

**UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
SHERMAN DIVISION**

Jonathan Corrente, Charles Shaw, and Leo
Williams, each individually and on behalf of
all others similarly situated,

Plaintiffs,

v.

The Charles Schwab Corporation,

Defendant.

Case No. 4:22-cv-470

ANALYSIS OF PROPOSED
SETTLEMENT

Declaration of Hal J. Singer, Ph.D. and
Ted P. Tatos, MS, PStat

July 17, 2025

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I. INTRODUCTION AND ASSIGNMENT

1. This report relates to the *Corrente et al. v. Charles Schwab* class action litigation (“*Corrente*”). In *Corrente*, Plaintiffs alleged that Charles Schwab’s (“Schwab”) acquisition of rival brokerage TD Ameritrade (“TDA”) increased Schwab’s selling power over its customers in the retail order flow market (“ROFM”). Schwab closed its acquisition of TDA in late 2020 and consummated the transaction in September 2023. During that period, Schwab moved millions of customers from TDA onto its own platform.¹ We understand integration of TDA’s platform was completed during 2023. Plaintiffs alleged that Schwab’s increased share of ROFM customers allowed it to leverage its increased market power by limiting the pass-through of payment for order flow (“PFOF”) from wholesalers (a.k.a., market makers or liquidity providers) like Citadel or Virtu to retail customers (a.k.a., retailer traders) in the form of reduced trading costs (rebates, price improvement, or liquidity improvement). For ease of reference, this report refers to Schwab’s wholesale trading partners as market makers and to Schwab’s retail trading customers as retail customers.

2. We understand that the parties in *Corrente* have entered into a Stipulation and Agreement of Settlement (the “Stipulation of Settlement”), whereby Schwab has agreed to create and implement an antitrust compliance program to address Plaintiffs’ concerns regarding the now combined TDA and Schwab investment trading platform. The Stipulation of Settlement explains that the parties have agreed to engage a team of attorneys from Fried, Frank, Harris, Shriver and Jacobson, LLP (the “Consultant”) to design such a program. Plaintiffs’ counsel has asked us to review and provide an opinion regarding the extent to which the proposed antitrust compliance program (the “Compliance Program”) will reasonably benefit Schwab’s retail customers in the form of reduced trading costs.

3. Section 2.2 of the Stipulation of Settlement addresses the contemplated injunctive relief, *i.e.*, antitrust guardrails meant to promote competition and safeguard against anticompetitive conduct. Subsection (c) points i-iv detail the attributes of the proposed Compliance Program most relevant to our analysis. Specifically, these points permit the Consultant to access and review, the following:

- i. Policies, practices, and procedures related to Schwab’s communications with and among market makers and other broker-dealers;
- ii. Policies, practices, and procedures related to Schwab’s order routing and execution, including those pertaining to Schwab’s order routing allocations and price improvement as provided by market makers to Schwab’s retail customers who trade equities and options;
- iii. Policies, practices, and procedures applicable to Schwab’s order routing committees and decisionmakers, including as to communications and coordination with market makers and other broker-dealers; and
- iv. Schwab’s post-merger disclosures, reporting, statements, and other communications with retail clients regarding transaction-related price improvement and order routing that may promote inter-brand competition among broker-dealers.²

1. Gordon Gottsegen, *Schwab got millions of new customers by buying TD Ameritrade — now what?*, MARKET WATCH, July 17, 2024, available at <https://www.marketwatch.com/story/schwab-got-millions-of-new-customers-by-buying-td-ameritrade-now-what-ca066ad4>.

2. Stipulation and Agreement of Settlement (the “Stipulation of Settlement”) Sec. 2.2 (c).

4. We understand that Consultant's recommendations will occur after the effective date of the Stipulation of Settlement, and, as of the writing of this report, neither Schwab nor Consultant have finalized the specific details of points i-iv above. As a result, we base our findings and opinions on reasonable inferences of the final provisions of the proposed Compliance Program. Economic theory, quantitative analysis, and the relevant literature all inform the opinions contained herein. To the extent that the finalized provisions of the Compliance Programs diverge substantively and materially from the assumptions that constitute the basis of the findings in this report, we anticipate that the effects of the Compliance Program on trading costs will also differ.

5. We understand that the parties in this matter, while each maintaining its respective positions in the *Corrente* litigation, intend this Compliance Program to function as a prospective and thus prophylactic measure with regard to potentially anticompetitive conduct, even if unintentionally so. As such, this report's mandate seeks not to weigh each side's position but rather to evaluate the Compliance Program's effectiveness in protecting competition in the future. As detailed subsequently below, this report envisions cognizable efficiencies arising out of the merger between Schwab and TDA in the form of price improvement to retail customers—that is, lower trading costs. We evaluate the extent to which the Compliance Program protects the ability of such efficiencies to manifest themselves unimpeded.

6. The difference between trading costs that Schwab customers would receive with and without the implementation of the Compliance Program is a measure of the benefits that will reasonably accrue to retail trading customers because of the Stipulation of Settlement. The status quo functions as a reasonable proxy for retail consumer trading costs absent the Compliance Program. To evaluate the counterfactual in which Schwab implements such a program, this report considers an alternative scenario in which the Compliance Program motivates Schwab to adopt certain changes in business practices relating to, *inter alia*, Schwab's interaction with market makers who provide PFOF, as contemplated by Sec. 2.2(c) of the Stipulation of Settlement, with a focus on the types of communication between Schwab and the market makers. This report offers several proposals for consideration, none of which should be interpreted as a *sine qua non* for the success of the Compliance Program, but rather as possible preventative measures with respect to anticompetitive conduct.

II. EXPERT QUALIFICATIONS

A. Hal Singer, Ph.D.

7. I am a Managing Director at Econ One Research and a Career-Line Professor at the University of Utah College of Social and Behavioral Science, where I teach Economics and the Law to undergraduate economic students and law students. I am also the director of an inter-disciplinary institute at the University of Utah, named the Utah Project, that straddles the law school and the economics department and is dedicated to the study of antitrust and consumer protection law and policy. I received my undergraduate degree from Tulane University and my PhD in Economics from Johns Hopkins University.

8. I am an applied microeconomist with an emphasis on industrial organization and regulation. In an academic capacity, I have published several books and book chapters, spanning a range of industries and topics, and my articles have appeared in dozens of legal and economic journals. My competition-related articles have appeared in multiple American Bar Association (ABA) Antitrust Section journals, and I have been a panelist at several ABA Antitrust events. In a

consulting capacity, I have been nominated for antitrust practitioner of the year among economists in 2013 by the American Antitrust Institute (AAI) for my work in *Tennis Channel v. Comcast*, and AAI named me as co-Honoree in the same category in 2018 for my work in *In re Lidoderm Antitrust Litigation*, and again in 2023 for my work in *Cung Le et al. v. Zuffa d/b/a Ultimate Fighting Championship*.

9. I have testified as an economic expert in state and federal courts, as well as before regulatory agencies. I also have testified before the House Judiciary Subcommittee on Antitrust and the Senate Judiciary Subcommittee on Competition Policy, Antitrust, and Consumer Rights on the interplay between antitrust and sector-specific regulation. Federal courts have relied on my models of common impact in certifying nine classes in antitrust matters,³ and five classes in consumer protection matters.⁴

10. In addition to antitrust and regulatory matters, I also have significant experience in finance. For example, I served as a senior economist at the Securities and Exchange Commission, I have taught financial economics to undergraduates at both Georgetown and Johns Hopkins University, and I have published articles in the *Journal of Business and Finance* and the *Journal of Financial Transformation*. I also served as an economic expert for a class of investors in *In re Foreign Exchange Antitrust Litigation*. In addition, I served as the expert for the Plaintiff class in *In re GSE Bonds Antitrust Litigation*,⁵ and *In re London Silver Fixing, Ltd., Antitrust Litigation*.⁶

B. Ted Tatos, MS, PStat

11. I am an affiliated Consultant to the Firm at Econ One Research and the Director of Empirical Analytics. I taught graduate-level econometrics at the University of Utah as an adjunct professor and am currently the Associate Economics Editor at the Antitrust Bulletin, a Sage journal that originated in 1955 and covers antitrust law and economics and industrial organization. I obtained my undergraduate degree in economics from Duke University and my masters' degree in statistics with a focus in econometrics from the University of Utah. I also hold a Professional Statistician certification from the American Statistical Association.

3. *Meijer, Inc. v. Abbott Laboratories*, No. C 07-5985 CW, 2008 WL 4065839 (N.D. Cal. Aug. 27, 2008) (granting Plaintiffs' Motion for Class Certification); *Natchitoches Parish Hosp. Serv. Dist. v. Tyco Int'l, Ltd.*, 262 F.R.D. 58 (D. Mass. 2008) (granting Motion to Certify Class); *Se. Missouri Hosp. v. C.R. Bard, Inc.*, No. 1:07cv0031 TCM, 2008 WL 4372741 (E.D. Mo. Sept. 22, 2008) (granting in part Motion for Class Certification); *Johnson v. Arizona Hosp. & Healthcare Ass'n*, No. CV 07-1292-PHX-SRB, 2009 WL 5031334 (D. Ariz. July 14, 2009) (granting in part Motion for Class Certification); *In re Delta/AirTran Baggage Fee Antitrust Litig.*, 317 F.R.D. 675 (N.D. Ga. 2016) (granting Motion to Certify Class); *In re Lidoderm Antitrust Litig.*, No. 12-md-02521-WHO, 2017 WL 679367 (N.D. Cal. Feb. 21, 2017) (granting Motions for Class Certifications); *In re Pork Antitrust Litig.*, No. CV 18-1776 (JRT/JFD), 2023 WL 2696497 (D. Minn. Mar. 29, 2023) (granting Motion to Certify Class); *Le v. Zuffa, LLC*, No. 2:15-cv-01045-RFB-BNW, 2023 WL 5085064 (D. Nev. Aug. 9, 2023) (granting in part Motion to Certify Class). <Add Invisalign.>

4. *In re: MacBook Keyboard Litig.*, No. 5:18-cv-02813-EJD, 2021 WL 1250378 (N.D. Cal., Apr. 5, 2021) (granting Motion to Certify Class); *In re JUUL Labs, Inc., Mktg. Sales Pracs. & Prod. Liab. Litig.*, 609 F. Supp. 3d 942 (N.D. Cal. 2022) (granting Motion For Class Certification); *In re Univ. of S. California Tuition & Fees COVID-19 Refund Litig.*, No. CV 20-4066-DMG (PVCx), 2023 WL 6453814 (C.D. Cal. Sept. 29, 2023) (granting motion to certify a class); *In re Pepperdine Univ. Tuition & Fees Covid-19 Refund Litig.*, No. CV 20-4928-DMG (KSX), 2023 WL 6373845 (C.D. Cal. Sept. 26, 2023) (granting motion to certify a class). <Add LSU.>

5. *In re GSE Bonds Antitrust Litigation*, Case No. 1:19-cv-01704 (JSR).

6. *In re London Silver Fixing, Ltd., Antitrust Litigation*, Case No. 1:14-F-02573.

12. I have testified as an economic expert in state and federal courts, as well as before administrative law judges. I have over twenty-five years of experience in economic, statistical, and econometric analysis for both public and private sector clients. Prior to my positions at EconONE Research and Empirical Analytics, I was a consultant with North Harvard Group, an information technology and strategy consulting firm. Before that time, I was employed as a Managing Economist with the global expert services firm of LECG in the Washington, D.C. and Salt Lake City, UT offices.

13. I have served as both a testifying expert and a consulting expert in litigation involving financial matters. I was retained by the Securities and Exchange Commission to provide expert testimony in a matter involving alleged fraud on the market.⁷ I have also been engaged in various matters In Re Silver Price Fixing Antitrust Litigation, In Re GSE Bonds Antitrust Litigation and have provided consulting services in the copper antitrust matter involving Sumitomo. I also regularly provide valuation analyses of executive compensation plans, including contingent obligation provisions for various firms. My curriculum vitae is attached as Appendix 3 to this Report.

III. THE STATUS QUO

14. This section begins with a brief review of key issues in the *Corrente* litigation and the seminal concerns that motivated Plaintiffs' allegations.

A. Order Routing and Payment for Order Flow

15. Retail orders fall into two main categories: directed and non-directed. Directed orders occur when a retail customer who purchases or sells securities provides specific directions, such as designating a given exchange or venue, to the broker on how to execute a given order. Non-directed orders, which are the focus of the *Corrente* litigation and, by extension, this report, occur when the retail customer does not provide such directions, allowing the broker discretion over order execution.

16. Non-directed orders allow brokerages such as Schwab to trade order flow for compensation from market makers, such as Citadel, Jane Street, Virtu, and others, or PFOF. Although the compensation that brokerages receive from PFOF has permitted the rise of commission-free trading, regulators have raised concerns regarding potential conflicts of interest, such as a distortion of routing decisions.⁸ Such concerns center on the distribution of financial gain resulting from the execution of trades subject to PFOF.

17. Retail non-directed order execution at Schwab occurs as follows. A retail customer places a buy or sell order for a security. Next, Schwab may route that order to unaffiliated broker-dealers (e.g., Citadel), who serve as market makers. Prior to routing any orders to market makers, Schwab sets an identical PFOF rate (the price it sells retail order flow) with all market makers. As Schwab explains in its Form 606:

Schwab receives payment for listed equity order flow routed to market makers. For marketable orders the payment rate is \$0.001 per share or less, for non-marketable orders the

7. *Securities and Exchange Commission v. Colin McCabe (D/B/A Elite Stock Report, The Stock Profiteer, and Resource Stock Advisor)*, Civil Action No. 2:13-cv-00161

8. See Securities Act Release No. 10906, "In the Matter of Robinhood Financial, LLC" (Dec. 17, 2020), available at <https://www.sec.gov/litigation/admin/2020/33-10906.pdf>. See also, SEC Chair Gary Gensler, *Market Structure and the Retail Investor: Remarks Before the Piper Sandler Global Exchange Conference*, June 8, 2022, [hereafter, "Gensler Remarks"].

rate is \$0.0033 per share or less, and for extended hours orders the rate is \$0.0006 per share or less. All market makers pay the same rate to Schwab for any given order flow type. Schwab does not negotiate payment as a condition for sending more order flow to a market maker nor does Schwab negotiate a tradeoff between payment and price improvement/execution quality.⁹

Schwab has maintained the same policy of an identical PFOF rates across all market makers for the same products since at least second quarter of 2020, the earliest availability of Form 606 (though Schwab has increased its PFOF rate from a previous \$0.0009 or less per trade).¹⁰ Prior to its acquisition by Schwab, TDA also set equal rates from each market maker by product. The PFOF rates that TDA received prior to its acquisition by Schwab can be observed in its Form 606 filings at that time.¹¹

18. Market makers then execute those orders, often by taking the opposite side of an order, and, in doing so, market makers profit from the bid-ask spread—that is, respectively, the price the market makers pays to *purchase* a security (taking the opposite side of a seller) and the price the market maker will accept to *sell* a security (taking the opposite side of a buyer). The spreads may differ by exchange, with the best quoted market price known as the National Best Bid and Offer (“NBBO”).¹² For example, if Exchange A offers the best bid price among five exchanges at \$15.50 and Exchange B offers the best ask price of \$15.55 among those same five exchanges, the NBBO equals a \$15.50 bid and \$15.55 ask.

19. As illustrated in the example above, the NBBO aggregates order information across exchanges in an attempt to provide outcomes consistent with Section 11A of the Exchange Act, which calls for, inter alia, price transparency and best execution of investor orders.¹³ Such benefits notwithstanding, the NBOB has two important limitations with respect to pricing transparency. *First*, it only considers round lots—that is, quotes for 100 shares or more. SEC staff found that odd lots have increased from approximately 15 percent of trades in January 2015 to 55 percent of trades by

9. Charles Schwab, Held NMS Stocks and Options Order Routing Public Report, January 2025, *available at*, https://content.schwab.com/drupal_dependencies/psr/606/2025-Q1-Schwab-Quarterly-Report.pdf

10. Charles Schwab, Held NMS Stocks and Options Order Routing Public Report, 2nd Quarter 2020, *available at*, <https://public.s3.com/rule606/chas/606-CHAS-2020Q2.pdf>

11. TD Ameritrade, Inc., Held NMS Stocks and Options Order Routing Public Report, 2nd Quarter 2021, *available at*, <https://public.s3.com/rule606/tdam/606-TDA,%20Inc%20-%202021Q2.pdf>

12. Charles Schwab, Price Improvement, *available at* <https://www.schwab.com/execution-quality/price-improvement>.

13. See, e.g., SEC Division of Trading and Markets Memorandum to SEC Market Structure Advisory Committee, April 30, 2015, *available at* <https://www.sec.gov/spotlight/emsac/memo-rule-611-regulation-nms.pdf>. This letter aimed “to facilitate an assessment of Rule 611 of Regulation NMS, also known as the ‘Order Protection Rule’ or ‘Trade-through Rule.’” Discussion of the Order Protection Rule follows in this report. The letter also explains that, “A logical starting point for any discussion of the U.S. regulatory regime is Section 11A of the Exchange Act. It charges the SEC with facilitating the establishment of a national market system that promotes five objectives: (1) economically efficient execution of securities transactions, (2) fair competition among broker-dealers, among exchange markets, and between exchange markets and non-exchange markets; (3) price transparency; (4) best execution of investor orders; and (5) an opportunity, consistent with economic efficiency and best execution, for investor orders to meet without the participation of a dealer.”

March 2022.¹⁴ Internal Schwab comments [REDACTED]

[REDACTED].¹⁵ *Second*, and relatedly, no NBOB exists for odd lots. Schwab has acknowledged such shortcomings and signaled its support for including customer orders of less than 100 shares in the NBBO calculation.¹⁶

20. From revenues obtained by trading against the spread, market makers cover their own costs, which generally consist of (1) adverse selection costs—that is, trading against more informed parties such as institutional investors, (2) inventory holding costs—that is, holding shares until buyers can be found, and (3) technological costs.¹⁷ In addition to covering such costs, market makers must distribute a portion of their profits in the form of commissions to the brokerage that routed the order. Brokerages that sell their order flow to market makers report the corresponding revenues from doing so in their Form 606 filings.¹⁸ Some benefit is expected to accrue to the customer in the form of better execution quality, which takes three primary forms:¹⁹

- Liquidity improvement: Fulfilling all instead of part of the order (fill rates approximating 100 percent), even though a bid-ask spread only relates to smaller-sized orders than the customer requests.
- Execution speed improvement: Execution speed refers to the time between when the broker routes the order to the execution venue (the market maker) and when the market maker fills that order.
- Price improvement: Price improvement occurs when a customer's non-directed retail order benefits from execution at a better price than the NBBO. As noted above, the NBBO refers to the best *quoted* price from a national exchange or other trading venue. In contrast, the *effective* price refers to the actual price at which the market maker executes the order. A buyer benefits from price improvement when the market

14. Gensler Remarks. See also, SEC, Staff Report on Equity and Options Market Structure Conditions in Early 2021, October 14, 2021, note 39, (“When evaluating price improvement, it is important to note that the NBBO displayed across exchanges does not include many of the best prices available on exchanges, such as odd lots and non-displayed orders.”) Available at <https://www.sec.gov/files/staff-report-equity-options-market-struction-conditions-early-2021.pdf>.

15. [REDACTED]

16. Charles Schwab, U.S. Equity Market Structure: Order Routing Practices, Considerations, and Opportunities. Q2, 2022 [hereafter “Schwab White Paper”], at 22, available at <https://content.schwab.com/web/retail/public/about-schwab/Schwab-2022-order-routing-whitepaper.pdf>.

17. Anne Haubo Dyhrber, Andriy Shkillo, and Ingrid M. Werner, The Retail Execution Quality Landscape, Journal of Financial Economics, Vol 168, June 2025, available at <https://www.sciencedirect.com/science/article/pii/S0304405X25000595>. Market makers may have other reasons for retaining inventory such as “market making and hedging strategies, liquidity characteristics of the relevant stock, and market conditions.” See, Citadel Securities, Letter to SEC Secretary Vanessa A. Countryman Re: Order Competition Rule (File No. S7-31-22), March 31, 2023, [hereafter, “Citadel Order Competition Rule Letter”] at 14.

18. As FINRA explains, “SEC Rule 606(a) requires broker-dealers that route equity and option orders on behalf of customers to prepare quarterly reports that disclose specific information about their order routing practices for non-directed orders in NMS stocks and NMS securities that are options contracts.” Available at, <https://www.finra.org/finra-data/about-606>. SEC Final Rule available at <https://www.sec.gov/files/rules/final/2018/34-84528.pdf>.

19. For additional details, see <https://www.schwab.com/execution-quality/price-improvement>.

maker transacts the order a lower effective price than quoted. Conversely, a seller benefits from price improvement when the market maker transacts the order at a higher effective price than quoted. For example, suppose the market maker offers to trade Stock YYX at a \$2.00 bid (buy) and \$2.10 ask (sell), with a bid-ask spread of \$0.10. If the market maker fills a customer order to buy 100 shares of the stock at \$2.099, then the customer has received \$0.001 or 0.1 cent of price improvement.

21. Financial professionals commonly measure price improvement using a metric called the Effective over Quoted spread (“E/Q”), which compares the price at which the market maker filled the order to the quoted NBBO.²⁰ The quoted spread equals the difference between the NBBO bid (buy) and ask (offer) price and the effective spread equals the difference between the execution price and the midpoint of the quoted spread multiplied by two. In the example above, the quoted spread is \$2.00 (bid) and \$2.10 (ask). The spread, or difference, equals \$0.10 and the midpoint is \$2.05. To clarify this calculation, consider the following scenarios, in which market makers fill a retail customer’s buy order for Stock YYX at different prices.

22. In Scenario 1, the retail consumer buys at \$2.10 (the quoted ask) and gets no price improvement. The effective spread equals \$2.10 minus \$2.05 (the quoted bid-ask midpoint) times two, or \$0.10. Because the quoted spread also equals \$0.10 (\$2.10 minus \$2.00), the E/Q equals 100 percent, which corresponds to zero price improvement. In Scenario 2, the consumer pays the midpoint of the quoted spread, or \$2.05. The effective spread equals \$2.05 minus \$2.05 times two, or zero. The E/Q ratio equals zero, meaning the customer has received 100% price improvement. We can see from the remaining two scenarios that the closer to the midpoint of the quoted spread that the retail consumer transacts, the lower the E/Q ratio and the higher the price improvement.

TABLE 1: EFFECTIVE/QUOTED SPREAD AND PRICE IMPROVEMENT EXAMPLES

	Scenario			
	1	2	3	4
Buy Price	\$2.10	\$2.05	\$2.06	\$2.09
Quoted Spread (Q)	\$0.10	\$0.10	\$0.10	\$0.10
Effective Spread (E)	\$0.10	\$0.00	\$0.02	\$0.08
E/Q Ratio	100%	0%	20%	80%
\$ Price Improvement	\$0.00	\$0.05	\$0.04	\$0.01
% Price Improvement	0%	100%	80%	20%

To clarify, the price improvement metric applies to marketable orders—that is, orders that can be filled at the prevailing price and quantity. A different metric, called the fill rate, applies to non-marketable orders. Non-marketable orders “are not immediately executable for various reasons (e.g., the limit price is outside the current market, the order is designated for the opening or closing auction or it was an all-or-none order and the quantity is not available in the market).”²¹

23. As the example shows, three parties share the benefits of retail order flow: market makers, brokerages, and retail customers, resulting in two key considerations: (1) the size of the

20. Specifically, the E/Q equals the percentage of the quoted half-spread (the difference between the midpoint and the NBBO) that retail investors pay. Lower E/Q values benefit consumers. An E/Q of 100 means the retail investor pays the NBBO, while a value of zero means the individual pays the midpoint.

21. sifma, Q&A: US Equity Market Structure, *available at* <https://www.sifma.org/resources/news/blog/qa-u-s-equity-market-structure/>

surplus and (2) how that surplus is allocated among the parties. In a competitive outcome, market conditions would determine the proportion of the order flow revenues that would accrue to each party. Market makers would compete with each other on PFOF and execution quality to secure a broker's order flow, while brokers would compete with each other on the amount of price improvement or other execution quality benefits that they can offer retail customers. Of course, such scenarios depend on the degree to which retail order flows operate under competitive conditions and no party can exercise market power to retain a supracompetitive share of the revenues. Given the atomistic nature of retail customers and their relatively small order sizes, any concerns regarding divergence from competitive conditions should focus on brokers and market makers.

24. In a competitive market, each party (brokers and market makers) is a price taker, meaning that none holds market power—that is, the ability to raise its rate above competitive levels or exclude competitors. While a market maker may want to retain all of the revenues from trading against the spread, it cannot do so because it has entered into an agreement to share a portion with the broker that provided the order flow. If the market maker attempts to lower the share it pays to brokers below competitive levels, brokers will direct their order flow elsewhere.

25. Even though established market makers like Citadel and Virtu purchase the majority of retail order flow, a relative newcomer, Jane Street Capital, made substantial inroads into the market within a few months of its entry in 2019. In June 2021, Jane Street did not purchase any retail order flow from Schwab. By January 2022, Jane Street received approximately ten percent of Schwab's S&P 500 order flow. As of the first quarter 2025, Jane Street doubled the percentage Schwab's S&P 500 order flow that it purchased to 20 percent. Jane Street's entry suggests that competition exists between market makers for order flow, and preventing any potential anticompetitive barriers would benefit retail investors, as the Stipulation of Settlement contemplates in Section 2.2 (c).

26. At least theoretically, if a broker attempts to raise its payment rate above what the market maker obtains elsewhere, the market maker may refuse to fill the broker's orders and fill those of other brokers instead. Of course, the greater the amount of order flow a broker controls, the greater its ability to extract a higher payment for that order flow, regardless of whether it charges all market makers the same rate.

27. Schwab's acquisition of TDA represents a significant consolidation of retail order flow and places Schwab as the second highest recipient of PFOF, behind only Robinhood. The resulting status quo precipitated *Corrente* Plaintiffs' concerns that Schwab's increased size would allow it to exert precisely the sort of market power contemplated above and reduce below competitive levels the price improvement that retail customers would have expected to obtain had the two firms remained separate.

B. Regulatory and Investor Concerns

28. This section begins by emphasizing that the Stipulation of Settlement is not intended as a panacea for various perceived or actual market shortcomings. Rather, parties to the Stipulation of Settlement intend its provisions to address potential antitrust concerns, including those that may arise from Schwab's acquisition of TDA. While this report briefly discusses certain challenges that characterize retail trading, it does so only to provide context for the Compliance Program of the Stipulation of Settlement and frame its provisions within a broader market context.

29. Conflict-of-interest concerns regarding PFOF surround a brokerage's decision of where to route the order—specifically, whether a broker may route its orders to the market maker that offers the highest PFOF at the expense of price improvement.²² Such agency problems (also known as principal-agent problems) may impact the duty that a broker/dealer (the agent) has to ensure that its customer (the principal) receives best execution, as defined and enforced by the Financial Industry Regulatory Authority (FINRA). The term “best execution” refers to the broker's duty to seek out the best execution terms for a customer transaction given the prevailing conditions.²³

30. The SEC's investigation of Robinhood's PFOF practices during the 2015-2018 period cast into sharp relief such agency problems. On December 17, 2020, the SEC charged Robinhood for “repeated misstatements that failed to disclose the firm's receipt of payments from trading firms for routing customer orders to them, and with failing to satisfy its duty to seek the best reasonably available terms to execute customer orders.”²⁴ In his address to the Piper Sandler Global Exchange Conference, then-SEC Chairman Gary Gensler explained that:

Payment for order flow can raise real issues around conflicts of interest. As described in the Commission's settled enforcement action against Robinhood in 2020, payment for order flow can distort routing decisions. Certain principal trading firms seeking to attract Robinhood's order flow told them that there was a tradeoff between payment for order flow and price improvement for customers.²⁵

As noted previously in this report, Schwab maintains in its Form 606 filings that it does not negotiate a tradeoff between payment and price improvement/execution quality. Based on a review of Schwab's 606 filings, this statement first appeared in its second quarter 2023 Form 606, though Schwab previously maintained that it “does not negotiate payment as a condition for sending more order flow to a market maker.”²⁶

22. Thomas Boulton, Thomas Shohfi, and Michael Walz, *How Does Payment for Order Flow Influence Markets? Evidence from Robinhood Crypto Token Introductions*, DERA Working Paper, January 2025 at 4, (“PFOF creates a potential conflict of interest by incentivizing brokers to route trades to the PFOF-paying liquidity providers and not necessarily the liquidity provider offering the best price.”)

23. Congressional Research Service, *Payment for Order Flow: The SEC Proposes Reforms*, Feb. 22, 2023, available at https://www.congress.gov/crs_external_products/IF/PDF/IF12332/IF12332.2.pdf.

24. SEC Press Release, *SEC Charges Robinhood Financial With Misleading Customers About Revenue Sources and Failing to Satisfy Duty of Best Execution*, December 17, 2020, available at <https://www.sec.gov/newsroom/press-releases/2020-321>. In its order, the SEC explained that, “As a broker-dealer that routed customer orders for execution, Robinhood had a duty to seek to obtain the best reasonably available terms for customers' orders. This duty is referred to as the duty of ‘best execution.’ From September 2016 through June 2019, while Robinhood was on notice that its high payment for order flow rates from principal trading firms could result in inferior execution prices for its customers, Robinhood violated its duty of best execution by failing to conduct adequate regular and rigorous reviews of the execution quality it was providing on customer orders. Robinhood did not begin comparing its execution quality to that of its competitors until October 2018, and did not take appropriate steps during the entire period to assess whether its higher payment for order flow rates were adversely affecting customer execution prices.” SEC Order Instituting Administrative Cease and Desist Proceedings Pursuant to Section 8A of the Securities Act of 1933 and Section 15(B) of the Securities Exchange Act of 1934, *Making Findings, and Imposing Remedial Sanctions and A Cease-and-Desist Order*, In the Matter of Robinhood Financial, LLC, December 17, 2020, available at <https://www.sec.gov/files/litigation/admin/2020/33-10906.pdf>.

25. Gensler Remarks.

26. Charles Schwab, *Held NMS Stocks and Options Order Routing Public Report*, 1st Quarter 2022, available at <https://public.s3.com/rule606/chas/606-CHAS-2022Q1.pdf>

31. Conflict-of-interest concerns and a stated desire to promote competition motivated the SEC to propose two new rules in January 2023. The first rule, known as the Order Competition Rule, “would prohibit a restricted competition trading center from internally executing certain orders of individual investors at a price unless the orders are first exposed to competition at that price in a qualified auction operated by an open competition trading center.”²⁷ The SEC estimated that retail investors would save an additional \$1.5 billion annually under the proposed rule, though parties, including market maker Citadel questioned the basis for this figure and the SEC’s proposed rule in general.²⁸ The second rule, known as the Regulation Best Execution Rule, “would enhance the existing regulatory framework concerning the duty of best execution by requiring detailed policies and procedures for all broker-dealers and more robust policies and procedures for broker-dealers engaging in certain conflicted transactions with retail customers, as well as related review and documentation requirements.”²⁹

32. On June 12, 2025, during the writing of this report, the SEC (under Chairman Paul Atkins) withdrew both of these proposed notices of rulemaking along, indicating its decision not to issue final rules with respect to either the Order Competition Rule or Regulation Best Execution.³⁰ This report takes no position on either proposed rule. As noted above, the Order Competition Rule would have stipulated an auction mechanism, likely run by exchanges or possibly alternative trading systems (ATS), as a means of driving competition between market makers to the ultimate benefit of retail customers in the form of better prices (tighter spreads).

33. Though the Compliance section of the Stipulation of Settlement seeks to preempt any conscious or inadvertent actions that Schwab might take that would inhibit competition among market makers, it neither contemplates such an auction-based solution nor an alternative benchmark to the NBBO. We acknowledge that the economic literature has documented certain existing or prospective shortcomings that characterize using the NBBO as a benchmark for price improvement. Specifically, using a randomized control trial, Levy (2022) found that orders submitted via direct market access also received significant price improvement relative to the NBBO, concluding that the NBBO does not accurately capture prevailing market conditions.³¹ To wit, if retailer customers who submit orders directly to exchanges rather than through an intermediary broker (i.e., direct market access, or DMA) also receive price improvement, then at least the portion of the price improvement that retail customers receive from orders that brokers route to market makers does not result from such order routing. In other words, retail customers would have received some price improvement even through direct market access. As a result, Levy argues that direct market access orders represent the counterfactual condition better than the NBBO.

34. While acknowledging such findings, implementing alternative benchmarks risks veering into the purview of regulatory authorities and thus falls outside the ambit of this report. Accordingly, this report considers provisions of the Stipulation of Settlement that would result in greater price improvement relative to the NBBO that would exist absent the Compliance Program.

27. <https://www.govinfo.gov/content/pkg/FR-2023-01-03/pdf/2022-27617.pdf>

28. Citadel Order Competition Rule Letter at 2.

29. <https://www.govinfo.gov/content/pkg/FR-2023-01-27/pdf/2022-27644.pdf>

30. <https://www.sec.gov/rules-regulations/2025/06/order-competition-rule#33-11377final> and <https://www.sec.gov/rules-regulations/2025/06/regulation-best-execution#33-11377final>

31. Bradford Levy, *Price improvement and payment for order flow: Evidence from a randomized controlled trial*, Working Paper (2022), <http://dx.doi.org/10.2139/ssrn.4189658>

Specifically, the Stipulation of Settlement focuses on the types of communication between Schwab and the market makers to which it sends its retail order flow. By monitoring and potentially limiting the nature of some communication, the Stipulation of Settlement seeks to preserve or enhance the level of competition among market makers for Schwab's order flow. Such an outcome would follow, *inter alia*, from a clear specification of the metrics that Schwab uses to inform its wheel-based order flow allocation system.

C. Order Flow Allocation

35. Relevant financial research suggests that scale economies characterize the market in which wholesalers operate, with the largest market makers benefiting from the lowest execution costs. If so, such a status quo poses the question of why market forces have not resulted in a monopolistic equilibrium, with the single lowest-execution-cost market maker taking all of the order flow. Dyhrberg et al (2025) posit that such an outcome would pose operational risk for brokers, who would find such a dominant market maker less amenable to PFOF requirements.³²

36. Such reasoning has parallels elsewhere. In the ongoing Google Ad Tech litigation, prior to Google's implementation of a most favored nation provision, publishers would set different price floors for various exchanges, with Google's AdX exchange commonly receiving higher price floors. Publishers indicated that, while profitability motivated their concerns, so did control.³³ From an economic viewpoint, such control would allow publishers to hedge against a dominant exchange by directing some inventory toward smaller exchanges, just as brokers may choose not to send all their order flow to a single market. We discuss the implications such considerations have for price improvement in section detailing the provisions of the Stipulation of Settlement.

1. Routing Wheel

37. Most brokerages use a routing wheel to allocate order flow among market makers that meet its criteria for consideration. For example, [REDACTED]

[REDACTED] According to its January 2025 Form 606, Schwab sold its order flow among six identified market makers as shown in Table 2 below, with Citadel and Jane Street capturing approximately one-half of Schwab's non-directed order flow.³⁵

38. To illustrate the mechanics of the routing wheel, suppose that Schwab received 1,000 non-directed market orders in a single tranche of orders. It allocated them based on the percentage

32. Anne Haubo Dyhrberg, Andriy Shkilko, and Ingrid M. Werner, *The retail execution quality landscape*, Journal of Financial Economics 168 (2025), [hereafter "Dyhrberg et al. (2025)"] at 3.

33. U.S. and Plaintiff States v. Google LLC (2023), PTX1854, 1:23-cv-00108, available at <https://www.justice.gov/atr/media/1367541/dl>. Dr. Singer is the advertisers' expert in the related private litigation.

34. [REDACTED]

35. [REDACTED]

reflected under the “Market Orders” column, with Citadel receiving the highest share (~38 percent) and Jane Street receiving the lowest percentage of such orders at ~3 percent. For a tranche consisting of 1,000 orders, the approximate breakdown of such total by venue appears in the right-most column of Table 2 below.

TABLE 2: SCHWAB ORDER FLOW ALLOCATION, JANUARY 2025 AND TRANCHE EXAMPLE

Venue – Non-directed Order Flow	Non-Directed Orders (%)	Market Orders (%)	Marketable Limit Orders (%)	Non-Marketable Limit Orders (%)	Other Orders (%)	Market Orders (Out of 1,000)
Citadel Securities	28.14	37.88	36.35	21.44	17.79	379
Jane Street	21.61	3.14	12.82	38.97	16.00	31
Virtu Americas	16.47	22.84	22.90	10.09	16.78	228
G1 Execution Services ³⁶	13.06	17.23	12.48	7.21	24.59	172
Hudson River Trading	8.97	12.31	9.09	7.11	6.14	123
Two Sigma Securities	8.03	4.94	4.47	9.74	13.82	49

39. According to the market order wheel, Schwab would route the first 379 orders to Citadel, the next 228 to Virtu, and so on until all 1,000 routes have been routed to a wholesaler.³⁷ At that point, the market order wheel returns to the original position, with Citadel to receive the next batch of market orders, followed again by Virtu and so on, with Jane Street last in order.

2. Competition Among Routing Wheel Members

40. As noted previously, in its recent Form 606 filings, Schwab details its criteria for sending order flow to market makers, as follows:

- i. All market makers pay the same rate to Schwab for any given order flow type. Schwab currently charges the following rates: “for marketable orders the payment rate is \$0.001 per share or less, for non-marketable orders the rate is \$0.0033 per share or less, and for extended hours orders the rate is \$0.0006 per share or less,”
- ii. Schwab does not negotiate payment as a condition for sending more order flow to a market maker, and
- iii. Since early 2023, Schwab has added a statement contending that it does not negotiate a tradeoff between payment and price improvement/execution quality.³⁸

From an economic viewpoint, one could interpret these statements as, at least facially, in tension with each other. For example, Schwab contends in (i) that it charges the same PFOF to all market makers, but in (ii) it states that it does not negotiate payment for sending more order flow to any market maker. It stands to reason that Schwab would not send any order flow to a market maker that does not agree to its PFOF terms. Thus, Schwab must set a rate that both it and the market makers can accept.

36. G1 Execution Services (“G1X”) is also known as Susquehanna.

37. [REDACTED]

38. Charles Schwab, Held NMS Stocks and Options Order Routing Public Report, Apr. 28, 2025, *available at* https://content.schwab.com/drupal_dependencies/psr/606/2025-Q1-Schwab-Quarterly-Report.pdf

41. [REDACTED]

[REDACTED]³⁹ As such we interpret its statement to mean that it does not base its allocation of order flow on any market maker's offer to pay a *higher PFOF* than what Schwab specifies in (ii) above.⁴⁰ Likewise, potential economic conflict exists between the first two points and point (iii). In the latter, Schwab appears to mean that, *once the market maker has agreed to pay the required PFOF commission rates* in (i), Schwab does not trade retail customer benefit in the form of price improvement against its own pecuniary interest in the form of PFOF. Again, this reflects a conditional statement that represents an implicit trade-off. The condition that Schwab imposes simply transfers the tradeoff to the market maker, but the trade-off exists nonetheless.

42. Suppose a market maker offered to pay \$0.0008 per share instead of \$0.001, a PFOF reduction of 20 percent, and instead offered to pay that amount in the form of price improvement. Schwab's answer reveals the nature of the trade-off. In the first scenario, Schwab answers "No" and declines the offer, because, based on point (i) above, the market maker would not meet the required PFOF criteria. In doing so, Schwab would make exactly the sort of trade-off it denies making in its Form 606. It would reject higher price improvement in exchange for receiving higher PFOF for itself.

43. In the second scenario, Schwab could answer "Yes" and accept the offer. Doing so would also reflect the same trade-off, except that in this case, Schwab's decision would benefit its retail customers. Yet this scenario cannot occur because Schwab has already communicated the PFOF rate it will accept from market makers, which means that trade-off has already occurred in step (i). In practical terms, Schwab means that it does not conduct any additional trade-offs beyond the one that step (i) implies. As a result, competition between market makers on price improvement does not occur at any PFOF rate below the negotiated \$0.001 per share. Only once the market maker has agreed to pay Schwab's designated PFOF does competition over price improvement or execution quality factor into the wheel-based order allocation scheme.

44. Schwab's Form 606 data clarify this point. A comparison of its Second⁴¹ and Third⁴² Quarter 2021 filings shows that Schwab realized an increase in PFOF from approximately \$0.0009 to \$0.001 per share for market orders, that is, from nine to ten cents per 100 shares. Concurrently, based on its Second⁴³ and Third⁴⁴ Quarter 2021 filings, TDA realized a decrease in PFOF from

39. SCH-CORRENTE-00014178, [REDACTED], at SCH-CORRENTE-00014182, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

40. If so, this meaning differs from that conveyed in Point (ii) above. Point (ii) makes an unconditional statement regarding PFOF, while reality represents a conditional statement. In other words, Schwab communicates that, conditional on a market maker accepting its PFOF requirements, it does not allocate more order flow based on any potential market maker offers to pay *higher rates* than those set forth in (i).

41. <https://public.s3.com/rule606/chas/606-CHAS-2021Q2.pdf>

42. <https://public.s3.com/rule606/chas/606-CHAS-2021Q3.pdf>

43. <https://public.s3.com/rule606/tdam/606-TDA,%20Inc%20-%202021Q2.pdf>

44. <https://public.s3.com/rule606/tdam/606-TDA,%20Inc%20-%202021Q3.pdf>

\$0.0012 to \$0.001—that is, from twelve to ten cents per 100 shares.⁴⁵ Schwab appears to have done so to equalize the PFOF between these divisions post-acquisition. Suppose Schwab had instead equalized the rates to the higher of the two (twelve cents per 100 shares) or at the lower of the two (nine cents per 100 shares). In these two counterfactuals, the market makers would have had less and more profit to distribute as price improvement.

45. Thus, the Schwab-designated PFOF rate will inform the amount of price improvement that a market maker could and would offer. The market maker knows in advance (1) its approximate transaction costs and (2) what it must pay to Schwab for the order flow. And as a result, it will determine the effective bid-ask spreads necessary to cover both costs, retain profit for itself and offer some price improvement.⁴⁶ Such choices reflect pecuniary trade-offs. Other things constant, the higher the PFOF rate a broker requires, the less margin a market maker has to distribute between itself and the retail customer in the form of price improvement. To the extent that market makers compete on the basis of price improvement, the lower the PFOF they must pay to the broker, the more intensely they will compete on price improvement. In other words, in a competitive market, economists expect a pass-through of approximately one, meaning that the seller will pass along all of its costs increases/decreases to the retail consumer.⁴⁷

46. The following section explains why the provisions of the Stipulation of Settlement, if accepted, would motivate increased competition among market makers to the benefit of the retail customers. We emphasize that the benchmark against which to compare the status quo is not zero price improvement, but rather the price improvement that would exist in a counterfactual condition marked by the protection or enhancement of competition among market makers.⁴⁸

IV. PRICE IMPROVEMENT UNDER THE STIPULATION OF SETTLEMENT

47. In this section, we present two potential considerations for inclusion in the Compliance Program. The first consideration contemplates the exploitation of cognizable efficiencies resulting from the merger to the benefit of consumers in the form of improved execution quality. The second consideration proffers an alternative means of evaluating market maker offers in exchange for order flow. This possibility, which we view as a contingency plan in the event the first consideration uncovers potentially anticompetitive conduct, bestows a greater level of control over price improvement to Schwab. As such, it increases transparency and permits Schwab to discipline any potential conduct incongruous with its stated anti-conflict-of-interest PFOF policies.

45. These figures apply to both TDA, Inc. and TDA Clearing, Inc.

46. Such calculations are made on average, as the market maker may suffer order flow toxicity resulting from adverse selection in some cases or higher revenues in others. Toxic order flow results from trading against informed traders, which can yield losses for liquidity providers. Dyhrbert et al. (2025) found that TD Ameritrade and Schwab provide and that Citadel and Virtu receive the most toxic order flow.

47. See, e.g., Christos Genakos and Mario Pagliero, *Competition and Pass-Through: Evidence from Isolated Markets*, 14(4) AMERICAN ECONOMIC JOURNAL: APPLIED ECONOMICS 35–57 at 35 (2022) (“We find that pass-through increases from 0.4 in monopoly markets to 1 in markets with four or more competitors and remains constant thereafter. The speed of price adjustment is about 60 percent higher in more competitive markets.”).

48. Retail consumers receive significant total price improvement under the status quo. Schwab reports that its clients received \$542 million in price improvement during the first quarter of 2025 on exchange-listed equity orders. See <https://www.schwab.com/execution-quality>. To the extent that this total includes price improvement from exchange-routed orders rather than those sent to market makers, such an outcome indicates that attributing all price improvement to market makers overstates the retail customer benefit of such order routing. Thus, absent the current PFOF system, some price improvement would still exist.

Importantly, both considerations alter the communication between Schwab and its market makers, as contemplated by Section 2.2.(c) of the Stipulation of Settlement.

A. Implementing Cognizable Efficiencies

48. We envision that the Compliance Program will primarily aim to exploit and protect any economies that accrue to the merging party, and ensure that the benefits to Schwab redound to the Schwab's retail customers. As Schwab explained in its press release announcing the TDA acquisition,

It [the TDA acquisition] allows Schwab to continue to add further scale on top of its organic growth, helping to drive sustainable, profitable growth and long-term value creation. More specifically, the acquisition will add to Schwab approximately 12 million client accounts, \$1.3 trillion in client assets, and approximately \$5 billion in annual revenue. *This added scale is expected to result in lower operating expenses as a percentage of client assets ("EOCA"), help fund enhanced client experience capabilities,* improve the company's competitive position and further its financial success and diversification of revenue.⁴⁹

To evaluate the nature of such efficiencies, we rely on the criteria set forth in the 2023 Merger Guidelines authored by the Department of Justice and the Federal Trade Commission (the "Merger Guidelines").⁵⁰ In evaluating the procompetitive justifications that merging parties may offer to either assuage any concerns regarding harm to competition or to offset any such anticompetitive effects, the regulatory agencies set forth four criteria that define cognizable efficiencies:

- i. Merger specificity – the competitive benefits could not occur absent the merger, i.e., through organic growth of one or more of the parties, through a partial consolidation, or other means.
- ii. Verifiability – the benefits must be verifiable using reliable methods and "not dependent on the subjective predictions of the merging parties or their agents".⁵¹
- iii. Preventative of a reduction in competition – To receive consideration, efficiencies must not simply reflect pecuniary benefits to the merging parties but rather must redound to consumers in a measurable manner using a reliable methodology.
- iv. Not Anticompetitive – the efficiencies must not result from a worsening of terms for any of the merged firms' trading partners. In other words, an increase in monopsony

49. Charles Schwab Press Release, The Charles Schwab Corporation to Acquire TD Ameritrade, Nov. 25, 2019, available at <https://pressroom.aboutschwab.com/press-releases/press-release/2019/The-Charles-Schwab-Corporation-to-Acquire-TD-Ameritrade/default.aspx>. See also, Charles Schwab Project Latte Announcement Deck, Nov. 25, 2019, at 11, noting \$3.5-\$4 billion in estimated synergies, available at https://content.schwab.com/web/retail/public/about-schwab/SCHW-AMTD_Announcement_deck.pdf. See also, Rick Wurster, Following a historic integration, Schwab's next chapter is continued growth, Charles Schwab, July 9, 2024, ("Scale and efficiency is about realizing economies of scale and maintaining our cost discipline. We are the low-cost leader among peers, and that's significant for our clients for many reasons. Less money out of our clients' pockets means more of their wealth is working towards meeting their goals. It also enables us to reinvest in our clients over time.") available at <https://www.aboutschwab.com/mss/story/schwabs-next-chapter-is-continued-growth>.

50. U.S. Department of Justice and the Federal Trade Commission, 2023 Merger Guidelines, Dec. 18, 2023, [hereafter "Merger Guidelines"], available at https://www.ftc.gov/system/files/ftc_gov/pdf/2023_merger_guidelines_final_12.18.2023.pdf.

51. Merger Guidelines at 33.

power or another decrease in competition in a separate market would render any claimed efficiencies not cognizable.

49. We view the Compliance Program as a means of ensuring that Schwab's acquisition of TDA results in cognizable efficiencies, generated as follows. *First*, subsequent to the acquisition, Schwab can now send more order flow to market makers from a single combined entity. *Second*, market makers benefit from that increased order flow from a single entity because it allows them to balance out toxic order flow—that is, trades from informed parties that create an adverse selection problem. *Third*, to the extent that market makers can better mitigate agency problems, they can offer a tighter spread. For this reason, retail orders benefit from a tighter spread than institutional orders, which regularly originate from informed parties and thus can generate higher order toxicity. *Fourth*, the tighter spread means better price improvement relative to the NBBO.

50. The Compliance Program should ensure that the four-step process detailed above functions unimpeded and data-driven metrics can evince the direct consumer benefits in the form of lower prices. Consumer benefits would occur to the extent that Schwab can effectively monitor the price improvement that market makers offer clients and refrain from providing any information, even unintentionally, that would create or exacerbate any agency problems. We note that, in the process of the *Corrente* litigation, Schwab identified one potential area of improvement.

51. Specifically, Schwab has explained [REDACTED]⁵² While this report does not challenge Schwab on the veracity of this statement, we note that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]⁵³ While the market maker's Form 605 filings contain some such information, [REDACTED]
[REDACTED]⁵⁴

52. Such an apparently standard practice notwithstanding, [REDACTED]
[REDACTED]
[REDACTED]⁵⁵ [REDACTED]
[REDACTED]
[REDACTED]⁵⁶

53. Economists recognize that trust can form the basis of business relationships. As Nobel Laureate Kenneth Arrow observed, “virtually every commercial transaction has within itself

52. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

53. [REDACTED]
54. [REDACTED]
55. [REDACTED]
[REDACTED]

56. [REDACTED]
[REDACTED]
[REDACTED] Id., at 50-1.

(2) *The periodic analysis and reporting of such data, detailing not only the price improvement that each market maker has provided over the previous period, but also a comparison of the price improvement provided with the long-term trend.* Such reporting should occur in a standardized format that permits longitudinal analysis. Given the expectation that greater price improvement should accompany increased order flow, we recommend that explanations from the market maker accompany any deviations from this relationship. While valid reasons may exist for such deviations, transparency and verifiability would benefit from their documentation.

55. The contemplated dataset would differ in granularity and detail from the data that market makers provide in their respective Form 605s. Form 605 data currently contain 26 fields, as specified by SEC rulemaking. Table 3 below provides a subset of the data contained therein, specifically, fields dealing with price improvement and execution speed for trades of AT&T stock during the 4th quarter of 2024. Notably, the form 605 data do not provide broker-specific information, but rather aggregated results across sources of order flow.

TABLE 3: CITADEL FORM 605 DATA FOR AT&T MARKET ORDERS, 4TH QUARTER 2024

Order Size Bucket	Covered Orders	Shares in Covered Orders	Shares Executed Within 9 Seconds of Order	Average Realized Spread	Average Effective Spread	Shares with Price Improv.	% Shares with Price Improv.	Price Improv. Per Share
100-499	19,529	4,084,552	4,000,206	\$0.0015	-\$0.0015	3,947,124	96.6%	\$0.0062
500-1999	8,401	7,781,393	7,620,907	\$0.0006	\$0.0000	7,391,349	95.0%	\$0.0055
2000-4999	2,280	7,060,262	6,945,275	-\$0.0007	\$0.0015	6,559,657	92.9%	\$0.0049
5000 or more	538	3,362,007	3,261,704	\$0.0143	\$0.0036	2,741,777	81.6%	\$0.0051

56. The Form 605 data above indicate that Citadel provided price improvement on the vast majority of market orders for AT&T stock that it purchased from brokers. The dataset that this report contemplates would include specific information for order flow that each market maker purchases from Schwab. The documents that Schwab has produced in the *Corrente* litigation indicate that the S3 analytical tool provides these data, as discussed further below. Making the results of his analysis public, even in aggregated and/or anonymized form would limit or obviate the need for reliance on “trust” and thus fulfill the verifiability requirement for cognizable efficiencies. Moreover, the provision of such a dataset would correct an acknowledged insufficient disclosure gap without a regulatory solution, which lies outside the scope of this report.⁶²

57. The parties in this litigation have also requested an analysis of the potential benefits in terms of execution quality that would reasonably accompany the implementation of the Compliance Program. At this stage, the benefits reasonably expected to redound to consumers from

62. See Joshua Nathanson, *A Disclosure Gap in the Market for Order Flow*, 2(2) UNIVERSITY OF CHICAGO BUSINESS LAW REVIEW 494-530, at 523 (2023) (“Unlike in other parts of financial markets where there are strong incentives for self-induced disclosure, there is an inefficient disclosure gap in the market for order flow, because no broker knows whether the benefits of wholesaler-specific disclosure will accrue to them or their competitors. Ultimately, I conclude that the disclosure gap limits competition and prevents customers from effectively monitoring brokers, and I propose a regulatory solution”), available at https://businesslawreview.uchicago.edu/sites/default/files/2023-07/Nathanson_v2_493-530.pdf.

the proposal above remain uncertain as the parties have not yet finalized the Compliance Program's provisions. Moreover, we have limited data on the basis of which to estimate such potential benefits. Nevertheless, we can leverage the existing information, both from publicly available Forms 605 and 606, and from internal data produced in discovery to proffer initial estimates based on two alternative approaches. We preface our analysis with the caveat that our estimates provide a value range, the accuracy of which is subject to considerable uncertainty.

1. Price Improvement Methodology One

58. Methodology One relies on the following logic. Schwab has reported that its E/Q ratio has dropped by approximately 67 percent over the 2006-2021 time period.⁶³ Using this trend as a competitive benchmark, we expect its continuation in the future. Decreases in the trend (higher E/Q ratios) would represent deviations potentially resulting from anticompetitive conduct, which the Compliance Program would attempt to either prevent or terminate.

59. A decline of 67 percent over a fifteen-year period implies a compound annual growth rate (CAGR) of approximately -7.13 percent.⁶⁴ Figure 1 below illustrates this result. Note that the CAGR implies a monotonic decrease in this case. While the actual value in any intervening period between the start and the end may deviate from the CAGR, the ending values will be exactly the same. As shown below, the index value for 2021 equals 33 (100 less 67), as expected.

60. While the CAGR calculated above and whose results appear in the figure below occurs on an annual basis, because it relies on data in Schwab's White Paper, the analysis that this Compliance Program contemplates would occur on a monthly basis. To the extent that the E/Q ratio calculated in a given month departs from expected ratio based on the CAGR above (i.e., declines by less than 7.13 percent), such a result would trigger a review to investigate the reason for such a deviation.

63. Schwab White Paper at Exhibit 3, p. 9. ("The Effective/Quoted (E/Q) Ratio measures the average effective spread of order execution vs. the NBBO's spread at the time of order entry. Lower ratios represent greater cost savings to clients, as they indicate executions at spreads below the NBBO spread.") These data apply order sizes in the 0-499, and 500-1999 size groupings.

64. The CAGR equals the geometric mean, i.e., quotient of the ending value divided by the starting value raised to the inverse of the number of periods, minus one: $(33/100)^{1/15} - 1 = -0.07125$. In other words, an annual time series that begins with a value of 100 must decline by 7.125 percent each year to yield a value of 33 at the end of fifteen years.

Year	Percentage
2006	100.0
2007	92.9
2008	86.3
2009	80.1
2010	74.4
2011	69.1
2012	64.2
2013	59.6
2014	55.4
2015	51.4
2016	47.8
2017	44.4
2018	41.2
2019	38.3
2020	35.5
2021	33.0
2022	30.6
2023	28.5
2024	26.4
2025	24.6

Using these data, we can compare the execution quality in terms of the E/Q ratio that Schwab's customers received from market makers to whom Schwab routed its order flow during the respective periods. The data for respective periods in Tables 4 and 5 below.

[illegible]

66. [REDACTED] SCH-CORRENTE-00278688 at SCH-CORRENTE-00278697

64. We now apply this percentage to the total price improvement that Schwab clients received. [REDACTED]

65. We emphasize that this figure does not represent an estimate of damages, but rather an example meant to illustrate how the calculation might function in practice. Schwab's Exhibit 3 data in its White Paper show that annual E/Q ratios did not follow a smooth decline. As a result, some deviation is expected. To account for such stochastic variation, an additional criterion may be imposed such that the deviation must exceed some threshold. Such a threshold may be based on the variation that the E/Q ratio has demonstrated in the past, thus permitting the construction of a confidence interval.

66. Finally, we note that the calculation above necessarily makes use of the limited data available to us at the time of this report. We anticipate that, if Schwab implements this methodology, it will leverage more granular and detailed information available from S3 or from market makers.

2. Price Improvement Methodology Two

67. The second proposed methodology constitutes a modification, rather than a holistic departure from the first approach detailed above. The first methodology reflects a comparison of the E/Q trend over the benchmark period with the average E/Q ratio in the current month across all market makers that purchased Schwab order flow in the period. The second methodology also contemplates a longitudinal comparison but includes comparisons (1) of each market maker with its previous trend in price improvement, and (2) across market makers with respect to the price improvements they offer to Schwab's customers.

68. In other words, the second methodology would include both a cross-sectional and a time-series component, resulting in a panel dataset with the former representing the market makers and the latter representing the monthly periods. The Compliance Program would perform both comparisons to ensure that the market maker does not offer worse price improvement over time and relative to other market makers. We understand that, based on the metrics available from S3, the current allocation system compares market makers' performance relative to each other in a given quarter. While useful, such a comparison may miss temporal declines in price improvement. Again, such a longitudinal comparison would be consistent with Schwab's acknowledgment of such trends, as evidenced in Figure 3 of its White Paper.

69. We provide an illustration of how this methodology would operate in practice by comparing price improvement in April of 2023 and 2025. To do so, we rely on Form 605 data, as made publicly available by each of the market makers that purchased Schwab order flow in the respective periods. Table 6 and 7 below provide the price improvement per share by market maker and order size bin, for market orders only.

TABLE 6: AVERAGE PRICE IMPROVEMENT/SHARE, APRIL 2023

Order Size	Virtu	Citadel	G1X	Hudson River	Jane Street	Two Sigma
100-499	\$0.0501	\$0.0384	\$0.0477	\$0.0093	\$0.0482	\$0.0380
500-1999	\$0.0370	\$0.0291	\$0.0380	\$0.0062	\$0.0314	\$0.0274
2000-4999	\$0.0189	\$0.0168	\$0.0143	\$0.0034	\$0.0153	\$0.0129
5000-9999	\$0.0075	\$0.0103	\$0.0049	\$0.0016	\$0.0070	\$0.0065

TABLE 7: AVERAGE PRICE IMPROVEMENT/SHARE, APRIL 2025

Order Size	Virtu	Citadel	G1X	Hudson River	Jane Street	Two Sigma
100-499	\$0.0723	\$0.0594	\$0.0698	\$0.0666	\$0.0799	\$0.0642
500-1999	\$0.0622	\$0.0470	\$0.0556	\$0.0484	\$0.0639	\$0.0501
2000-4999	\$0.0369	\$0.0337	\$0.0297	\$0.0292	\$0.0411	\$0.0243
5000-9999	\$0.0252	\$0.0223	\$0.0151	\$0.0175	\$0.0282	\$0.0142

As the tables above indicate, Forms 605 for all market makers indicate an increase in price improvement in April 2025 when compared to April 2023. Using these data, we can compare market maker performance both over time by market maker and across market makers within a period.

70. Table 8 below provides a comparison of price improvement over time by market maker. The data for Hudson River indicate marginal price improvement in April 2023 potentially representing outliers, so we do not calculate a differential for this market maker. In any case, Citadel, Jane Street, and Virtu purchased the most order flow from Schwab according to its March 2025 Form 606, the latest available data as of the writing of this report.

TABLE 8: CHANGE IN PRICE IMPROVEMENT PER SHARE, APRIL 2023-2025

Order Size	Virtu	Citadel	G1X	Hudson River	Jane Street	Two Sigma
100-499	\$0.0222	\$0.0210	\$0.0222	<N/A>	\$0.0317	\$0.0261
500-1999	\$0.0252	\$0.0180	\$0.0177	<N/A>	\$0.0325	\$0.0227
2000-4999	\$0.0181	\$0.0169	\$0.0154	<N/A>	\$0.0258	\$0.0113
5000-9999	\$0.0177	\$0.0120	\$0.0102	<N/A>	\$0.0213	\$0.0077

These data indicate that Jane Street not only provided the highest price improvement per share as of April 2025 but also increased its price improvement the most relative to April 2023. Such results notwithstanding, Jane Street lies 2nd and 3rd on Schwab's non-directed order flow for S&P500 and non-S&P500 equities, respectively.

71. Such differences may exist for innocuous and easily explained reasons. For example, because we rely, by necessity, on publicly available Form 605 data, which does not distinguish the order flow by broker, the data in Tables 6-8 may differ when only considering Schwab order flow. Likewise, Citadel's first position on the order wheels may occur because of other metrics, such as order speed and ability to handle larger order flow.

72. We anticipate that the Compliance Program will require documentation of such potential reasons to the extent that order-allocation wheel ranking deviates from the price improvement ranking among market makers. To the extent that the Compliance Program finds no such valid reasons, the Compliance Program may require that allocation match the price improvement ranking, with the market maker that offers the greatest price improvement taking first position on the wheel. The benefits of the Compliance Program could then be measured as the difference between the price improvement in this scenario compared to the scenario where the allocation wheel does not match the price improvement rankings.

73. We offer a stylized example of how such a calculation could proceed, based on April 2025 Form 605 data for the market makers and March 2025 Form 606 data for Schwab. In the first

step, we calculate the average price improvement per share by order size bin for shares that received price improvement for each market maker, based on their respective Form 605 filings.⁶⁷ These bin-level averages are then weighted by the percentage of total shares that each bin represents to arrive at the weighted average price improvement per share for each market maker. Table 9 below illustrates this calculation, based on March 2025 Schwab Form 606 data.

TABLE 9: PRICE IMPROVEMENT BY MARKET MAKER, MARCH 2025

Order Size	Virtu	Citadel	G1X	Hudson River	Jane Street	Two Sigma
100-499	\$0.0723	\$0.0594	\$0.0698	\$0.0666	\$0.0799	\$0.0642
500-1999	\$0.0622	\$0.0470	\$0.0556	\$0.0484	\$0.0639	\$0.0501
2000-4999	\$0.0369	\$0.0337	\$0.0297	\$0.0292	\$0.0411	\$0.0243
5000-9999	\$0.0252	\$0.0223	\$0.0151	\$0.0175	\$0.0282	\$0.0142
Wt. Avg	\$0.0459	\$0.0378	\$0.0397	\$0.0362	\$0.0495	\$0.0394

As Table 9 shows, Jane Street provides the highest weighted average price improvement, with Virtu second. Using these data, we can compare the market maker rankings in terms of price improvement provided with their current rankings on the order allocation wheels for S&P and non-S&P equities, as shown in Table 10 below.

TABLE 10: ACTUAL AND ALTERNATIVE ORDER ALLOCATION RANKINGS

Market Maker	Actual Allocation Ranking		PI-Based Rank
	S&P 500	Non-S&P 500	
Jane Street	3	2	1
Virtu	2	3	2
Citadel	1	1	3
G1X	4	5	4
Two Sigma	6	6	5
Hudson River	5	4	6

74. One possible scenario would re-allocate the shares that each market maker purchases from Schwab based on the descending order of price improvement offered. Based on Schwab's March 2025 Form 606 data and illustrated above, Citadel placed first on Schwab's allocation wheels and received the most order flow. Using each market maker's form 605 to calculate their weighted average price improvement and re-ranking the market makers would result in Jane Street obtaining the highest ranking, followed by Virtu, Citadel, and so on. This approach, however, assumes that every market maker has equal ability to absorb increased order flow, which may not be the case.

75. Rather than such a re-allocation, we propose modifying the percentage allocation to apply to shares rather than orders. To do so, we calculate the simple average order allocation for

⁶⁷ Column 20 of each market maker's standard Form 605 data contains the price improvement per share by equity on a dollar basis. The majority of shares reflected price improvement, though the overall percentages differ by market maker and order size bin. Another approach to calculate the price improvement would be to treat the complement of percentages of shares that received price improvement as receiving none.

each market maker for S&P500 and Non-S&P500 equities. Because Schwab's form 606 does not provide shares purchased, we calculate these figures based on the total PFOF divided by the PFOF per share.⁶⁸ As Table 11 shows, order sizes appear to differ substantially between market makers. On a share basis, Citadel obtains a much higher percentage of order flow than on a per-order basis, while Jane Street obtains a much lower percentage. Because Form 605s report price improvement on a per-share basis, and because Jane Street provides a higher level of price improvement, the fact that it receives a lower allocation of shares indicates room for additional price improvement.

TABLE 11: SCHWAB MARCH 2025 ALLOCATION BASED ON ORDER VS. SHARE PERCENTAGE

Market Maker	Order %	Share %
Jane Street	21.2%	8.3%
Virtu	20.5%	26.3%
Citadel	33.6%	44.9%
G1X	9.0%	13.5%
Two Sigma	6.5%	1.0%
Hudson River	9.2%	5.9%
Total	100.0%	100.0%

76. Methodology Two proposes re-allocating the shares such that market makers receive the same proportion of shares as their percentage of orders. To the extent that Schwab continues to prioritize price improvement as the lodestar of order allocation, we expect that our proposed Methodology Two modification to the status quo would motivate additional competition among market makers in terms of price improvement. As Table 12 below indicates, such a modification would result in approximately a 2.4 percent increase in price improvement.

TABLE 12: ADDITIONAL PRICE IMPROVEMENT BASED ON REVISED ALLOCATION PERCENTAGES

Market Maker	PI/Share	Actual Shares	Revised Allocation Percentage	But-For Shares	Actual PI	But-For PI
Jane Street	\$0.0495	3,057,725,136	21.2%	7,832,965,113	\$151,230,983	\$387,407,946
Virtu	\$0.0459	9,711,752,985	20.5%	7,548,719,667	\$445,599,853	\$346,354,399
Citadel	\$0.0378	16,579,036,450	33.6%	12,399,969,127	\$626,023,421	\$468,222,089
G1X	\$0.0397	4,963,571,575	9.0%	3,330,822,476	\$197,159,616	\$132,304,666
Two Sigma	\$0.0394	384,346,213	6.5%	2,382,701,760	\$15,145,377	\$93,891,694
Hudson River	\$0.0362	2,190,614,263	9.2%	3,391,868,478	\$79,355,122	\$122,870,622
Totals					\$1,514,514,372	\$1,551,051,417
Difference						2.4%

77. Applying this percentage increase to the same total price improvement figure of \$600 million per month that Schwab reported for the first quarter of 2025 and that we used in Methodology One, results in additional price improvement of approximately \$14.5 million.

68. Form 606 provides the PFOF per 100 shares on a cents basis. As a result, we first need to convert cents to dollars by dividing by 100. Second, we need to divide by 100 again to obtain the PFOF per share rather than per 100 shares, as reported. The formula for total shares is Total PFOF/Cents PFOF per 100 shares/(100x100).

B. Order Wheel Allocation Based on Effective Retained Profit Percentage

78. This report also considers the possibility that Schwab’s analysis of the data discussed above would yield deviations from the long-term E/Q trend that may lack economic justification. We anticipate that the Compliance Program may require some preparation for such a contingency. In this case, we propose a modification of the order wheel allocation based on an alternative metric.

79. This report contemplates a counterfactual scenario that limits the information Schwab provides to market makers that receive its order flow—information sharing that can inhibit the competitive process. Schwab provides market makers with the PFOF criteria they must meet to receive its order flow. [REDACTED]

[REDACTED].⁶⁹

80. The proposal below attempts to mitigate the information asymmetries that exist in the retail order flow market. The proposed counterfactual would operate in a very similar manner to the status quo with a few distinctions.

- i. Rather than informing market makers of the rate Schwab will accept for a given order type (e.g., \$0.0001 per share for market orders), market makers would compete on the percentage of total profit from the order flow that they would retain (the “Effective Retained Profit Percentage” or “ERPP”), with the most favorable bids ranked in ascending order from lowest to highest.
- ii. Allocation on the wheel would be based on the inverse of the market maker’s ERPP. For example, suppose Citadel bids 30 percent, Virtu bids 35 percent and Jane Street bids 33 percent. Allocation on the wheel would occur as follows:

TABLE 13: BIDDING BASED ON SHARE OF PROFIT RETAINED (ERPP)

	ERPP	Inverse of ERPP	Order Allocation
Citadel	30%	3.333	36.15%
Virtu	35%	2.857	30.99%
Jane Street	33%	3.030	32.86%
		9.221	100.00%

In this example, Citadel bids to retain a 30 percent share, the inverse of which equals 1/0.30 or 3.333. The same calculation repeats for the remaining market makers. The

69. [REDACTED]

[REDACTED]

inverses are summed together and each market maker receives an allocation equal to the percentage of the total. Citadel would receive a 36.15 percent allocation (3.333 divided by 9.221). Using this method, not only does an individual market's ERPP matter, but so does the amount by which it differs from its competitors. For example, suppose Citadel instead bid an ERPP of 15 percent but Virtu's and Jane Street's bids remained unchanged. Citadel would then obtain 53.1 percent of the order flow allocation as shown below.

TABLE 14: VARIATION ON MARKET MAKER'S ERPP BID

	ERPP	Inverse of ERPP	Order Allocation %
Citadel	15%	6.667	53.10%
Virtu	35%	2.857	22.76%
Jane Street	33%	3.030	24.14%
		12.554	100.00%

Note that the methodology specified above does not trade off price improvement for PFOF. At this step, the market makers are agnostic to this difference. They simply bid on the amount of the profit they will retain.

- iii. Once it obtains the revenues from the order flow, the market maker retains its share then transmits the complement (one minus its retained share) to Schwab. At this point, Schwab determines the proportion of the revenues it will retain and the remainder that it will distribute to retail traders in the form of price improvement (via rebate, for example).
- iv. The proportion of the revenue that Schwab retains could be equal to the amount that would offset the revenues it would have otherwise obtained in commission fees absent PFOF.

V. CONCLUSION

81. Both regulators and practitioners extol the benefits of implementing an antitrust compliance program. As the Department of Justice has noted, "Antitrust compliance programs promote vigorous competition in a free market economy by creating a culture of good corporate citizenship."⁷⁰ In remarks to the New York University School of Law, former DOJ Assistant Attorney General of the Antitrust Division Makan Delrahim explained that, "If violations do occur, robust compliance programs should lead to prompt detection, which not only nips the conduct in the bud earlier, *minimizing the harm to consumers*, but also gives companies the greatest chance of

70. U.S. Department of Justice, Antitrust Division, Evaluation of Corporate Compliance Programs in Criminal Antitrust Investigations, November 2024, at 2, ("a well-designed antitrust compliance program should also minimize risk of civil antitrust violations. If allowed to occur, civil antitrust violations expose companies to substantial risk: civil actions resulting in equitable relief to restore competition to affected markets, treble damages actions—including federal enforcement actions on behalf of victim agencies—and monetary penalties for violations of the Hart-Scott-Rodino Act.")

winning the race for leniency under the Antitrust Division's Corporate Leniency Policy."⁷¹ Qualcomm Legal Counsel Jodie Williams likewise emphasizes the nature of harm that antitrust compliance programs seek to prevent, including reputational harm that may cause customers to feel wronged.⁷² The Compliance Program serves as a meaningful deterrent against pricing manipulation or degradation by introducing third-party oversight and potential judicial review. This accountability mechanism incentivizes Schwab to uphold rigorous standards in its routing and pricing protocols, particularly in a post-merger landscape where its market share affords outsized influence. Even modest distortions in order routing behavior or pricing incentives can significantly impact execution quality for retail investors, underscoring the need for robust safeguards.

82. By granting the Consultants access to Schwab's order routing policies and price improvement protocols, the Compliance Program introduces independent oversight over practices that directly affect trade outcomes for retail investors. This report details reasonable contingencies that would occur should Schwab implement a Compliance Program with the features contemplated herein. We caution that the analyses contained in this report rely on limited data compared to that available to Schwab, particularly the data that Schwab obtains from S3. Those data were only available to us in very limited scope, from several Schwab reports.

83. This report acknowledges issues that regulators, industry practitioners, and the literature have all documented with respect to (1) the potential conflict of interest that accompanies PFOF, (2) the use of the NBBO as the defining benchmark of best execution, and (3) the routing wheel allocation system. We reiterate, however, that the prescriptions offered herein do not and are not intended to offer a panacea for any and all perceived or actual retail trading shortcomings. Rather, we demonstrate the nature of the potential benefits that would reasonably accompany a Schwab antitrust Compliance Program that includes the prophylactic measures discussed in this report. Such prescriptive solutions all aim at lubricating the competition between market makers with respect to price improvement, yielding benefits to retail consumers.

84. We have tethered the suggested provisions we assume would characterize the Compliance Program to existing metrics and data that Schwab uses to motive its allocation decisions among market makers. Specifically, our proposed Methodology One relies on a periodic evaluation and comparison of market makers' E/Q ratios with the long-term trend, a metric that appears in Schwab's White Paper. Methodology Two proposes a related approach, focusing on the price improvement per share using a panel dataset that permits both a time-series and cross-sectional comparison. Methodology Two provides the estimated price improvement resulting from a revised order flow allocation such that share percentages mirror the order percentages allocated.

71. U.S. Department of Justice, Antitrust Division, Wind of Change: A New Model for Incentivizing Antitrust Compliance Programs, Remarks as Prepared for Delivery at New York University School of Law Program on Corporate Compliance and Enforcement, July 11, 2019, at 2, *available at*, https://www.justice.gov/d9/speeches/attachments/2019/07/11/final_delrahim_nyu_compliance_remarks_07112019-link-added_formatted_0.pdf. (emphasis added). See also, *id.* at 4, ("Enforcement often is of inherently limited deterrent value because it is retrospective. On the other hand, a company with a robust compliance program actually can prevent crime or detect it early, thus reducing the need for enforcement activity; minimizing the harm to consumers earlier and saving precious taxpayer resources.")

72. Jodie Williams, Risks and Reward: Building an Antitrust Compliance Program, Concurrences, October 2020 at 2, *available at* https://compliance.concurrences.com/IMG/pdf/building_an_antitrust_compliance_program-october_2020_-_working_paper.pdf.

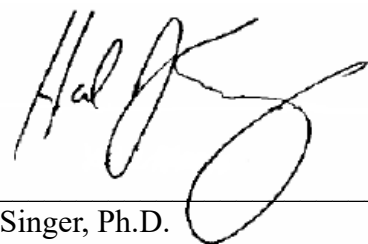
85. Under simulations of the potential benefits estimated using Methodology One and Two, we estimate that Schwab's retail customers could benefit from an increase in price improvement between approximately 1.8 percent and 2.4 percent, yielding additional price improvement of between \$10.7 million and \$14.5 million per month.

86. In the event that the previous metrics reveal deviations that engender concern on Schwab's part regarding the state of competition among market makers with respect to execution quality, we offer a more intrusive solution as a contingency. Under this proposal, market makers would bid for order flow on the basis of their ERPP, their willingness to accept lower shares of trading profits in exchange for a combination of PFOF and price improvement. This approach would offer greater transparency and, if implemented correctly, would obviate conflict-of-interest concerns. We acknowledge that such a proposal would require some modification to the current bidding and allocation process, though we reiterate that such a solution could be valuable as a contingency measure in the face of concerns regarding potential anticompetitive conduct and thus protect Schwab and its retail customers.

87. Finally, we understand that the solutions contemplated herein are still subject to approval by both parties. For clarity, the recommended features outlined in this report are not the only viable methods through which the Compliance Program could generate consumer benefits in the form of greater price improvement. Comparable mechanisms adopted within the Compliance Program may be capable of achieving similar outcomes. Nonetheless, this report seeks to quantify the anticipated benefits that would reasonably accompany an antitrust Compliance Program incorporating the measures discussed herein. To the extent that the final agreed-upon Compliance Program differs in its provisions from the recommendations in this report, we assume the expected price improvement to differ as well. Moreover, our estimates rely on limited data. Using more granular information that Schwab has available could provide more detailed insight into consumer benefits from improved execution quality. Whatever data and calculations that the Compliance Program relies upon in its final form should meet the transparency and verifiability criteria in the Merger Guidelines and discussed herein.

I declare under penalty of perjury that the foregoing is true and correct.


Executed on July 17, 2025.



Hal J. Singer, Ph.D.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on July 17, 2025.



Ted P. Tatos, MS, PStat