PANELIST BIOGRAPHIES

Panel Discussion Regarding Best Execution and its Role in post-NMS Market Structure

SEC Investor Advisory Committee | June 10, 2021 Meeting

Moderator:

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Antonin Scalia Law School, George Mason University

Professor J.W. Verret teaches law and accounting, securities law, corporate law, and banking law at the George Mason University Law School, and serves on the Financial Accounting Standards Advisory Committee that advises FASB on the development of GAAP. He is a licensed CPA in the state of Virginia. He has been a Visiting Professor at the Stanford Law School.

He also serves on the Investor Advisory Committee of the Securities and Exchange Commission, where he advises the SEC on matters of investor protection. He also serves as faculty liaison to the American College of Business Court Judges. He previously served as Chief Economist at the U.S. House Financial Services Committee.

Professor Verret has served as the Independent Chairman of the Board of Directors of a leading credit rating agency and proxy advisory firm, where he was charged with implementing a compliance reform program.

He holds a Bachelor's degree in Financial Accounting, a Masters in Economic Policy from the Harvard Kennedy School of Government, and a J.D. from the Harvard Law School. He also clerked for the Delaware Court of Chancery.

He has served as an expert in numerous corporate and securities litigation and arbitration matters, two representative engagements include: New Jersey v. Sprint, 758 F.Supp.2d 1186 (2010) and Landsdowne v. OpenBand, 713 F.3d 187 (2013).

Panelists

Sal Arnuk
Partner, Co-Founder, and Co-Head of Equity Trading
Themis Trading LLC

Sal Arnuk is partner, co-founder and co-head of equity trading of Themis Trading LLC. Mr. Arnuk has extensive experience in equities trading and is an expert in electronic trading and market structure. He is also the co-author of Broken Markets -- How High Frequency Trading and Predatory Practices on Wall Street are Destroying Investor Confidence.

Mr. Arnuk has provided expert commentary for media outlets such as the Associated Press, BBC Radio, Bloomberg Television & Radio, BNN, CNBC, Fox Business, NPR, Barron's, The New York Times, The Wall Street Journal, USA Today, Time, Los Angeles Times, Bloomberg News, Institutional Investor, Pensions & Investments and Advanced Trading. Mr. Arnuk has also co-authored articles for Traders Magazine, Dow Jones and Journal of Investment Compliance. He is a frequent speaker at industry conferences on issues involving market access, algorithmic trading and other sell- and buy-side concerns such as Trader Forum, Waters, The National Organization of Investment Professionals (NOIP) and Fusion IQ's Big Picture conference. Finally, Mr. Arnuk has provided expertise to the House Financial Services Committee, FINRA, and the Securities and Exchange Commission.

Prior to Themis, Mr. Arnuk worked for more than 10 years at Instinet Corporation, where he headed the team responsible for equity sales and trading for major institutional money managers. He graduated from New York University's Stern School of Business with an MBA in Finance and received a Bachelor's Degree in Finance from SUNY Binghamton University.

Paul Atkins
Founder (and Former SEC Commissioner)
Patomak Global Partners

Mr. Atkins leads client work for financial services firms regarding an array of issues, including Dodd-Frank compliance, domestic regulatory expertise, European regulatory advice, and corporate governance. Mr. Atkins regularly serves as an independent compliance consultant and a court-appointed monitor in settlements involving federal agencies and regulators. His expert witness engagements include federal, state, and foreign litigation, as well as U.S. Securities and Exchange Commission matters.

Since 2017, Mr. Atkins has led industry efforts to develop best practices for digital asset issuances and trading platforms as co-chair of the Token Alliance.

Prior to founding Patomak, Mr. Atkins served as an SEC Commissioner from 2002 to 2008 where he advocated for transparency, consistency, and the use of cost-benefit analysis at the agency. He represented the SEC at meetings of the U.S.-E.U. Transatlantic Economic Council, the President's Working Group on Financial Markets, the World Economic Forum, and the Transatlantic Business Dialogue. From 2009 to 2010, he was appointed a member of the Congressional Oversight Panel for the Troubled Asset Relief

Program. Earlier in his career, he served on the staffs of SEC chairmen Richard C. Breeden and Arthur Levitt as chief of staff and counsellor, respectively.

In private practice, Mr. Atkins was a partner of PricewaterhouseCoopers and its predecessor firm, Coopers & Lybrand. Mr. Atkins began his career as a lawyer in New York with Davis Polk & Wardwell and was a resident for 2½ years in the firm's Paris office. He was admitted as conseil juridique in France in 1988.

From 2012 to 2015, Mr. Atkins served as an independent director and Non-Executive Chairman of the Board of BATS Global Markets, Inc., a leading operator of electronic U.S. and European securities markets trading listed cash equity securities and equity options. He also serves as a Trustee of the American Council on Germany.

Mr. Atkins received his J.D. from Vanderbilt University School of Law, where he was Senior Student Writing Editor of the Vanderbilt Law Review, and his A.B. from Wofford College, summa cum laude, Phi Beta Kappa.

Tyler (Ty) Gellasch
Executive Director
Healthy Markets Association

Tyler Gellasch is a leading capital markets policy expert whose opinions and insights are frequently sought by regulators, members of congress, market participants, and the press. Gellasch's public service included five years as Counsel in the US Senate, as well as service as Counsel to then-new SEC Commissioner Kara M. Stein. In private practice, Gellasch has served as a general counsel of a boutique investment bank, as well as associate at Mayer Brown LLP and Morgan, Lewis & Bockius, LLP. Gellasch is also a Founder of Myrtle Makena, LLC, a consulting firm. Gellasch received his undergraduate degree from Case Western Reserve University. Both his juris doctor and master's degree in economics were awarded by Duke University.

Daniel Gray
Senior Special Counsel, Division of Trading and Markets
U.S. Securities and Exchange Commission

Daniel Gray is a Senior Special Counsel in the Division of Trading and Markets, U.S. Securities and Exchange Commission. Since 1999, he has worked on a variety of SEC market structure initiatives. These include the Research Note on Equity Market Volatility on August 24, 2015, reviews of economic literature on high frequency trading (2014) and market fragmentation (2013), the Findings Regarding the Market Events of May 6, 2010, the Concept Release on Equity Market Structure (2010), Regulation NMS (2005), rules requiring disclosure of order execution quality and order routing practices (2001), the Market Fragmentation Concept Release (2000), and the Market Information Concept Release (1999). He previously worked as an Assistant General Counsel of Ernst & Young LLC, as counsel to SEC Commissioner Philip R. Lochner, Jr., and as an attorney in the Office of Chief Counsel of the Division of Market Regulation. Mr. Gray graduated in 1983 from Duke Law School.

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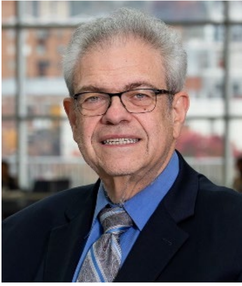


Chester Spatt, PhD
Pamela R. and Kenneth B. Dunn Professor of Finance
Tepper School of Business
Carnegie Mellon University

Chester Spatt is the Pamela R. and Kenneth B. Dunn Professor of Finance at the Tepper School of Business at Carnegie Mellon University, where he has taught since 1979. He served as Chief Economist of the U.S. Securities and Exchange Commission and Director of its Office of Economic Analysis from July 2004 through July 2007. He earned his Ph.D. in economics from the University of Pennsylvania and received his undergraduate degree from Princeton University.

Professor Spatt is a well-known scholar studying financial economics with broad interests in financial markets. He has analyzed extensively market structure, pricing and valuation, and the impact of information in the marketplace. For example, he has been a leading expert on mortgage valuation and contracting, taxation and asset allocation and financial regulation. His co-authored 2004 paper in the Journal of Finance on asset location won TIAA-CREF's Paul Samuelson Award for the Best Publication on Lifelong Financial Security. He has served as Executive Editor and one of the founding editors of the Review of Financial Studies, President and a member of the Founding Committee of the Society for Financial Studies, President of the Western Finance Association, and is currently an Associate Editor of several finance and real estate journals. He also is currently a member of the Systemic Risk Council and the Financial Economists Roundtable, a Research Associate of the National Bureau of Economic Research, Senior Economic Adviser to Kalorama Partners, and a Fellow of the TIAA—CREF Institute and has served as a member of the Federal Reserve's Model Validation Council, the Advisory Committee of the Office of Financial Research and the Equity Market Structure Advisory Committee of the Securities and Exchange Commission.

Sal Arnuk Planned Remarks

Thank you esteemed members of the Investor Advisory Commission for inviting me to participate in today's meeting.

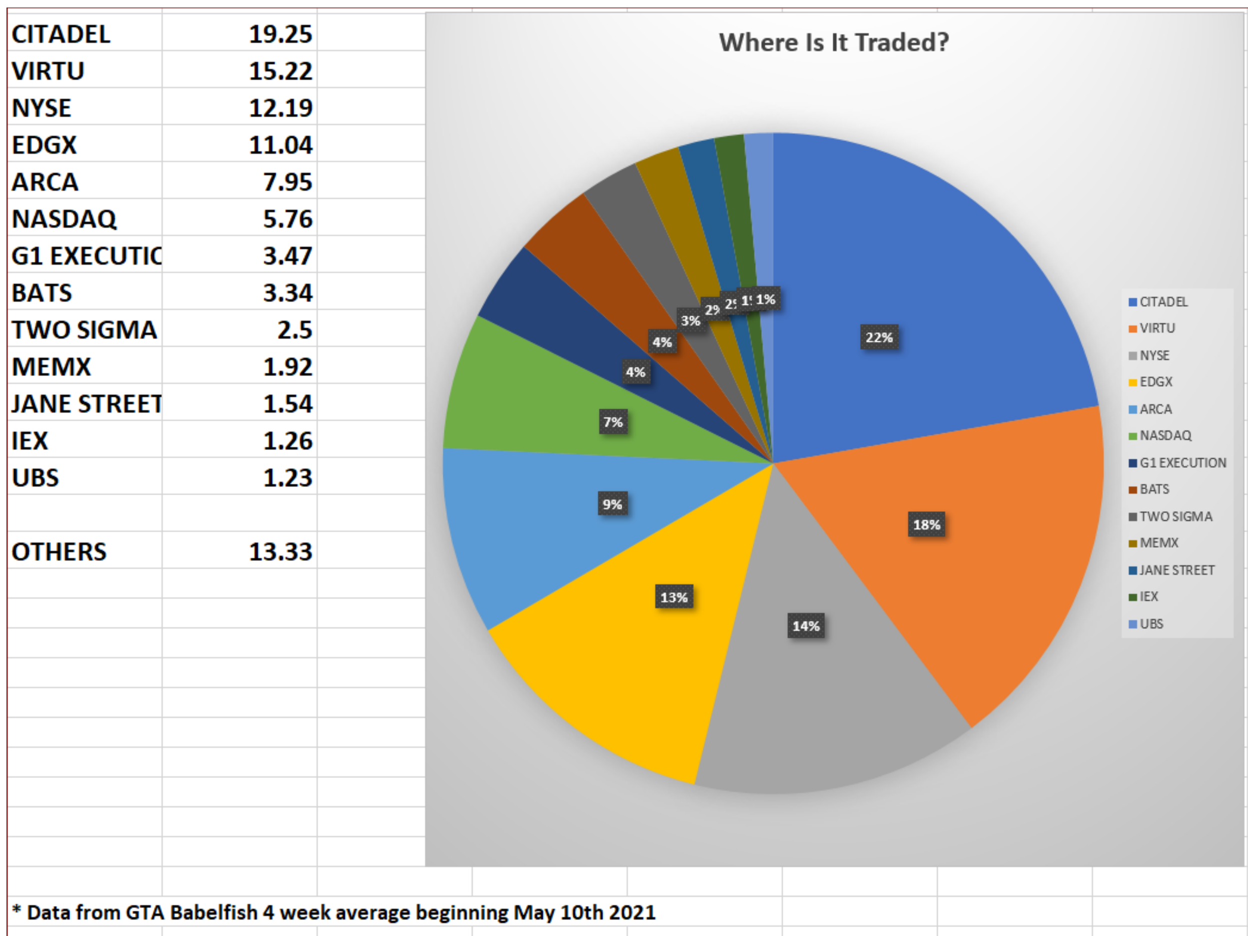
As I understand it the main purpose of this panel is to discuss Best Execution in a post Reg NMS environment. Best Ex is near and dear to my heart, and has defined my role in the financial industry for my entire career, dating back to my early 1990s employment at Instinet – "the World's First Electronic Broker." I have worked as an agency institutional broker well before Reg NMS was ever conceived – in a quote -driven market with a single "ECN" added in, then two, then a half dozen. I have also worked for two decades at the firm I co-founded, Themis Trading, in a post-Reg NMS order-driven market. My entire career has been dedicated to serving institutional money managers representing the overwhelming majority of long-term investors our markets are charged to serve.

Best Execution is an evolving and complex concept. How it applies to a retail order of 12 shares of Palantir is very different than how it applies for a money manager's order of 500,000 thousand shares of Palantir.

The key to Best Ex for a retail 12 share order is an execution consistent with real time market conditions against actual available liquidity. Terms like Price Improvement (PI) and the National Best Bid Offer (NBBO) are commonly used, but there are problems with those terms. The NBBO is typically thin for most stocks, and using it as a benchmark for Best Ex doesn't account for available odd-lots and hidden liquidity within the NBBO. The NBBO is also stale. There are multiple pricing feeds, or views of the markets, and Exchanges make massive amounts of money selling speed and access, so that there is a built-in arbitrage subsidy between real-time views of the market, and an ever so slightly stale public view of the markets.

The key to my achieving Best Ex for my larger investors clients is a different matter entirely. My achieving Best Ex for my clients depends on how well I can source liquidity in a fragmented web, and mitigate price impact, which we try to do by being unpredictable and controlling the degree of interaction with very short-term traders. My performance is typically measured by how much I am affecting the stock price, since it is unlikely my client can buy 500,000 shares of anything within the confines of a thin-crust NBBO – an NBBO that presents enough challenges as it is for retail orders.

Let me illustrate, please. Here is a liquidity profile of Palantir:



CITADEL	19.25
VIRTU	15.22
NYSE	12.19
EDGX	11.04
ARCA	7.95
NASDAQ	5.76
G1 EXECUTIC	3.47
BATS	3.34
TWO SIGMA	2.5
MEMX	1.92
JANE STREET	1.54
IEX	1.26
UBS	1.23
OTHERS	13.33

* Data from GTA Babelfish 4 week average beginning May 10th 2021

Over 50% of the liquidity is executed by a handful of high-speed firms off-exchange – through bilateral PFOF relationships and captive order flow. All Stock Exchanges together trade about 43%. All dark pools together trade about 5% - UBS is the largest at 1.23%.

Where should I trade my client’s 500,000 share order? On IEX? On the NYSE? In UBS’s dark pool? Should I start a bilateral relationship with Citadel, where they know that every time I send them a part of my order, there is usually stock behind? Should I use a systematic predictable algorithm? What % of volume participation rate should I aim to execute at? At what price levels should I be aggressive, and what price levels should I be extremely passive? How do the above destinations treat my client’s order when I rest there? Where should I rest first? Last? What order and matrix should I route in? Am I being predictable? What is a natural amount of expected price impact for my order?

How I deal with the above questions is how I achieve Best Ex for my client - and the situation differs for every stock, every single day. Defining Best Ex in the institutional world I operate in is not simple at all. Heck it isn't even simple in the retail world, as the Meme Stonk Craze lays testament to.

Perhaps because of the complexity of our modern markets, Themis has always believed the best way to regulate "the right thing" and "fairness" is by eliminating conflicts of interest where possible. Banning Payment for Order Flow (PFOF) is one principal we have urged our regulators to adopt going back a decade. It would elegantly guide our equity markets to a natural state of supply and demand, price discovery, and proper market fragmentation, in a way that specific and complex rule-writing could never do. Banning PFOF, in dark and in public markets, would result in public markets that are more diverse – with participation from market makers, prop traders, retail investors, and institutional investors. And those diverse public markets would be deeper and more robust, in good times and in times of market stress. Banning PFOF would greatly reduce the segmentation that is occurring currently, for the benefit of a few firms, and at the expense of investors.

I look forward to answering any questions you may have for me today.

Remarks of Chester S. Spatt, June 10, 2021, to the Investor Advisory Committee

I appreciate the opportunity to address the SEC's Investor Advisory Committee as part of its panel on Best Execution. I have been a long-time Professor of Finance at Carnegie Mellon University's Tepper School of Business. An important area of my academic expertise is market structure and trading. For example, I was a member of the SEC's Equity Market Structure Advisory Committee from 2015 through 2017. I served as the Commission's Chief Economist from 2004 to 2007, a period which included the adoption and implementation of Regulation NMS, the conversion of the New York Stock Exchange into a for-profit exchange and the end of its specialist system, and the founding of FINRA.

The nature of Best Execution responsibilities of market participants has been surprisingly complex in light of the evolution of trading technology and our regulatory system. My remarks highlight several facets: the NBBO, Regulation NMS and the trade-through rule, fees and rebates in trading and make-take pricing, rebate pricing tiers, proprietary data and pricing power by the exchanges, latency and the geography of trading and post-trade opacity. These raise a variety of questions about the meaning of Best Execution. Perhaps the ambiguity in meaning reflects the Commission's desire to allow Best Execution responsibilities to evolve organically, along with technology and the trading process. At the same time, the amorphous nature of Best Execution makes it difficult for market participants to internalize their responsibilities and for regulators to enforce clear standards.

While Regulation NMS has facilitated the electronic evolution of equity markets and originally helped end the entrenched monopolistic specialist system that predominated equity trading, it is striking that NMS, including the trade-through rule and the system of make-take pricing used by

many exchanges is at the core of the complexity of our trading system. In fact, NMS came about because of concerns by the Commission about whether *broker-dealers* were fulfilling their Best Execution duties, but the Commission's response was to impose responsibilities on the *exchanges* rather than broker-dealers by requiring a trade-through restriction through exchange linkages as a partial substitute for Best Execution, though only at the "tops" of the order book—adding significantly to the complexity of market structure. To the extent that there is an agency problem in order routing, then the trade-through rule could have the potential to improve routing, as alternatively would greater focus on Best Execution. However, the trade-through restrictions, which focus upon facilitating small trades, also have the potential to increase execution costs for institutional orders, such as mutual funds.

In a presentation to the IAC two years ago I highlighted the impact of rebate pricing tiers using large numbers of alternative tiers and somewhat customized pricing within our system of fees and rebates.[1] This clearly seems designed to price discriminate under reasonable assumptions about the form of exchange costs, i.e., the costs depend upon total activity, but do not depend upon the distribution across broker-dealers. The price tiering is significant in terms of Best Execution because it encourages small brokers to use larger one for trading to obtain better rebates, arguably inconsistent with the requirement of the Exchange Act with respect to placing an undue burden on competition. Indeed, citing this problem specifically and my related paper,[2] three congressmen wrote to the Commission early last year suggesting a ban on pricing tiers.[3] The case for such a ban

[1] Remarks of Chester S. Spatt, March 28, 2019, to the Investor Advisory Committee.
[2] Chester S. Spatt, "Is Equity Market Structure Anti-Competitive?" working paper, revised December 2020 and presented at the American Finance Association meetings, January 2021.
[3] Budd, Congressman T.; Congressman A. Mooney; and Congressman A. Wagner, Letter to SEC Chairman Jay Clayton, January 31, 2020.

is even stronger than at the time of my presentation or the subsequent letter as the D.C. Circuit later overturned the SEC's effort to study and potentially ban rebates after a market pilot. Of course, if the SEC had banned rebates, then the tiering issue would have been moot.

Another key feature of current practice is that the pricing tier achieved by broker-dealers and others routing orders is only determined at the end of the month and is not transparent to asset managers, in contrast to the tiering based upon pre-determined pricing in airline frequent flyer programs. In that spirit and in the aftermath of my earlier presentation the IAC itself called upon the Commission to require much stronger disclosure, but that has not progressed. This actually was a much weaker recommendation than those of the three congressmen. The unknown nature of the rebate rate leads to an agency conflict even for institutional investors and amplifies the agency conflict in order routing relative to the basic "make-take" structure.

I would reemphasize the earlier recommendations to the Commission. In my view it should seriously consider banning price tiers for rebates and absent that should implement much stronger disclosure requirements. This is an important issue in a Best Execution context.

Another important aspect of Best Execution is to what extent different market participants need to have access to various proprietary datasets to fulfill their Best Execution requirements or should the access to the data simply reflect the commercial preferences of various broker-dealers and asset managers? To the extent that particular data are required universally is there any advantage to not including it in the SIP? The issue of data that would be required for Best Execution is complex, in part, because of the market power of many of the providers of unique data, the range of proprietary datasets offered, the diverse business models for various intermediaries, as well as the locations of the various exchange data centers and trade reporting facilities.

Data are not uniformly available at all locations due to latency and the geographic structure of data availability. Yet much of the SEC's regulatory framework, such as the meaning of the NBBO, the import of the trade-through rule and the underlying meaning of Best Execution largely abstract from latency frictions and the geographic structure of trading. The diverse geographic points at which prices are measured and the latency to identify and access liquidity are fundamental. Even with faster technology and assumed continuation of Moore's Law, the geographic structure of trading and the physical constraint associated with the speed of light suggest that frictions cannot disappear in the limit. Given that and the importance of relative time in trading, latency is inherent and an important issue to address in the context of Best Execution.

With collaborators, I have recently been examining post-trade transparency, and the pattern of trading around the publication of trades. Our research highlights the difference in latency between off-exchange and exchange trading: we identify bursts of trading activity consistent with market participants learning about off-exchange trades from SIP broadcasts, but appearing to learn about on-exchange trades from faster proprietary feed broadcasts. The much slower response to off-exchange trading reflects greater post-trade opacity and latencies in reporting and the manner in which market participants utilize data. This highlights fundamental questions about the meaning of Best Execution in the presence of various latencies, including those associated with exchange vs. off-exchange trading. For example, what are the Best Execution responsibilities of various market participants in light of their potential knowledge of trading activity given the latencies?

The underpinnings of Best Execution, both conceptually, as highlighted by my remarks, and pragmatically from the perspective of the goals of the Commission require further attention.

PANELIST BIOGRAPHIES

Panel Discussion regarding Best Execution Issues Unique to Wholesale Brokers

SEC Investor Advisory Committee | June 10, 2021 Meeting

Moderator:

J.W. Verret, JD, CPA/CFF, CFE
Associate Professor of Law (with tenure)
Antonin Scalia Law School, George Mason University

Professor J.W. Verret teaches law and accounting, securities law, corporate law, and banking law at the George Mason University Law School, and serves on the Financial Accounting Standards Advisory Committee that advises FASB on the development of GAAP. He is a licensed CPA in the state of Virginia. He has been a Visiting Professor at the Stanford Law School.

He also serves on the Investor Advisory Committee of the Securities and Exchange Commission, where he advises the SEC on matters of investor protection. He also serves as faculty liaison to the American College of Business Court Judges. He previously served as Chief Economist at the U.S. House Financial Services Committee.

Professor Verret has served as the Independent Chairman of the Board of Directors of a leading credit rating agency and proxy advisory firm, where he was charged with implementing a compliance reform program.

He holds a Bachelor's degree in Financial Accounting, a Masters in Economic Policy from the Harvard Kennedy School of Government, and a J.D. from the Harvard Law School. He also clerked for the Delaware Court of Chancery.

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Panelists

Doug Cifu
CEO
Virtu Financial

Douglas A. Cifu has been Chief Executive Officer and a member of the board of directors of Virtu Financial, Inc. since November 2013 having previously co-founded the firm in 2008. Virtu Financial, Inc. (NASDAQ: VIRTU) is a technologically-enabled financial services firm that has offices in New York, Austin, Boston, Chicago, San Francisco, Dublin, London, Paris, Hong Kong, Sydney and Singapore. At Virtu, Mr. Cifu has led and managed all key strategic and operational decisions, including its initial public offering that closed in April, 2015, the $1.4 billion acquisition of KCG Holdings in 2017, the $1.0 billion acquisition of ITG in March 2019 and various public and private financings. Mr. Cifu frequently speaks on global market structure issues and concerns with global regulators and at industry conferences and in private settings.

Prior to co-founding Virtu, Mr. Cifu was a partner at the international law firm of Paul, Weiss, Rifkind, Wharton & Garrison LLP, where he practiced corporate law from 1990 to 2008, served on the firm's Management Committee and was Deputy Chairman of the Corporate Department. At Paul Weiss, Mr. Cifu specialized in complex merger and acquisition transactions for private equity sponsors and other Fortune 500 companies.

Mr. Cifu also serves on the board of directors (as the lead independent director) of Independent Bank Group, Inc. (NASDAQ: IBTX), a regional bank holding company. Mr. Cifu is a member of the Board of Directors of the U.S. Chamber of Commerce and the Board of Visitors of Columbia College at Columbia University. Mr. Cifu is also Partner, Vice Chairman and Alternate Governor of the Florida Panthers, an NHL hockey franchise.

Mr. Cifu completed his J.D. at Columbia Law School in 1990 and received his B.A. from Columbia University in 1987, from which he graduated magna cum laude and was elected to Phi Beta Kappa.

Stanislav (Stan) Dolgopolov
Chief Regulatory Officer
Decimus Capital Markets, LLC

Stanislav Dolgopolov is the Chief Regulatory Officer with Decimus Capital Markets, LLC, and he is also affiliated with Hyperion Decimus, LLC. He was previously affiliated with several law firms, including Dechert LLP, and taught business law and securities regulation at UCLA School of Law. His published research, which includes The Market Structure Crisis: Electronic Stock Markets, High Frequency Trading, and Dark Pools co-authored with Haim Bodek, has covered several areas in securities regulation and market structure.

He obtained his BSBA from Drake University, his MBA from the University of Chicago Booth School of Business, and his JD from the University of Michigan Law School.

Hitesh Mittal
Founder and CEO
BestEx Research

Hitesh Mittal is the Founder and CEO of BestEx Research, a financial technology firm specializing in high-performance trading algorithms that reduce transaction costs and improve customer returns. He has been an active market microstructure researcher and practitioner for over 20 years, utilizing his market structure and computer science expertise to reduce the trading costs of institutional managers. Before starting BestEx Research, Hitesh was the global head of trading at AQR Capital, a renowned systematic asset manager supervising over $226 billion in investments. At AQR, Hitesh was responsible for managing trading across all asset classes; he founded AQR's advanced systematic trading group and built the firm's in-house algorithmic trading and transaction cost analysis platform, automating all FX, futures, and equity trading. Prior to AQR, Hitesh was the global head of algorithmic trading and crossing networks at ITG. Hitesh and his team built ITG's algorithmic products from scratch and established ITG as a leader in the industry. Hitesh has an MBA in Finance from NYU and a Bachelor of Engineering in Computer Science from JNV University, India.

Larry Tabb
Director, Market Structure Research
Bloomberg, LLP

Larry Tabb is the Director of Market Structure Research at Bloomberg, LLP. Currently Larry is writing as well as managing a team developing research and insight on financial markets infrastructure, technology, regulation, trading practices and industry issues.

Prior to joining Bloomberg in June 2020, Larry was the Research Chairman of TABB Group, the financial markets' strategic advisory and research firm where he managed research and consulting for TABB Group. Mr. Tabb published on many aspects of the capital markets industry and has analyzed both US and European market structure; central clearing, credit default swaps, fixed income, equity and foreign exchange trading; financial markets trading and processing systems; analytical trading tools; cloud computing, and financial markets infrastructure.

Before founding TABB Group, Larry was vice president and founder of TowerGroup's Securities & Investments practice. Prior to joining TowerGroup, he managed business analysis for Lehman Brothers' Trading Services Division and he began his career managing various operations for the North American Investment Bank of Citibank.

Written Testimony to the SEC's Investor Advisory Committee
Larry Tabb,
Head of Market Structure Research
Bloomberg Intelligence
Investor Advisory Committee
June 10, 2021 1:00 pm

Introduction

I would like to thank Chairman Gensler, the Commissioners and the SEC Staff for inviting me to testify on this important topic, retail best execution. While I believe that while this topic has been widely publicized, and certainly at times heated, I do think that it is a topic deserving of greater attention, transparency, and insight.

What is best execution? Best execution is the process a broker goes through to find the best price for each and every client order. While the concept is clear, the implementation, transparency and process for achieving best execution is a challenge given that in May 2021, 213 billion shares were turned over via 1.3 billion trades transferring $10.9 trillion in proceeds with orders averaging only 160 shares for $8,216.

I am Larry Tabb, the head of market structure research for Bloomberg Intelligence, the research arm of Bloomberg. I have been at Bloomberg for a little over a year. I have no responsibility for sales, nor do I perform any consulting work. My only commitment is to put out thoughtful, interesting and accurate research. Our readers are the many Bloomberg terminal users who have access to our content and data. Prior to Bloomberg, I was founder and head of research and consulting of TABB Group, which I had sold via a management buyout in November 2016. TABB Group was a research and consulting company that provided financial markets research and advisory services to many firms in the industry including exchanges, dealers, institutional investors, market makers, ATSs, data providers, and industry-focused technology vendors. I was on the SEC Fixed Income Market Structure Advisory Committee, but I believe that group's term expired in March, as well as the automated trading sub-committee of the CFTC Technology Advisory Committee (TAC). I am also a member of the National Organization of Investment Professionals, the Market Monitoring Group of the Institute of International Finance, and an advisory group member of the Digital Dollar Project.

At Bloomberg, I have written extensively on retail execution and have been able to compile hard to assemble data including, but not limited to, SEC-mandated 605 and 606 reports which detail retail execution quality and payment for order flow data that I do not believe can be found in aggregated form anywhere else. Some of that data will be used in this testimony.

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The Retail Execution Process

When an online or mobile-based investor decides to trade a U.S. equity, their order goes through their broker, who generally does not send it to an exchange or alternative trading system (ATS), it is shipped to one of a half dozen equity market makers. These market makers are typically called retail wholesalers. The wholesalers for the most part, internalize equity orders (options orders are executed on exchange), at a price at or better than the best prices displayed to the market, as defined by SEC Regulation National Market Structure (Reg. NMS).

Retail order flow is significant. Bloomberg estimates that the order flow driven by retail investors comprised approximately 24% of total U.S. equity shares traded (see Exhibit 1). The majority of this flow is sent to six wholesalers: Citadel Securities, Virtu Financial, G1 Execution (a division of Susquehanna International Group), Two Sigma Securities, UBS, and Jane Street Capital (see Exhibit 2). The one-sided flow (just the customer side of the orders) represented on these wholesalers' 605 Reports equaled approximately 24.3% of total U.S Equity order flow from January through April 2021 at a time when the total amount of flow traded over the counter averaged approximately 45% (See Exhibit 3). This is historically high.

Exhibit 1

Retail Investor U.S. Equity Percentage of Market

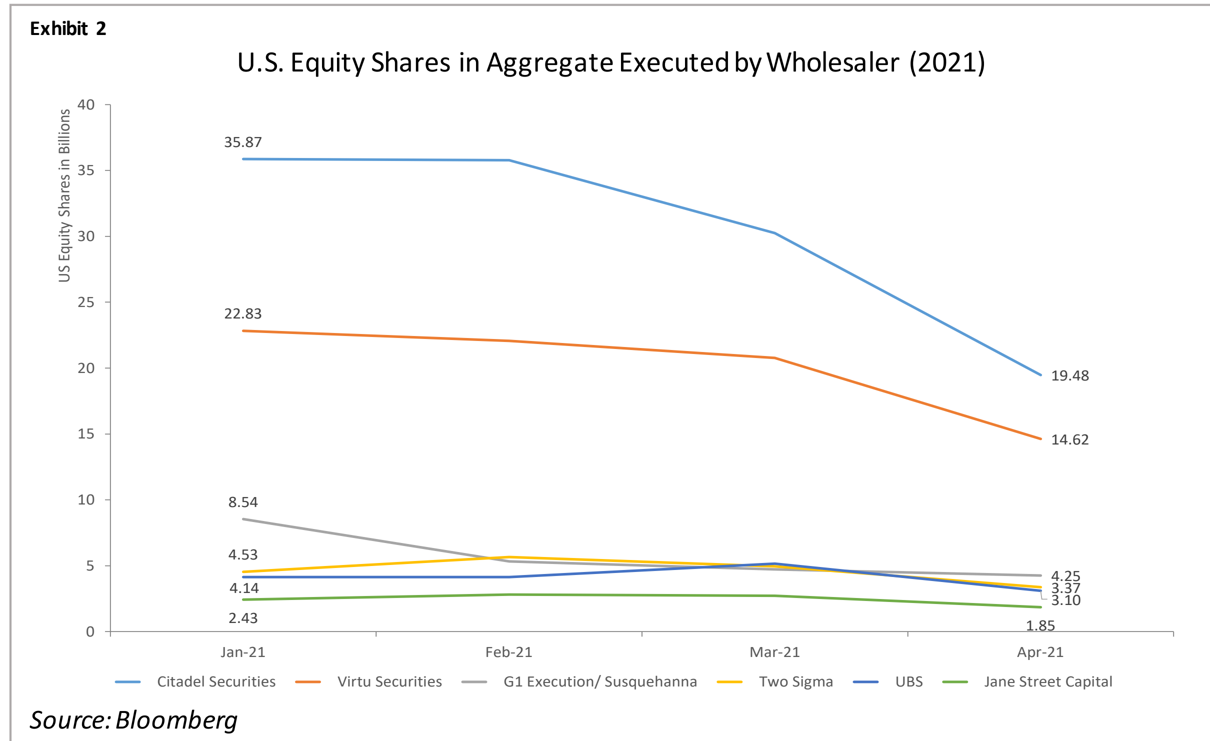
Source: Bloomberg Estimate

The online/mobile retail brokerage order flow is sent to wholesalers in return for payment, called payment for order flow, or PFOF.

There have been many questions if these order flow payments create incentives to retail brokers to stimulate inappropriate trading activities and if the processes of paying for order flow compromises brokers' best execution obligations.

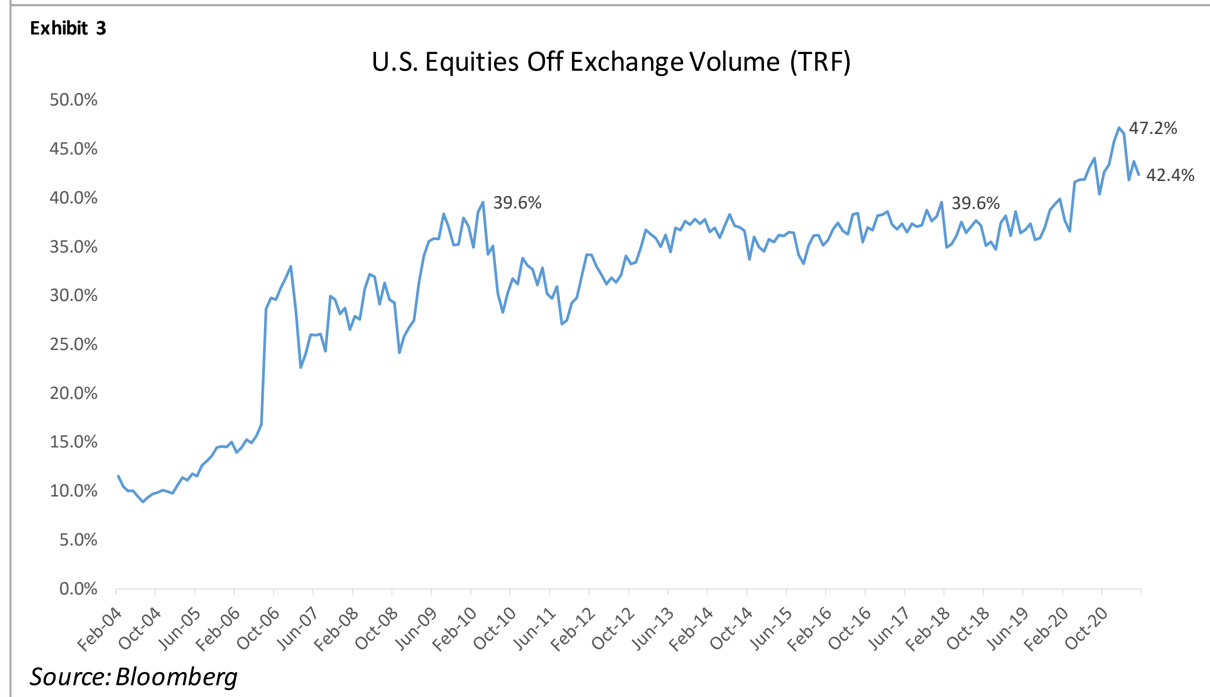
I cannot answer these questions, however I can provide the Commission with information about the execution process, the services provided by these payments and best execution data represented in

Exhibit 2



Source: Bloomberg

Exhibit 3



Source: Bloomberg

firms best execution / 605 reports and some recommendations for enhancing best execution as well as improving enhanced transparency on this process.

Why Route To Wholesalers

The U.S. Equity marketplace is complex. There are 16 regulated equity exchanges, 32 regulated ATSs or dark pools, and up to 223 brokers/market makers (as documented by FINRA), that internalize order flow. So there are up to 271 venues (since Oct 2019) to find the other side of a U.S. equity trade.

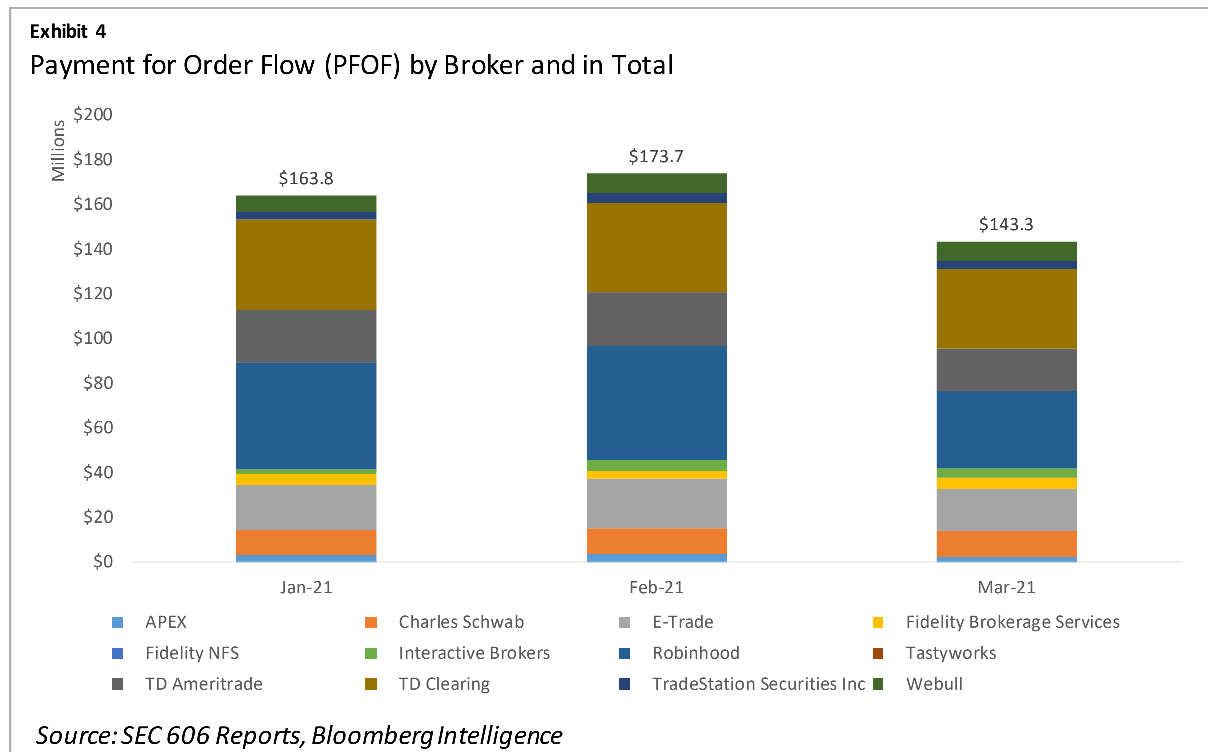
While there are many venues, creating a world class trading desk, is expensive. Besides technology, connectivity, analytics, market data, and traders, extensive infrastructure is needed as only a handful of brokers have meaningful U.S. equity market share.

The benefits of routing order flow to the largest wholesalers, six of which are included in this handful of meaningful execution firms, allow retail brokers to put these firms into competition to provide best execution (as well as order flow payments). If one wholesaler performs poorly, it is easy to reroute to another. This competition reduces the investments needed to build out a competitive trading floor and take these largest technology-enabled traders on, head to head.

To compete for this retail flow, wholesalers provide two major benefits: broker payments (PFOF) and client price improvement. Equity PFOF for the first quarter 2021 to the largest online brokers was $481 million (see Exhibit 4). Price improvement by the six largest market makers (which includes more firms than listed above), for the first quarter amounted to almost $1.2 billion (see Exhibit 5). While the sample set from these two analyses are not consistent, the amount of price improvement to investors represented in SEC 605 Reports substantially exceeds the amount paid to retail brokers the PFOF displayed by SEC 606 Reports.

Exhibit 4

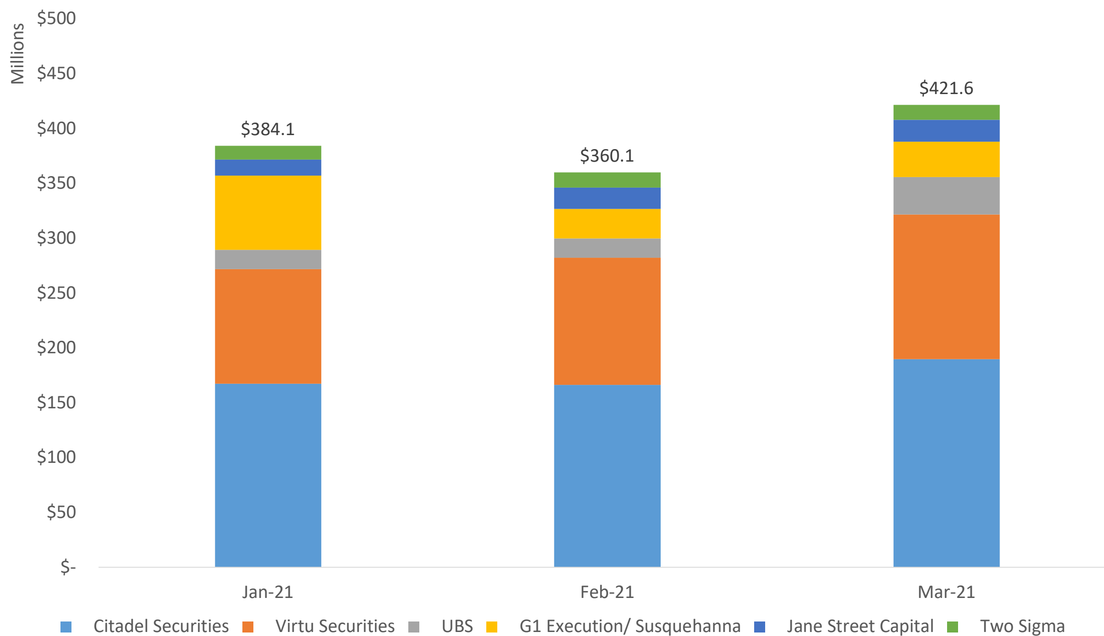
Payment for Order Flow (PFOF) by Broker and in Total



Source: SEC 606 Reports, Bloomberg Intelligence

Exhibit 5

Price Improvement From Largest Retail Wholesalers



Source: SEC 605 Reports, Bloomberg Intelligence

Retail brokers don't compete in the execution space, as having a trading desk is also a conflict, as a poor build-out or hiring the wrong staff can be a very costly. In addition, why compete when you can pit the most sophisticated traders to provide best execution for your clients?

In addition to obtaining better than market execution quality, retail brokers also get the most sophisticated market makers to represent their clients' orders, have these firms guarantee execution quality, and if something goes awry, like the 2010 Flash Crash, the wholesalers make good on executed orders and compensate investors for market-based problems. This would not occur if brokers routed their orders directly to the market as exchanges have liability caps and fair access rules prohibit differentiated client service.

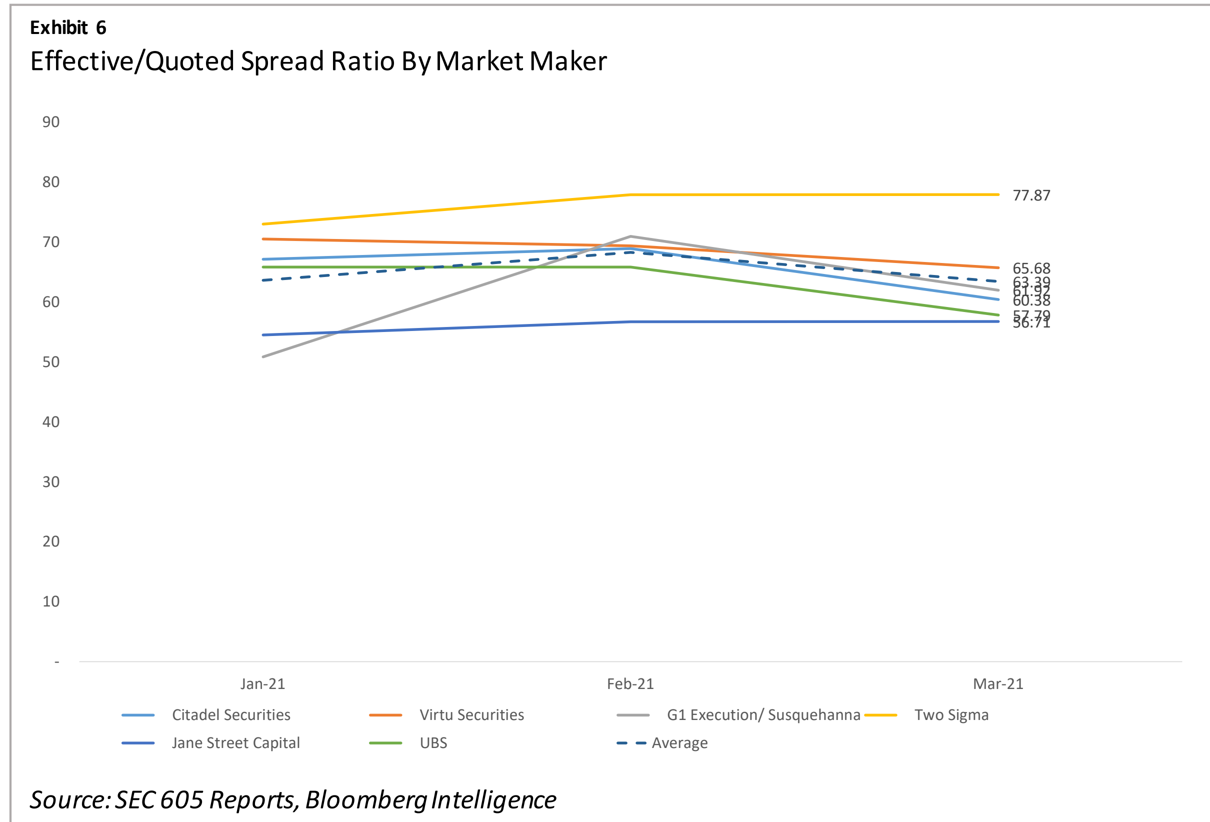
Order flow payments also enable brokers to waive retail brokerage commissions and while the $4.99 commission level that was popular before execution fees were eliminated was historically low, free is certainly less expensive than $4.99 a trade.

One may argue that the spread paid is a type of commission, as it is a trading cost. Many retail brokers use E/Q (effective/quoted spread) to measure execution quality. The average E/Q for March 2021 was 63.39% (see Exhibit 6). This means that the market maker captured 63.39% of ½ the spread with the inverse (36.61%) going to the retail investor. Given a penny spread, the market maker would capture 0.317 cent while the investor would benefit by 0.183 cent. In addition, of the 0.317 cent the market maker captures, approximately 0.15 cent is paid to the broker (in PFOF), leaving the market maker a net

capture of 0.167 cent or a little less than what is provided to the client in improved execution costs (see Exhibit 7).

Exhibit 6

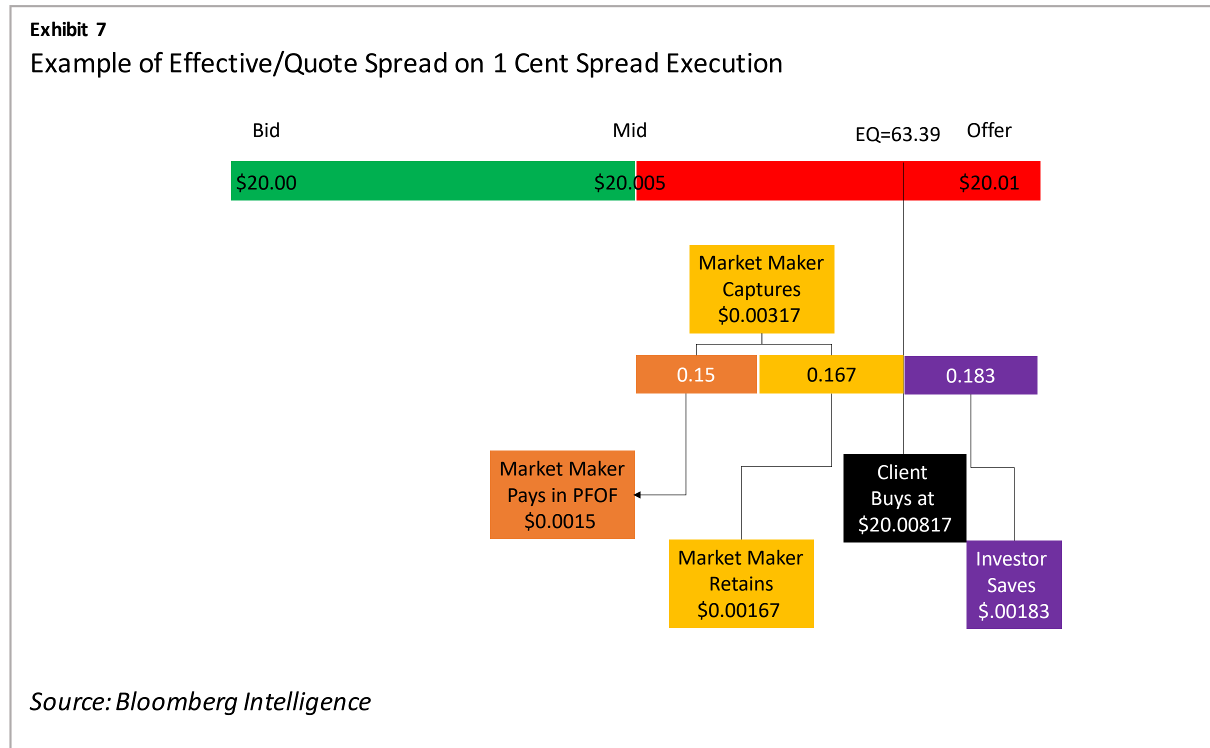
Effective/Quoted Spread Ratio By Market Maker



Source: SEC 605 Reports, Bloomberg Intelligence

Exhibit 7

Example of Effective/Quote Spread on 1 Cent Spread Execution



Source: Bloomberg Intelligence

Why Do Self-Directed Investors Get A Better Deal?

There is a lot of misinformation on why individual investors can be price improved over the best price shown to the marketplace. This occurs because of supply and demand and order segmentation. As we learned in Intro To Economics, price is a function of supply and demand. The more demand, the higher the price and the more supply, the lower the price. The same is true for U.S. equities. Larger orders impact supply and demand more than smaller orders. Order segmentation enables market makers to segment order flow by not accepting institutional, or orders from larger-sized firms, which are more likely to push prices up or down.

If the market maker has a vetted supply of smaller than average-sized orders (at the parent level), there is less likelihood that interacting with these orders will be detrimental. Conversely, the posted prices on exchanges need to be wider, given the other side of the trade may be for a market-moving order, or an algorithmic generated stream of smaller orders that will push prices up or down.

The price displayed to the market represents a party willing to interact with a supply of more market-impactful orders and needs to be wider to take into consideration these orders.

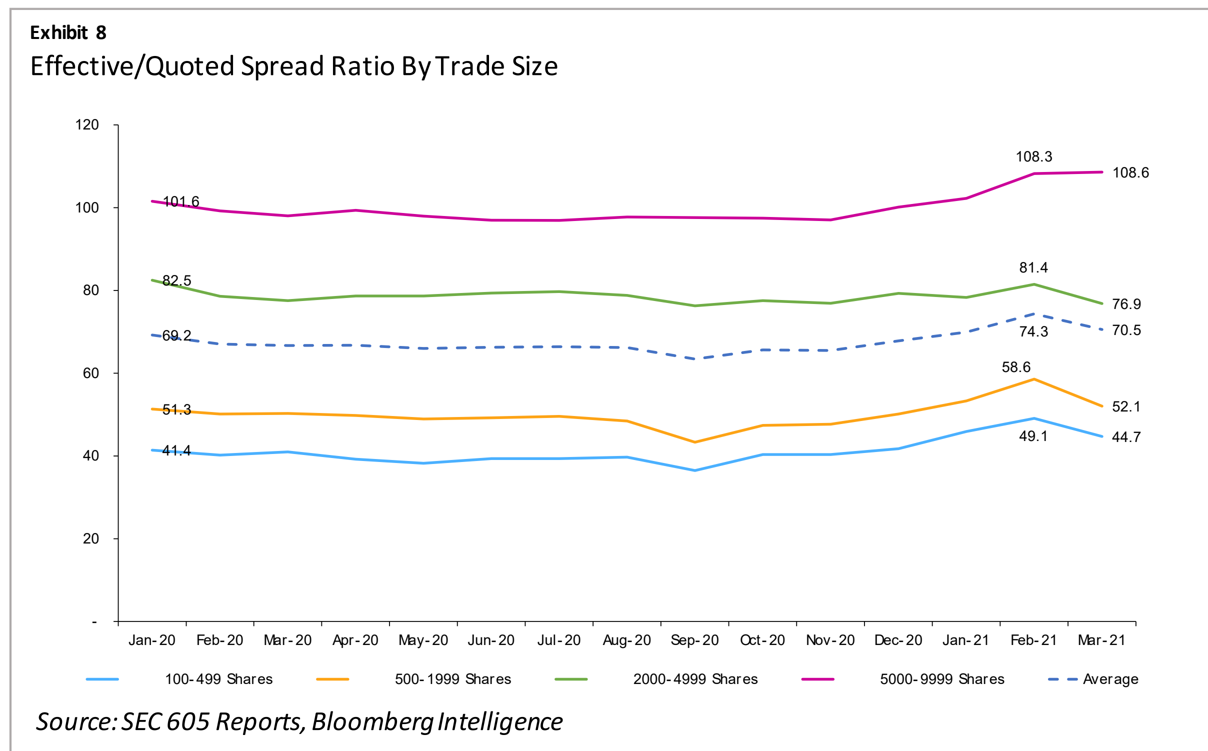


Exhibit 8

Effective/Quoted Spread Ratio By Trade Size

Source: SEC 605 Reports, Bloomberg Intelligence

The impact of order size on execution quality can be demonstrated by analyzing E/Q statistics by order size, which is a component of SEC 605 Reports. For the four largest retail market makers, the best (smallest) E/Q was for the smaller order sizes, followed by each subsequent order size cohort, until the largest tier size 5,000 to 9,999 shares, which averaged an E/Q over 100, which signifies that it was executed at, or outside (over 100) the spread (see Exhibit 8).

Eliminating the segmentation of smaller orders would push more retail orders into the market of institutional-sized orders, most likely giving them worse pricing. That said, this is my perspective and given measuring the amount of hidden liquidity in the market, or contingent liquidity that would appear if more retail orders would hit the market, is challenging at best and generally not possible, a major change of this sort could create unintended consequences.

The impact of bringing more retail flow onto the market causing spreads to improve is a valid theory, but does not take into consideration who would be trading against that flow. Would it be pension plans or asset managers, or would it be trading houses and hedge funds who have invested in highly sophisticated trading technology

In either case, moving retail volume onto exchanges would be a transfer of wealth from self-directed and mostly less well-equipped individual investors to more well-equipped institutional investors, hedge funds and trading houses.

This is a policy decision that the SEC must contemplate.

Is This The Perfect Market?

While I have argued that the current process benefits individuals, retail brokers and market makers, is this the best market structure?

No.

Should We Have A Segmented Market?

While a unified market, in theory, obtains the best price for everyone as a whole, is a single price for all fair? Should the largest investors, spending the most on research, hiring the best skilled traders equipped with the most cutting edge tools, and courted by the sophisticated institutional brokers get the benefit of trading against the smallest, least equipped self-directed investors without a sophisticated partner to represent their orders? Who represents the self-directed trader, trading over a Wi-Fi connection or a mobile device?

De-segmenting the market would also mean getting rid of multiple exchanges, ATS, internalization and possibly block trades as well, as these are segmentation strategies. If we move in this direction, it would be a significant shift in market structure and regulatory policy.

Should We Ban PFOF?

Order flow payments do create incentives for brokers to stimulate trading. That said, so do commissions. When I started in the business (1980), a retail trade cost $200 a side or $400 per round trip. Before you bought or sold, you really needed to be committed to that trade. As commissions declined, opportunities and trading increased. Our current zero commission environment has just been a continuation of this 40-year trend and we shouldn't be surprised when a broker begins offering clients payments to trade. Exchanges already do this through rebates.

Banning PFOF would create complications. Given self-directed retail orders have less market impact and better economics, they are valuable. If PFOF were to be banned, another mechanism would be developed to harvest these economics, with differing abilities to align economic value back to the self-directed investor. Exchanges are allowed to rebate for order flow and these rebate rules align to both marketable and non-marketable orders. Retail brokers could just send non-marketable orders to traditional markets, and marketable orders to inverted markets, clipping rebates of 15 to over 30 cents per 100 shares for both types of orders. This is much more than brokers receive through standard PFOF agreements. The brokers, however, would then capture all of the rebates, leaving investors without protection from being picked off, and most likely in a worse place.

Another model could entail packaging execution into a service, as a large market maker could package its routing software services, and provide the full economics back to the investor, while charging the broker for the service. This would most likely end with higher retail commissions, however a profit sharing agreement may fall within the guidelines.

Last but not least, if order flow payments were banned there could be non-transparent ways of securing order flow outside of regulators and investors' view.

Should We Look to Foreign Markets?

A number of market participants point toward Canada and Europe, where order-flow payments are banned. While obtaining valid retail data in other markets is hard, remember Canada has broker

preferencing, which allows the broker to cut the execution queue to match one of their own retail orders. Europe is another challenging corollary given the lack of a retail investor user base. Many retail investors, especially in the U.K., use derivatives and spread betting to invest, as the U.K. stamp tax and European transaction taxes hinder retail trading.

Recommendations

Improve transparency.

We should start with better execution and order flow payment reporting as there are a number of transparency gaps the agency could fix that may not change the process but would provide greater insight and understanding.

Update 605 Reports.

SEC 605 reports have time increment buckets reflecting human scale. The timeliest bucket is 1 to 9 seconds. Most orders are executed within milliseconds if not microseconds. Reduce the time frames of these buckets. This will allow brokers to see how expeditiously their orders are being executed and benchmarked.

Price improvement is generated by market makers, not by brokers. Given different brokers have different arrangements with market makers as some firms like Fidelity and Interactive Brokers don't accept equity payments while others do, providing insight on the price improvement by retail brokers would let investors see how well their brokers execute on their behalf.

Odd lots are also not included in the 605 reports as all orders under 100 shares are dropped. Given that odd lots for some stock pricing tiers is upwards of 50%, and no odd lot information hits the 605 reports, we don't know if odd lots are being price improved or if they are being used to improve market maker profitability. Better reporting would shine a light on this area.

Improve Client Reporting

In a no-commission world, the spread is the fee. However, we don't have any reporting on spreads. We could mandate that brokers/market makers snap the NBBO and the midpoint price and quantify this gap to show investors their spread cost. This would highlight how much investors actually paid for execution.

Improve Data Timeliness

Timeliness of the benchmark could be improved. Currently, the SIP is used to benchmark execution. Improving the timeliness of the SIP would tighten the benchmark. This, however. isn't a major issue, given retail self-directed investors are mostly using internet-based data and execution mechanisms, so the price they are personally benchmarking to would most likely not be improved by using a direct feed, if execution quality is measured by what the investor sees at the time of order submission.

Odd Lots

While the SEC has a proposal on adding odd lots to the tape, the final version isn't clear. Moving the round lot barrier to $250 means there will be fewer odd lots that make it to a retail investors' market data screen. This hides more aggressively priced odd lots from retail investors. While the SEC mandated that all odd lots become part of Level 1 data, this definition is murky. Does it mean that sub $250 priced odd lots need to be displayed to investors or not? If they do, then there is a greater chance that market makers will not take advantage of this opaqueness. In addition if SEC 605 reports included odd-lots we could see as a cohort how well these trades were being priced.

Tighten Spreads

One of the barriers costing investors is the SEC mandate for penny spreads. While spreads are increasingly widening as stock prices rise, for actively traded lower priced shares the 1-cent barrier

keeps spreads for these stocks abnormally wide. It may be worthwhile to reduce the penny spread mandate to a tenth (0.001) or a fifth (0.002) of a cent. There is also the corollary that less liquid stocks with wider spreads may need larger minimums. Nasdaq proposed flexible tick sizes. The SEC should investigate this.

Make Best Execution Demonstrable

The way that we report best execution is antiquated. Retail investors use the SEC 605 Reports. While these reports are somewhat adequate (see above), they mostly look at market and marketable orders. They don't look at limit orders. In addition, a number of markets, most identifiably Europe, have moved toward demonstrating best execution instead of just a de facto mandate. It may be time to push brokers, and not just retail brokers, toward a more demonstrable best execution framework that forces brokers to show investors how they satisfied their best execution mandates.

Conclusion

While there is much controversy about retail execution, the experience for retail investors isn't bad. They are between 20 and 25% of the market and retail self-directed trading has grown approximately 25% since commissions have gone to zero and the pandemic has quarantined many at home. Do we expect volumes to remain heightened? Probably not, as we are seeing the level of OTC trading decline as the economy gets back on track. That said, with zero commissions, we do expect retail volumes to remain above 20% of the market.

The payment for order flow, price improvement, internalization process, isn't pristine and certainly has conflicts. That said, most selling processes are conflicted – look no further than a grocery store accepting shelf-space payments for items placed at eye level, or Google putting ads at the top of query responses. We need to quantify the impact of firms' best execution policies so investors, their broker and the regulators can make the appropriate decisions.

It would be beneficial for all if the exchange / displayed market was more conducive and less toxic to all orders, including retail. The increasing democratization of the market and lower trading friction is to blame for allowing larger and more technology-abled investors to get in and out with less intermediation and lower cost. Is this a bad thing? Probably not.

To fix this challenge, the first question we need to ask is; do we want to create a market for all? This would mean one market where all orders interact. While theoretically sound, we had this type of market before, and the operators of those markets did not evolve with the times. This is why the SEC wrote Reg. NMS.

If after consideration we decided to unify the market, it would be very impactful. Given what is good for retail would be good for institutions, moving to a unified market would require closing most exchanges, 32 ATS, and eliminating the ability of brokers to internalize flow, including block trades. This is a very drastic step.

We could ban order flow payments, but we would need to do this carefully as well, so other economic structures wouldn't develop that provide similar macro-economic benefits but may harm various cohorts (brokers or investors).

In my opinion the best option would be to make the markets more efficient and transparent, and let market forces work. If spreads could be reduced, odd lots added, executions benchmarked, greater transparency, and better reporting provided, it would allow investors and their brokers to make better decisions. It would also provide academics, market structure analysts, and regulators with better and more accurate information to ascertain what is truly happening with customer orders.

Better data and a more efficient market should push more flow toward lit markets and provide greater insight into how orders are managed. These types of changes would certainly be much less impactful to market structure causing less drastic and less unintended change to a market that works very well for the vast majority of individual and institutional investors.

I would like to thank the Chairman, Commissioners and the SEC staff for giving me this opportunity to share my ideas about how to make the U.S. Equity markets better for not just self-directed retail investors but all.

Thank you.

Sincerely

Larry Tabb,
Head of Market Structure Research,
Bloomberg Intelligence
Bloomberg, LLP

PANELIST BIOGRAPHIES

Panel Discussion Regarding 10b5-1 Plans

SEC Investor Advisory Committee | June 10, 2021 Meeting

Moderator:

Cambria Allen-Ratzlaff
Corporate Governance Director
UAW Retiree Medical Benefits Trust

Cambria Allen-Ratzlaff is Corporate Governance Director of the $61 billion UAW Retiree Medical Benefits Trust, the largest non-governmental purchaser of retiree health care benefits in the United States. Cambria's responsibilities at the Trust include engagement strategy development and execution, and oversight and implementation of the Trust's global proxy voting compliance program.

Cambria's areas of expertise span a wide range of topical areas, including board structure and accountability, executive compensation incentives and alignment, governance risk management and mitigation, shareholder rights, the role of transparency and accountability in ensuring efficacy and efficiency in the capital markets, and the relationship between U.S. and global public policy choices and long-term value creation. Since 2013, Cambria has led the Human Capital Management Coalition, a cooperative effort among a group of 35 institutional investors representing over $6.6 trillion in assets to elevate effective human capital management as a critical driver of long-term shareholder value. The Coalition is currently co-chaired by Cambria and Mary Morris, Investment Officer at the California State Teachers' Retirement System.

Cambria is Vice Chair of the Investor as Owner Subcommittee of the U.S. Securities and Exchange Commission's Investor Advisory Committee, and a member of the National Association of Corporate Directors and the Detroit Chapter of the Society for Corporate Governance. In 2016, Cambria was named a Rising Star of Corporate Governance by the Millstein Center for Global Markets and Corporate Ownership at Columbia Law School. Cambria previously served as an Officer on the Council of Institutional Investors board of directors.

Cambria joined the Trust in 2011 after serving as Senior Corporate Governance Analyst for the Office of Connecticut State Treasurer Denise L. Nappier and an Analyst for the Council of Institutional Investors. Cambria received her A.B. in Political Science from Bryn Mawr College in Bryn Mawr, Pennsylvania and her M.A. in Public Policy from Trinity College in Hartford, Connecticut.

PANELIST BIOGRAPHIES

Panelists

Keir D. Gumbs
Vice President, Deputy General Counsel, and Deputy Corporate Secretary
Uber Technologies, Inc.

As Vice President, Deputy General Counsel, and Deputy Corporate Secretary, Keir leads a team of professionals who support Uber's executive leadership team in partnership with Uber's business in the areas of Payments, M&A, Finance, Real Estate and Commercial Transactions, Corporate Governance, Marketing, ESG, Capital Markets and related matters. Keir is responsible for overseeing Uber's group-wide corporate governance practices and supporting Uber's board of directors.

Prior to Uber, Keir was a Partner for nearly a decade at Covington & Burling, where he represented a cross-section of constituencies in securities and governance matters, including companies ranging in size from Fortune 50 companies to venture-backed firms, as well as public pension funds, hedge funds, faith-based investors and trade associations.

Keir's career includes six years of service with the SEC, where, immediately prior to joining Covington & Burling in 2005, he served as Counsel to SEC Commissioner Roel C. Campos. In that position, Keir advised the Commissioner on a variety of matters arising under federal securities law with an emphasis on corporate finance issues under the Securities Act of 1933, issuer reporting obligations under the Securities Exchange Act of 1934, corporate governance developments and SEC enforcement actions. Prior to serving as Counsel to Commissioner Campos, Keir spent five years as a staff attorney and later a Special Counsel in the Office of Chief Counsel in the SEC's Division of Corporation Finance.

Jeff Mahoney
General Counsel
Council of Institutional Investors

Jeffrey P. Mahoney joined the Council of Institutional Investors as general counsel in 2006. His responsibilities include advocating the Council's membership-approved policies before standard setters, regulators, members of Congress, and other policy makers.

Prior to joining the Council, Mahoney was counsel to the chairman of the Financial Accounting Standards Board. From 1996-2006, he advised FASB and its parent entity, the Financial Accounting Foundation, on a variety of research, technical and administrative matters, and was primarily responsible for FASB's Washington, D.C. liaison activities. Prior to joining FASB, Mahoney was a corporate securities lawyer at Morgan, Lewis & Bockius LLP; a law clerk to the Honorable James G. Exum Jr., chief justice of the North Carolina Supreme Court; and an auditor at Arthur Andersen LLP.

Mahoney holds a J.D. degree, served on the North Carolina Law Review, and was named to the Order of the Coif. He also holds a B.B.A. degree and an A.A. degree. Mahoney is a member of the District of Columbia and North Carolina Bar Associations and is admitted and qualified to practice before the U.S. Court of Appeals for the Seventh Circuit. He also is a certified public accountant in North Carolina and Michigan, a member of the American Institute of Certified Public Accountants, and a Chartered Global Management Accountant.

Panelist Biographies

Daniel Taylor, PhD
Associate Professor; Arthur Andersen Chair, and
Director, Wharton Forensic Analytics Lab
The Wharton School
University of Pennsylvania

A tenured professor at The Wharton School, Dr. Taylor is an award-winning researcher and teacher with extensive expertise on issues related to corporate transparency, accounting fraud, insider trading, and corporate governance. A world-renown scholar, Professor Taylor leads the Wharton Forensic Analytics Lab; has written more than 20 articles published in leading academic journals in accounting, finance, and management; led seminars at dozens of top business schools across the globe; and won numerous academic and industry awards. His research frequently appears in the business media; has been cited in rules and regulations promulgated by the Securities and Exchange Commission; and has been instrumental in multiple investigations by the SEC, FBI, Treasury, and Department of Justice. Professor Taylor received his bachelor's degree from University of Delaware, his master's from Duke University, and his PhD from Stanford University.