



Royal Bank of Canada
Global Equity
3 World Financial Center
200 Vesey Street, 8th Floor
New York, NY 10281

October 25, 2019

Ms. Vanessa Countryman
Secretary
U.S. Securities and Exchange Commission
100 F Street, N.E. Washington, D.C. 20549-1090

Re: Market Data and Market Access. File No. 4-729

Dear Ms. Countryman:

On behalf of RBC Capital Markets, we appreciate the opportunity to provide our views on the commendable efforts of the Commission to review various issues around market data and access to that data for market participants like RBC and our customers.

RBC Capital Markets, LLC (RBCCM) is the investment banking platform of Royal Bank of Canada.¹ RBCCM is a U.S.-registered broker-dealer that, among other activities, provides equities trading and execution services to retail and institutional investors. These investors include large investment managers with trillions of dollars in assets under management. Those assets reside in employee pension funds, mutual funds, and other vehicles that hold the savings of individual investors.

RBCCM has supported Commission efforts to strengthen the fairness, transparency, and efficiency of U.S. equity markets. These efforts have included reform of order handling disclosure requirements², and a rule establishing a pilot study of transaction fees³, among other Commission actions.⁴ During meetings this year with Commission officials, we have appreciated the opportunity to discuss ongoing Commission efforts to examine issues regarding market data and market access. In the course of those discussions, we have

¹ Royal Bank of Canada (RBC), headquartered in Toronto, Ontario, is a global provider of financial services, including personal and commercial banking, wealth management services, corporate and investment banking, and life insurance and transaction process services. RBC's approximately 80,000 employees serve more than 16 million personal, business, public sector, and institutional clients worldwide through offices in Canada, the United States, and 36 other countries. In the United States, RBC's approximately 12,300 employees primarily provide corporate and investment banking, wealth management, asset management, and retail banking services to customers and clients in more than 40 states.

² See <https://www.sec.gov/rules/final/2018/34-84528.pdf> (Final Rule, "Disclosure of Order Handling Information").

³ See <https://www.sec.gov/rules/final/2018/34-84875.pdf> (Final Rule: "Transaction Fee Pilot for NMS Stocks").

⁴ See "Equity Market Structure 2019: Looking Back & Moving Forward" (colloquy with SEC Chair Jay Clayton, SEC Director of Division of Trading and Markets Brett Redfearn),

<https://www.sec.gov/news/speech/clayton-redfearn-equity-market-structure-2019>.

presented research conducted by RBCCM on depth-of-book liquidity and odd-lot trades. The research finds that (i) significant liquidity exists at levels beyond top-of-book, and (ii) as share prices rise, so does the percentage of those shares that are traded in odd lots. This latter finding takes on added significance in light of the fact that, in recent years, an increasing percentage of all trades on U.S. exchanges are in odd-lot sizes.⁵ Our findings suggest that, were the Securities Information Processors (SIPs) to provide to the investing public greater depth-of-book information – down to four levels of displayed quotes rather than only the top level, as currently require – investors not wishing to obtain costly proprietary feeds would find greater liquidity in stocks that currently appear less liquid given the SIPs top-of-book limitations. This enhanced disclosure should, in turn, provide greater liquidity in those stocks. Our findings also suggest that the SIPs should display odd-lot quotes. Further, we suggest that steps be taken to ensure brokers access odd-lot quotes for their customers, such as through guidance implementing price-based thresholds for odd lots from a best-execution standpoint.

We are attaching summary results of our research and would be happy to discuss this information further at your convenience.

Sincerely,

A handwritten signature in cursive script, appearing to read "R. Steiner".

Rich Steiner

Head of Client Advocacy and Market Innovation

⁵ See "Tiny odd lot trades reach record share of U.S. stock market," Wall Street Journal, October 25, 2019.



Analysis of Stock Exchange Order Books and Odd Lots

Key Points

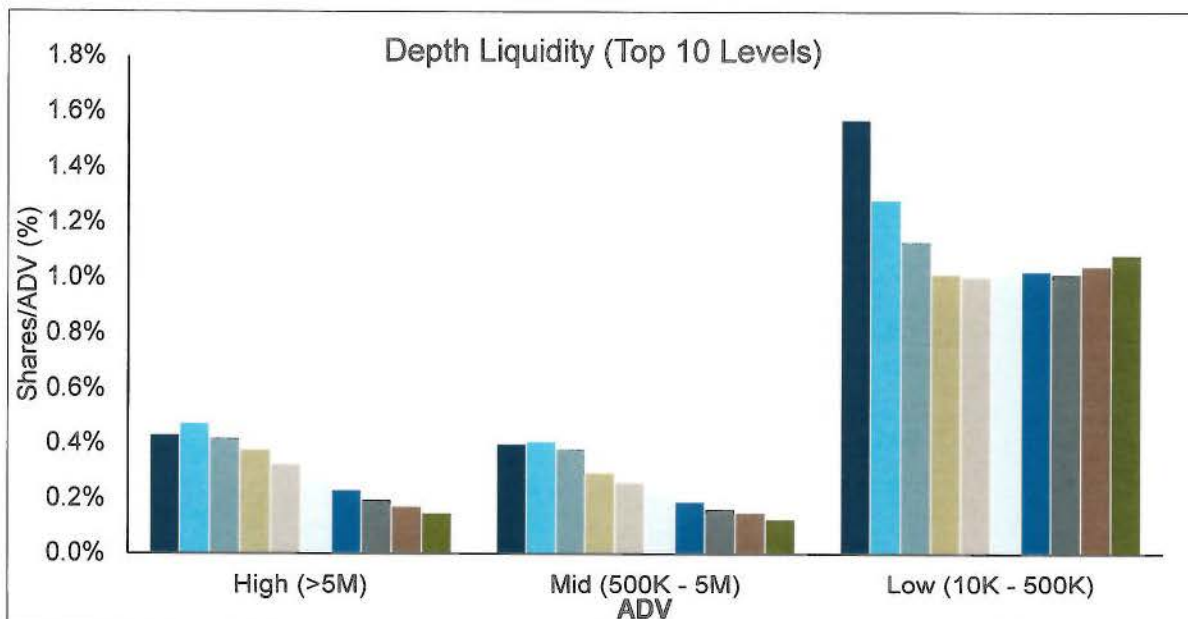
- Our analysis of depth-of-book liquidity and odd-lot trades for a wide universe of stocks traded on U.S. exchanges shows that substantial displayed liquidity is available within the depth of book for stocks in all liquidity tiers.
- We also found that stock price has a meaningful impact on odd lot frequency and trade size.
- Therefore, incorporating additional depth of book information and odd lot quotes into the core data disseminated on the SIP (Securities Information Processor) feeds would provide market participants an economical and accessible mechanism to obtain a more complete picture of the available liquidity on stock exchanges.

Methodology

- We studied depth of book information available on exchange proprietary market data feeds. This information was aggregated at each price level across all stock exchanges in the U.S. equity market. The analysis period was for a one month window distributed across September and October 2019.
- Each trading day we randomly selected a group of 100 corporate stocks across each ADV (Average Daily Volume) tier and recorded a view of the order books every 30 minutes. We averaged the daily time series of the individual stock order books, followed by a cross sectional average over the time window.

How Does Average Daily Volume Affect Liquidity Depth?

The chart below shows depth of book liquidity by ADV tiers. We observed substantial displayed liquidity available beyond the top of book / NBBO (National Best Bid and Best Offer) across all ADV tiers, with low ADV stocks having the greatest amount.





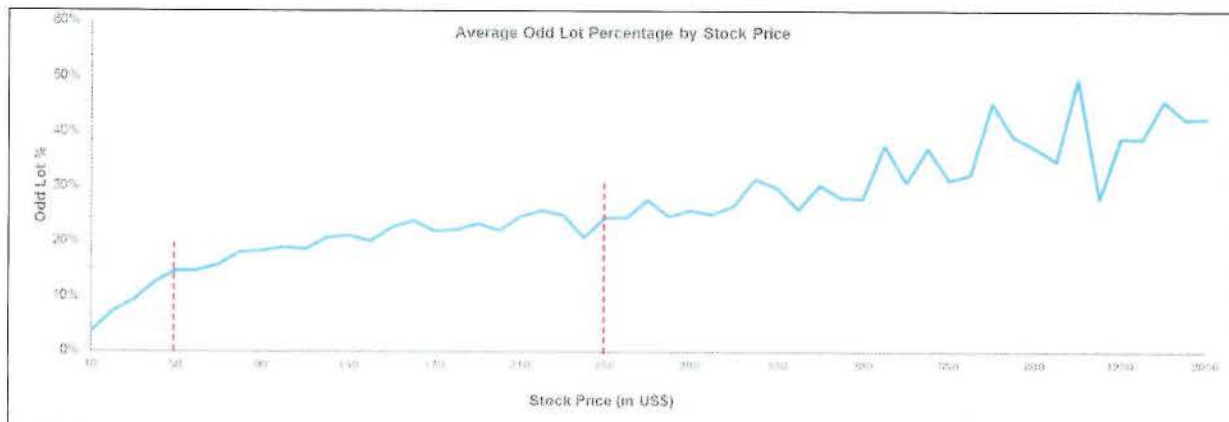
The Importance of Odd Lots on Liquidity

As stock prices overall have risen and average trade sizes have fallen, odd lots are becoming more important in the trading process and make up an ever-growing portion of trading volume.¹ The chart below shows that odd lot trades now comprise approximately 50% of the total trades in the U.S. equity market. What's more, this trend has been growing for years, and the velocity has increased in 2019.



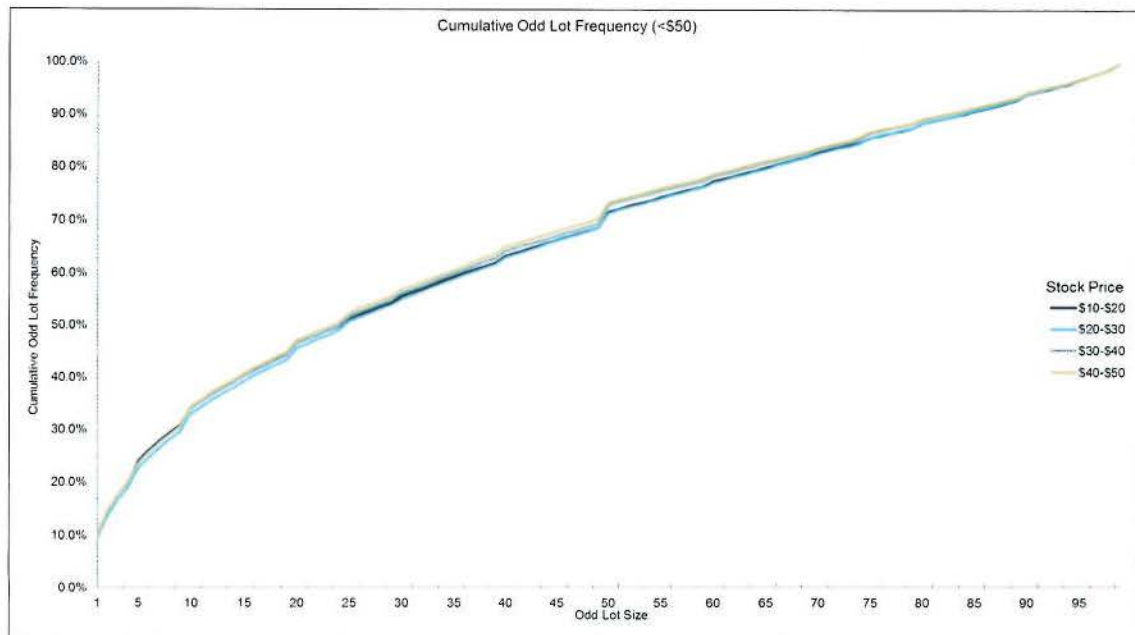
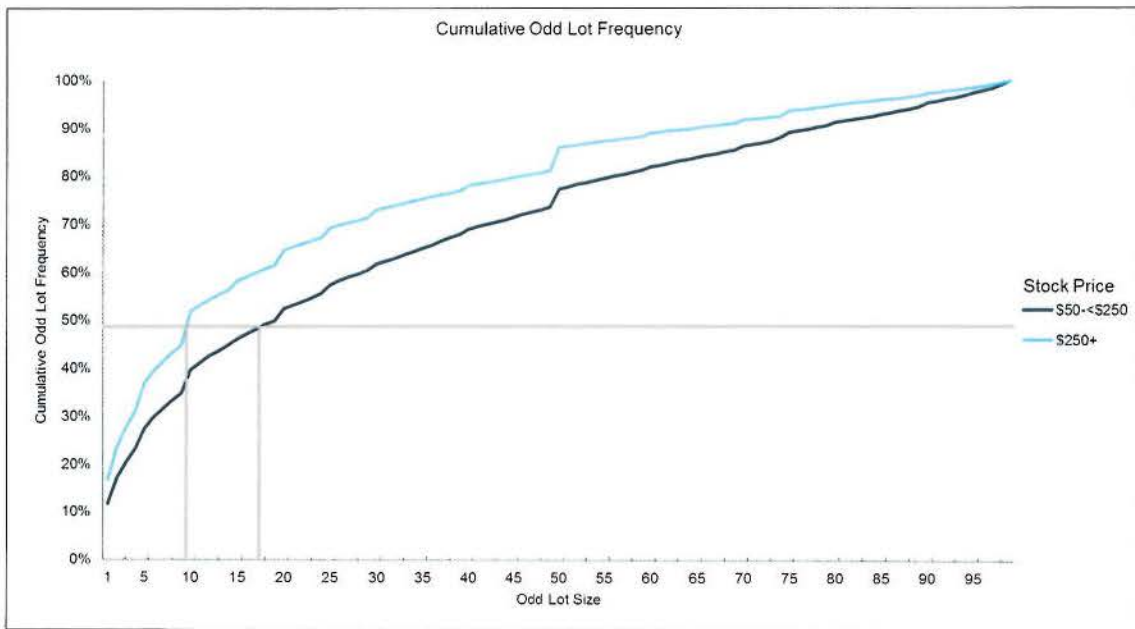
In an effort to better understand the optimal thresholds for order routing -- maximizing access to liquidity and price improvement while minimizing the potential for information leakage -- we studied odd lot trades within Russell 1000 stocks from January 1st to October 15th 2019.

The chart below shows how stock prices have an impact on odd lot frequency and trade size. For high-priced stocks, odd lots make up a larger percentage of the ADV.





In the charts below, we plot the cumulative odd lot trade frequency (percentage of odd lot trades below the respective odd lot size) by price tier. We observe that high-priced stocks trade in smaller quantities. Cumulative odd lot trade frequency is lower in stocks below \$50 and greater in higher priced stocks. We have highlighted that roughly 50% of the odd lots traded in stocks priced between \$50 and \$250 are 20 shares or less, while stocks trading above \$250 trade 10 shares or less. Put another way, for stocks priced between \$50 and \$250 per share, about half are sold in odd lots of less than 20 shares. And for stocks priced at more than \$250 per share, about half are sold in odd lots of less than 10 shares.





Recommendations for More Robust SIP Core Data and Improving Best-Execution:

Core data delivered via the SIPs should provide basic information on the true liquidity available, not just at the top of book, but at additional prices, too. Furthermore, odd lot quotes have become more prevalent and should also be disseminated on the SIPs. Last, when brokers are routing orders in an agency capacity on behalf of clients, their best-execution obligations should include accessing displayed odd lot orders on exchanges, above predefined thresholds to maximize liquidity access and minimize information leakage. To elaborate:

- **Add Three Levels of Depth of Book:** While each level of depth of book contains important price information, adding 3 additional levels would provide a significantly more detailed view of liquidity. Market participants who do not need the full breadth of depth of book information available from exchanges' proprietary market data feeds and who choose not to purchase those feeds are currently at a significant disadvantage relative to those participants who do utilize those feeds. Our recommendation would provide a cost-effective method for market participants to receive additional price formation and liquidity data, without unduly burdening the SIPs. When added to the current top of book price information, this additional depth of book information would enable the SIPs to provide investors with a significantly more detailed picture of price and liquidity. Currently, this critical price formation data is only available by purchasing exchange proprietary market data feeds from each exchange.ⁱⁱ
- **Add Odd Lot Quotes to the SIPs:** While odd lot trades are included in the core data on the SIPs, odd lot quotes are not. Including displayed odd lot orders on the SIPs would increase transparency on price formation and available liquidity to a broader group of market participants, including those who do not purchase exchange proprietary market data feeds. This additional information on the SIPs would also create a more viable, robust alternative source of market data for investors and brokers to utilize.
- **Improve Best Execution by Routing to Odd Lots:** Odd lots are a growing source of liquidity and if they are included on the SIPs, brokers should route their client orders to access them. To maximize the benefit of increased liquidity and price improvement created by accessing these odd lots, while mitigating the risk of information leakage that could be created by trading against very small orders in the marketplace, we suggest that price-based minimum thresholds be implemented. One possible approach would be to create tranches for stocks priced above \$50 and applying a minimum odd lot threshold equal to 50% of the cumulative odd lot trade size for those tranches. For example, for stocks priced between \$50 and \$250, there would be a 20 share minimum threshold.

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Endnotes

ⁱ SEC, Market Activity Overview, <https://www.sec.gov/marketstructure/datavis/ma_overview.html>.

ⁱⁱ Investors Exchange Group (IEX) does not charge proprietary market data fees.