater than the size of the NBB
- #5 "Real PI"** (All displayed quotes including odd lots, NBBO, and depth of book from all lit exchanges)
 If all displayed quotes are considered, this fill is price improved by \$0.0632 per share, or a total of \$37.90 on the trade.
 i.e., fill price of \$99.97 vs. the benchmark of \$99.9068 (volume weighted average price of all displayed quotes)