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ROUNDTABLE ON OPTIONS MARKET STRUCTURE

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100 F Street, N.E., Washington, D.C.

Page 2 1 PARTICIPANTS: 2 Paul Atkins, Chairman 3 Hester Peirce, Commissioner 4 Mark Uyeda, Commissioner 5 Jamie Selway, Division of Trading and Markets 6 Andrej Bolkovic 7 Jesse Brady 8 Ivan Brown 9 Shelly Brown 10 Ethan Coombs 11 Alicia Crighton 12 Steve Crutchfield 13 Nathan Duckles 14 Geralyn Endo 15 John Fischer 16 Ellen Greene 17 Richard Holley III 18 Ed Hosty 19 Eric Juzenas 20 Kevin Kennedy 21 JJ Kinahan 22 John Kinahan 23 Katie Kolchin 24 Jon Kroeper 25 Matt MacKenzie	Page 4 1 CONTENTS 2 PAGE 3 Opening Remarks 5 4 5 Data Presentation 17 6 7 Panel One: Facilitating Competition in a Quote- 8 Driven Market 30 9 10 Panel Two: Evaluating the Customer Experience 112 11 12 Remarks from SEC Chairman Paul S. Atkins 174 13 14 Panel Three: Opportunities and Challenges of 15 Growth 178 16 17 Concluding Remarks 160 18 19 20 21 22 23 24 25
Page 3 1 PARTICIPANTS (Continued): 2 Arun Manoharan 3 Faris Matalka 4 Stewart Mayhew 5 Stino Milito 6 Dmitriy Muravyev 7 Nathaniel Pomeroy 8 Racquel Russell 9 Andrew Schultz 10 Christopher Schwarz 11 Stephen Sikes 12 Steve Sosnick 13 Jim Toes 14 Michael Treacy 15 Kevin Tyrrell 16 17 18 19 20 21 22 23 24 25	Page 5 1 PROCEEDINGS 2 MR. SELWAY: Good morning. Welcome to the 3 Options Roundtable, those of you in the room, and thank 4 you to those of you watching online. My name is Jamie 5 Selway. I am the director of the Commission's Division 6 of Trading and Markets. 7 Today, we are shining a spotlight on the 8 option market, which often gets lost on the shadow of 9 its bigger and older brother, the equity market. But 10 today we will remedy that a bit. We've got a very 11 impressive group of experienced options practitioners, 12 academics, and folks to join us today. 13 I would like to start by welcoming our 14 commissioners, Commissioner Uyeda, Commissioner Peirce. 15 We'll start with remarks from them. 16 Commissioner Peirce, I believe you are up 17 first. 18 OPENING REMARKS 19 COMMISSIONER PEIRCE: Thanks, Jamie. 20 Welcome, everyone. This is a great morning. 21 I'm very excited about this Options Roundtable. Thank 22 you to all the participants and to everyone attending, 23 either in person or online. And thanks to the 24 Commission Staff who made this happen. I am also very 25 grateful to the people who submitted comment letters.

Page 6 1 We have a written comment file for this roundtable, and 2 we've gotten some really productive submissions with 3 problems identified and potential solutions and 4 recommendations. So thank you for that. And for those 5 of you watching, feel free to weigh in by submitting 6 your own written comment. 7 I do expect the discussion today to be 8 informative and entertaining. After all, even the 9 terminology in the options markets is fun. Butterfly 10 and condor spreads? I mean, how can you beat that? We 11 don't do that in the equity markets. 12 So as Jamie mentioned, despite the fact that 13 the options market is so intriguing, the equities 14 markets tend to overshadow the options market in the 15 Commission's time and attention. And so I think that 16 it's good that we're remedying that today. 17 As we have been writing and rewriting Reg NMS 18 for the equities market, the options market has grown 19 enormously. That growth has not been just in notional 20 value or in volume, but also in participation and 21 sophistication and in the role of the market within the 22 broader capital markets. 23 Because of the importance of this market, a 24 persistent item on my wish list as Commissioner has been 25 that we have a roundtable. And thank you, Jamie, for	Page 8 1 of clearing firms, which raises concerns about 2 resiliency and capacity. We have seen a concentration 3 of activity in a few market makers which, combined with 4 the cost of connecting to numerous venues and quoting 5 across millions of options raises concerns about 6 competition and barriers to entry. We've noted the 7 proliferation of strikes, the limited interest in many 8 of them, and the attendant consequences to the market, 9 its infrastructure, and its participants. We've heard 10 from some industry members that generous market maker 11 allocation formulas established years ago to incentivize 12 liquidity provision may inhibit competition and may no 13 longer be necessary in the current market landscape. 14 We've received calls for more transparency with respect 15 to options market data. And, of course, as with many of 16 our markets, we've heard of both the opportunities and 17 the challenges associated with 24/7 trading and 18 tokenization also. 19 I look forward to a lively discussion on all 20 these topics and more. And unlike the Commission's 21 recent roundtables on the equity market, which have 22 focused on how the Commission can undo the damage it 23 caused through its own Reg NMS heavy-handedness, I 24 anticipate that the solutions that will emerge from 25 today's discussion will be industry led, with the
Page 7 1 making this wish come true today. 2 But should I, who is someone who generally 3 thinks about markets as perfectly capable of functioning 4 on their own with very little regulatory oversight, be 5 inviting oversight of the options market? While the 6 equity markets have been pushed and pulled by the 7 detailed mandates of Reg NMS, the options market has had 8 more space to develop its own solutions, sometimes with 9 gentle nudging from the Commission. 10 And we're not here today because the options 11 markets are failing, we're here because they're 12 succeeding. We want to ensure that the options market 13 continues to function effectively. As trading and 14 participation reaches new highs, the Commission's role 15 is to ensure that the plumbing is sound and that the 16 playing field remains open to competition. 17 As we will hear today, the growth in the 18 options market has been impressive, but it has brought 19 with it some matters worthy of consideration. For 20 example, we have seen a proliferation of exchanges -- 21 there are soon to be 20 -- which raises the question of 22 whether we are fostering competition or fostering more 23 market fragmentation, added cost, and greater 24 complexity. 25 We have seen a notable reduction in the number	Page 9 1 Commission providing a -- playing a supporting role. 2 The recent changes to the methodology of the 3 options regulatory fee, which charmingly is referred to 4 as the ORF, are an example of such a solution. Under 5 the previous methodology, the ORF permitted an options 6 exchange almost limitless ability to charge regulatory 7 fees, even for transactions that occurred on other 8 exchanges or involving a product that was not traded on 9 that exchange. This ability, akin to the state of 10 Maryland being able to charge a toll on your car when 11 you're driving over a bridge in Texas, helped to 12 encourage exchange proliferation. 13 A year ago, when I attended the Options 14 Industry Conference, many doubted that this problem 15 could ever be solved. Yet less than a year later, all 16 the options exchanges have submitted rule changes 17 limiting their ability to assess ORF fees on 18 transactions that are not executed on their own 19 exchange. 20 I want to congratulate the industry and our 21 Staff in Trading and Markets on the welcome change. 22 Special shout out to Richard Holley. 23 I hope that the discussions today will lead to 24 similar solutions in the options market that facilitate 25 its growth, foster its resilience, and continue to

Page 10 1 support innovation that serves investors well. 2 Thank you all. 3 (Applause.) 4 COMMISSIONER UYEDA: Well, good morning, 5 everyone, and thank you, particularly to our Staff in 6 the Division of Trading and Markets, as well as the 7 other Staff of the Commission for organizing this 8 Roundtable on Options Market Structure. Many thanks 9 also to our participants here today who have taken the 10 time to join us and prepare for this event. We look 11 forward to hearing your thoughts. 12 For as long as I can remember, equity market 13 structure and, to a lesser extent, fixed income market 14 structure have taken center stage at the Commission. 15 It's in our public and regulatory dialogue. In fact, 16 over the years, we've convened advisory committees in 17 both of those areas. Issues like fragmentation, 18 concentration, data asymmetries, and uneven execution 19 quality have been studied exclusively on the equities 20 side. But data recently released by the Commission 21 makes clear that many of the concerns long debated in 22 equities exist even to a greater extent in options. 23 During the last 10 years, the options 24 landscape has transformed dramatically. Growth in 25 retail participation, particularly in short-dated and	Page 12 1 thoughtful, measured reform. So I thank Chairman Atkins 2 and also our Staff for convening this Options Market 3 Structure Roundtable. Thank you. 4 (Applause.) 5 MR. SELWAY: So thank you, Commissioners 6 Peirce and Uyeda, for your remarks today and for your 7 engagement on options market structure. In particular, 8 I would like to credit Commissioner Peirce with the idea 9 of this roundtable which has been granted. Her advocacy 10 and leadership on options help make today possible, and 11 her intellectual curiosity, her passion for our work, 12 and her dedication to core Commission principles 13 regularly make our division better. 14 I also would like to thank our moderators and 15 distinguished panelists for lending us your valuable 16 time, your expertise, and your experience today to help 17 inform the Commission and the investing public we serve. 18 We are confident this group will lead us through a 19 lively, thought provoking, and informative discussion 20 about current issues in the options market. 21 Before I begin, please note that my remarks 22 today are provided in my official capacity as the 23 Commission's Director of the Division of Trading and 24 Markets and do not necessarily reflect the views of the 25 Commission, the Commissioners, or members of our Staff.
Page 11 1 ultra-short-dated strategies has reshaped order flow 2 dynamics, execution pathways, and the economics of being 3 a liquidity provider. 4 These developments should cause us to 5 reconsider the assumptions behind our existing 6 regulations. For example, how does increasing 7 fragmentation with 15 exchanges with greater than 1 8 percent market share affect the execution quality of 9 retail marketable orders? We should also consider 10 issues in the institutional space, such as the practical 11 effects of market maker entitlements, data asymmetries, 12 and competitive barriers. Do today's institutional 13 market makers still require the types of incentives and 14 entitlements that exist in current floor auction rules, 15 or has the market evolved to a point where those 16 mechanisms should be revisited? 17 The Commission should optimize regulations for 18 all types of market participants, including individual 19 persons who are often the beneficiaries of the efforts 20 of institutional investors. I look forward to public 21 feedback on how our rules can be modernized to 22 strengthen execution quality, enhance competition, and 23 ensure that the options market can effectively serve 24 investors, institutions, and issuers alike. 25 The data is clear and the moment is right for	Page 13 1 This disclaimer also applies to the comments of my 2 Division colleagues who will join me as part of today's 3 program. 4 As we explore current topics in option market 5 structure today, it is useful to remember the 6 Commission's last deep dive into the listed options 7 waters was in 2004, a concept release on competitive 8 developments in option markets. The concept release 9 reflected on fundamental questions about how 10 competition, technology, and investor protection 11 intersect in the option markets. It came on the heels 12 of a transformational time for options. Multiple 13 listing standards had been introduced in August of 1999, 14 driving venue competition. The International Securities 15 Exchange -- remember that? -- launched in May of 2000, 16 becoming the first new entrant in the options market in 17 more than two decades. Controversy marked the 18 introduction of payment for order flow and 19 internalization to option markets then, as execution 20 venues sought to differentiate themselves to customers. 21 Some of the questions raised in the concept release, 22 such as the appropriateness of execution quality 23 disclosure to options trading, remain relevant today. 24 Now, more than 20 years later, the option 25 market has seen phenomenal growth with increasing retail

Page 14 1 participation and the addition of more options 2 exchanges, and hence more competition and more investor 3 choice. At the same time, option markets are working 4 harder than ever. The sharp increase in the number of 5 option classes and series and exploding quote traffic 6 necessitate higher levels of technological investment 7 and capital commitment. And despite these 8 transformative changes, liquidity is even more 9 concentrated in a limited set of the most active 10 symbols. Wide spreads are common in less liquid 11 symbols. And large market makers occupy a significant 12 number of specialist appointments. And consolidators 13 control the vast majority of retail flow. Many of the 14 same issues and questions from 2004 persist. It is 15 therefore incumbent upon us to reinform ourselves and 16 revisit where things stand. 17 In our first segment today, we will delve 18 deeper into these trends via data. As we listen, 19 consider that what's old is new again, albeit with a 20 modern twist. As the option market evolves, many of the 21 underlying policy questions with which the Commission 22 and market participants have grappled over the years 23 remain familiar. But today, we consider these policy 24 questions in a landscape that is profoundly more 25 automated, interconnected, and complex than ever before.	Page 16 1 robust discussions that will help us assess these 2 important market structure issues. 3 Today, first, we will hear from Jesse Brady 4 and Ethan Coombs from the Division's Office of Analytics 5 and Research. Jesse and Ethan will present highlights 6 from their paper that was released last week to support 7 today's discussion. The paper is available on the 8 roundtable website and on the Commission's market 9 structure analytics page. The data describes key trends 10 observed in the options market in recent years. 11 Following the presentation, we will have three 12 panel discussions. Panel One, moderated by Division 13 colleague Arun Manoharan, will examine how current 14 option market structure facilitates or hinders the 15 ability of liquidity providers to compete fairly and 16 freely in furtherance of a robust national market 17 system. 18 Our second panel will discuss the customer 19 experience with listed options. Division colleagues 20 John Kroeper and Eric Juzenas will moderate. 21 After lunch, Chairman Atkins will be making 22 remarks. 23 Our third and final panel will be moderated by 24 Richard Holley and will consider the growth of listed 25 options, the associated challenges and opportunities
Page 15 1 For example, we continue to consider ways to 2 promote and facilitate competition, while addressing any 3 potential negative effects of fragmentation. At the 4 same time, new issues have emerged such as short-term 5 options series with more expirations during the week. 6 And ORF, as Commissioner Peirce noted, I'm happy to say 7 that in the case of the options regulatory fee, every 8 exchange has amended its rules as part of successful if 9 long overdue industry-led reform effort. This reform 10 will move the marketplace to a more equitable and fair 11 regulatory funding model on July 1 of this year. 12 And to the exchange leader who volunteered 13 last fall to participate in an ORF roundtable on 14 December 24, your Christmas comes early in 2026. 15 Today's roundtable is an effort by the 16 Commission to once again engage with market participants 17 in a thoughtful dialogue on these issues and to 18 reexamine and reaffirm an approach that supports 19 transparency, fairness, and competition in the markets 20 that investors rely on every day. We should consider 21 how to respond to changing market dynamics whether in 22 technology, trading behavior, or market participation, 23 and reflect on our collective past experience and 24 lessons learned as we do so. 25 I expect that today's panel will provide	Page 17 1 that growth presents, and the issues that the Commission 2 and market participants should consider in the years 3 ahead. 4 Again, thank you to everyone participating in 5 today's roundtable. We look forward to exploring with 6 you an interesting and always evolving segment of the 7 marketplace which is increasingly important to 8 investors. 9 I'll now bring up Jesse and Ethan for their 10 presentation. 11 Gentleman. 12 (Applause.) 13 DATA PRESENTATION 14 MR. BRADY: My name is Jesse Brady. I am with 15 the Office of Analytics and Research. 16 First, I want to thank Jamie for this 17 opportunity, as well as everyone else that helped 18 support this effort. It takes a lot of people to put 19 something like this together and we really appreciate 20 all the assistance. 21 I am in the Division of Trading and Markets. 22 And today we are going to be talking through the 23 supporting data paper. We are going to pull out some 24 highlights for discussion here. There is more detail 25 available on the paper, as Jamie stated, that's posted

Page 18 1 on our website. 2 Before we get started, I will read another 3 disclaimer. Ethan and I are presenting today in our 4 official capacities as Staff of the Division of Trading 5 and Markets. This work does not necessarily reflect the 6 views of the Commission, the Commissioners, or other 7 members of the Staff. 8 The presentation today will follow along with 9 the sections in our supporting data paper, if you're 10 following along with the paper copy. The first section 11 is going to be the options market trends. 12 This really isn't a surprise probably to 13 anyone in this room, but options markets have been 14 expanding very rapidly over recent years. I think Jamie 15 and the Commissioners did a great job of summarizing 16 that. But we wanted to put some numbers to that to help 17 further explain this. 18 In 2012, there were around 3,400 underliers 19 that traded any options trade in the year. And by 2025, 20 that number had increased to over 8,000, representing 21 the majority of NMS stocks, a considerable increase in 22 terms of the number of underliers. Additionally, when 23 we look at individual options securities or OSIs, we 24 went from around half a million in 2012 to nearly five 25 million in 2025. So again, a very significant increase.	Page 20 1 quote to trade ratio, to the equity markets. So we 2 looked at the period 2017 to 2025, and we're showing it 3 here on the screen. The blue line representing the 4 options quote to trade ratio, and that aligns with the 5 right axis, OPRA quote to trade ratio. The red dotted 6 line is the equity SIP quote to trade ratio which you 7 can see on the red dotted line on the screen. As we're 8 showing here, the option quote to trade ratio nearly 9 doubled, going from around 10,000 to nearly 20,000 over 10 this period. Meanwhile, the equity quote to trade ratio 11 was rather stable, starting and finishing near 15. 12 In terms of message counts, what that 13 translates into is that we have OPRA message totals 14 increasing by 1,300 percent over this period. Meanwhile 15 equity SIP messages only increased by 200, so only 16 double. 17 Despite all this increase in activity and 18 messaging that we've talked about, we also noted an 19 increasing concentration in the top symbols. So the top 20 10 symbols in 2012 accounted for around 24 percent of 21 all trading, about a quarter of all trading. By 2025, 22 that had increased to over 30 percent, approaching a 23 third of all trading concentrated in only the top 10 24 equity symbols. The concentration we noted was even 25 greater in ETP options. In ETP options, the top 10
Page 19 1 In terms of the venues where options can trade, we went 2 from 14 exchanges in 2012 to 18 in 2025, with additional 3 ones on the way. 4 When we talk about options market expansion, 5 the conversation frequently shifts to the quote traffic 6 and message traffic. So we will go over that a little 7 bit here. 8 In 2017, the quote to trade ratio in options 9 was around 9,000 to one. Kind of an eye-popping number 10 on its own. But by 2025, that had increased to 17,000 11 to one. And what that means in terms of quote messages, 12 in 2017, on the OPRA wire, about nine billion quotes 13 were going out per day in 2017. And now in 2025, by the 14 end of the year, we were around 131 billion quotes per 15 day, which is a large increase on its own. But there 16 were even more significant peaks earlier in 2025. 17 We pulled a quote from the paper which I think 18 is pretty impactful. By the end of 2025, the OPRA feed 19 was disseminating 3,275 times more messages than it did 20 in the year 2000. Or nearly a full day at that 2000 21 rate, which was around 40 million a day, every seven 22 seconds. I think that is helpful to put this in 23 context. 24 Now we wanted to compare the increases we've 25 talked about in the options market, especially on the	Page 21 1 products account for almost 84 percent of total volume. 2 The next section we are going to talk about 3 from the paper is the options market makers. I think 4 the Commissioners did a great job summarizing some of 5 the difficulties facing market makers, and we wanted to 6 put some numbers to support those -- the hardships that 7 market makers may have been facing. 8 When we look at the count of market makers 9 that reported any focus revenue for options market 10 making, in 2012, we had a total of 98. That number was 11 rather stable until 2015 or so, and then we see a pretty 12 stark decline, where we go into the seventies, down as 13 low as 50 in 2021. This is a significant decline in the 14 number of market makers reporting any revenue, much less 15 significant revenue. In the paper we discuss this 16 concentration seems to be strongest in the small market 17 makers. 18 We will note from 2021 to 2025 we had the 19 rapid expansion in terms of options market growth. 20 However that doesn't seem to translate directly into the 21 number of market makers, as we see that number does 22 stabilize, but we do not see a material increase. 23 The next section which is surely going to get 24 a lot of coverage on the panels today is payment for 25 order flow or PFOF. Again, we have a couple quotes from

Page 22 1 the paper here. Aggregate PFOF payments in options now 2 dwarf those in equities due to a couple factors. One 3 being the higher per-contract rates and then 4 additionally, the growth of the retail options market. 5 Now what this leads to is now PFOF payments from options 6 account for two thirds of all payment for order flow. 7 The next quote we have here from the paper. 8 Recent academic research finds that the top five payment 9 for order flow providers account for over 95 percent of 10 the total payment for order flow received by brokerages. 11 Options PFOF is highly concentrated, and the top three 12 account for as much as 90 percent of total payment for 13 order flow. 14 The next section we'll talk about from the 15 paper is market quality and competitive dynamics. The 16 first metric we get into in this section -- and again, 17 as the rest of this presentation will have a little more 18 data, we'll spend a little more time on each slide. 19 The first metric we looked at were effective 20 spreads in equity options. What we see here is an 21 overall decline when we look at all classes. We see 22 that number in 2012 going from 2.2 percent to 1.9 23 percent in 2025. You can see on the far righthand, the 24 change here is about 30 basis points. However that 25 decline in effective spreads is really concentrated only	Page 24 1 This is a sale condition breakdown for 2 customer orders. It shows that over 26 percent of 3 customer dollar volume is classified as multi-leg 4 electronic, so orders executed in the complex order 5 book. Over 11 percent of customer dollar volume was 6 multi-leg auction, which are complex orders executed in 7 a price improvement auction. Two point seven five 8 percent of customer dollar volume is classified as 9 other. Many of those orders were executed on the 10 options floor. The remaining 60 percent of volume are 11 single-leg orders executed in either the electronic 12 order book or price improvement auction. 13 On the following slides, we've provided CAT- 14 derived execution metrics for those single-leg orders 15 that make up more than 60 percent of individual customer 16 dollar volume. 17 On this slide, we examine price improvement 18 and effective spreads for marketable orders, the vast 19 majority of which are executed in the electronic order 20 book or price improvement auction. We've looked at 21 these market quality metrics across spread widths. For 22 these metrics, marketable means the limit price could 23 execute across the NBBO at the time of first submission 24 to an exchange. Price improvement and effective spread 25 were both calculated on that initial NBBO.
Page 23 1 in the top 10 symbols. The second line here, the 1 2 through 10, moved from 1.3 percent in 2012 to 0.9 3 percent in 2025, a 40 basis point decline. As we see on 4 the rest of the graph, every other bucket of securities 5 has an increase in effective spreads over this period. 6 Some of these are rather large. If you look 7 at the hundred and first to two hundred and fiftieth 8 underliers, you see an increase of 150 basis points. 9 The next metric we looked at was the trade 10 weighted quoted spreads in equity options. Again, these 11 were constant for the top 10, going from 1.6 to 1.6, 12 unchanged. But did widen for all other underliers. ETP 13 options also had a very similar pattern of increases. 14 As we see in the table here on the righthand 15 side, these changes were also very significant. We have 16 changes going from 110 basis points up to 260 basis 17 points, so considerable increases in that trade weighted 18 quoted spread. 19 The next section we are going to present on is 20 the customer experience in options. And I am going to 21 invite my colleague Ethan Coombs up to do this section. 22 MR. COOMBS: Thank you, Jesse. 23 This next section about the customer 24 experience will examine how customer orders are executed 25 in the options market.	Page 25 1 For marketable orders, we think price 2 improvement is a particularly valuable metric, due to 3 the fact that by crossing the entire spread, marketable 4 orders control for the variable aggressiveness of the 5 customer in non-market limit orders. The top table 6 shows price improvement where auctions live up to their 7 price improvement name by providing the most improvement 8 across spread widths. For example, 22 percent of orders 9 that had a quoted spread between a penny and a nickel 10 executed at a price better than the NBBO; 89 percent of 11 orders with a spread between \$1 and \$5 were executed at 12 better price. Compare this to the electronic book, 13 where almost no orders had price improvement with spread 14 widths between a penny and a nickel, and 5 percent of 15 orders were improved where spreads were between \$1 and 16 \$5. 17 The second table shows that effective spreads 18 for the electronic market and price improvement auctions 19 were very similar across the more narrow spread widths. 20 As quoted spreads widen, auctions result in lower 21 effective spreads. For instance, when quoted spreads 22 were between a quarter and a dollar, effective spreads 23 were 17 cents for auctions and 37 cents for electronic. 24 On this slide, we show the utilization rate 25 between the various execution methods across spread

Page 26 1 widths for individual account marketable orders. Across 2 spread widths, the electronic order book is used one and 3 a half to three times more than price improvement 4 auctions. 5 Here are the same metrics for individual 6 account nonmarketable limit orders instead of marketable 7 orders. Again, we look at price improvement in the top 8 table and effective spread below. We see high rates of 9 price improvement across the board, which is what you 10 would probably expect, given that the initial limit was 11 inside the initial NBBO that is used to calculate price 12 improvement. We do still see high rates of price 13 improvement for auctions, 96 percent versus 80 percent 14 for electronic executions, where the NBBO is less than 15 or equal to a nickel. 16 When we turn to effective spreads, again as 17 below, we see significantly lower effective spreads for 18 auctions versus electronic execution in all market 19 widths greater than a nickel. For instance, in markets 20 with a quoted spread of 6 to 10 cents, we see auctions 21 providing an effective spread of 2 cents versus 5 for 22 electronic. 23 On this slide, we show the utilization rate 24 between execution methods across spread widths for 25 individual account non-marketable limit orders.	Page 28 1 In our final section, we would like to talk 2 about the types of accounts we see participating in 3 options trading. Here we have the rates of CCIDs 4 reporting any amount of options trading. Despite the 5 options market growth, those rates are still single 6 digit outside of the other proprietary CCID category. 7 In our data, we see the rate of new individual 8 customer CCIDs declining and an increasing trend for 9 foreign CCIDs. We want to note here that foreign CCIDs 10 can sometimes represent an omnibus account with multiple 11 people behind it, so it isn't a perfect comparison to 12 the individual customer account type. 13 (Pause.) 14 MR. COOMBS: Should I tell my joke now? 15 MR. BRADY: Yeah, do your joke. 16 MR. COOMBS: I have a joke from my nine year 17 old. Why didn't the black hole cry? It pulled itself 18 together. 19 It's from a nine year old. You have to laugh 20 or you're bullying a child. 21 (Laughter.) 22 MR. COOMBS: Looking at individual customer 23 CCIDs, we should be clear that we are documenting CCIDs 24 new to CAT, which starts in mid-2021. So the fast 25 falloff at the beginning should be viewed as our data
Page 27 1 Interestingly, we see our highest auction utilization 2 rate of any band with non-marketable limit orders and 3 spreads between a penny and a nickel. This is the only 4 band in our data that has a higher than 50 percent 5 auction execution rate. Auction usage rates decline as 6 spread widths widen for non-marketable limit orders in 7 our sample. 8 We are going to turn now and talk about 9 trading in options with zero days to expiration. 10 Options have always traded on their expiration 11 day, but they have grown in popularity in recent years. 12 You can see the growth from 2022 to 2025 here. 13 On this slide, we show which types of accounts 14 are active in zero day versus non-zero day options. 15 Individual customer accounts, represented by the dark 16 blue, are a much larger percentage of volume at 17 expiration than non-expiry days. Institutional 18 customers, on the other hand, are a much smaller 19 proportion of volume in zero day options than others. 20 You can see institutional customers in the light blue. 21 Here we looked at the types of customers that 22 traded zero days in 2022 versus 2025. We find that 23 while it is still disproportionately individual 24 accounts, some of the market share has gone towards 25 other proprietary and foreign broker types.	Page 29 1 converging to the actual number of accounts being 2 activated. After that convergence is functionally 3 complete, we see the number of monthly CCIDs stabilize 4 before entering a long, slow decline in 2024, which 5 continues despite the record high contract volumes in 6 the options market. 7 There isn't a big enough reservoir of 8 preexisting foreign accounts to have an obvious 9 convergence at the beginning, and we see a clear pattern 10 of growth for most of the period. The highest number of 11 new foreign CCIDs is still several times lower than 12 individual accounts. 13 As Staff members, we don't want to speculate 14 on if or when they might pass each other. But if our 15 panelists want to give it a shot, they should feel free. 16 Okay, that's it for us. I want to say thanks 17 for coming here today and for reading the paper. I hope 18 it's helpful and supports a fruitful conversation about 19 the options market. 20 (Applause.) 21 MR. SELWAY: Many thanks, Jesse and Ethan. 22 Thank you for contending with technology. Better to 23 break closer to the end than the beginning. 24 So panelists for the first panel please come 25 up and join us. Arun also.

Page 30 1 Wonderful. Well, I am happy to introduce my 2 colleague from the Division, Arun Manoharan, who will 3 moderate our first panel. 4 Arun, you ready to roll? 5 MR. MANOHARAN: Ready to roll. 6 PANEL ONE: 7 FACILITATING COMPETITION IN A QUOTE-DRIVEN MARKET 8 MR. MANOHARAN: All right, good morning, 9 everyone. As Jamie mentioned this is the first panel of 10 three. And it's titled Facilitating Competition in a 11 Quote-Driven Market. We are going to talk about a range 12 of issues today, ranging from market maker guarantees, 13 price improvement auctions, and more. 14 As Jamie mentioned, my name is Arun Manoharan. 15 I am assistant director in the Office of Analytics and 16 Research in the Division of Trading and Markets. I've 17 been at the SEC for over 12 years. And many of those 18 years, I have worked on a ton of different issues in the 19 options market. And so I am very excited to be the 20 moderator today, along with Director Selway. And we 21 have a great number of experienced market professionals 22 today to help us on the panel, many of whom I've worked 23 with over the years. And so to kick us off, let's 24 everyone introduce ourselves, starting with Ivan. 25 MR. BROWN: Good morning. I am Ivan Brown,	Page 32 1 And I should say for the record, my opinions 2 today are my own and not necessarily those of CTC or any 3 other party. Thanks for having me. 4 MR. DUCKLES: Hi. My name is Nathan Duckles. 5 I lead our U.S. equity options business at Jane Street 6 and have helped to build and support Jane Street's 7 options business since I started there in 2008. 8 As background, Jane Street is a global market 9 making and quantitative trading firm that's active in a 10 broad range of asset classes around the world. In the 11 U.S., we provide equities and options liquidity as a 12 market maker, as an institutional liquidity provider, as 13 a wholesaler. By volume, we are one of the largest U.S. 14 options market participants. 15 I would like to thank Chairman Atkins, 16 Commissioners Peirce and Uyeda, Directors Selway and 17 Manoharan, and Richard Holley and the whole Trading and 18 Markets team for the opportunity to engage on these 19 important subjects alongside such a distinguished group 20 of industry colleagues. 21 MR. FISCHER: Good morning. I'm John Fischer, 22 head of market structure and business development at 23 Citadel Securities. We are a leading market maker in 24 the U.S. options ecosystem, serving both retail and 25 institutional participants. We provide liquidity on
Page 31 1 head of options at IEX. Prior to that, I served as head 2 of options and business development for the New York 3 Stock Exchange. 4 I want to thank the Commissioners and Staff 5 for providing this forum today to discuss important 6 issues in the growing and dynamic U.S. options markets. 7 Given the extraordinary growth in options trading, it's 8 critical that market structure remains well positioned 9 to support vigorous competition, strong displayed 10 markets, and positive outcomes for end investors. We 11 look forward to working cooperatively with all industry 12 participants in advancing this goal. 13 IEX is proud of its record as an innovator, 14 driving more liquidity and better prices on its equities 15 market, and we're excited to bring that same approach to 16 options later this year. Thank you for having us. 17 MR. CRUTCHFIELD: Good morning. I'm Steve 18 Crutchfield. Until recently, I was a partner at Chicago 19 Trading Company, where I was head of business 20 development globally. Prior to that, also at CTC, I 21 oversaw equity options market making for the firm. 22 Previously, I was an executive vice president and head 23 of options and ETFs for New York Stock Exchange, among a 24 number of other roles there. I was also CEO of NYSE 25 AMEX options.	Page 33 1 screen as well as across all options trading floors. 2 The U.S. options markets are the envy of the 3 world. Retail participants in particular have never had 4 it better. They benefit from significant price 5 improvement, free commission trading, and access to a 6 wide range of innovative products. 7 That said, there are targeted areas that we 8 believe warrant review. Exchange proliferation has 9 introduced significant cost and complexity to the 10 market. We estimate that small options venues introduce 11 a cost of \$200 million to the industry annually. We 12 should also consider introducing Rule 605, execution 13 quality disclosure, to options. We should evaluate the 14 role that trading floors play in options ecosystem. We 15 believe that the value that they once introduced to 16 investors is no longer the case. And we should consider 17 modernizing capital requirements to ensure they are 18 sufficiently risk based. I look forward to the 19 discussion today. 20 MR. JOHN KINAHAN: Hi, good morning. My name 21 is John Kinahan. I am the CEO of Group One. Group One 22 is a market making firm that is somewhat unique among 23 some of its larger competitors in that we don't have an 24 affiliated arm or related company to wholesale or route 25 order flow. I've been at Group One for the entirety of

Page 34 1 my career and have been the CEO since 2014. 2 I want to thank the Commission for offering us 3 the platform to speak. I think in many ways our markets 4 are extremely well functioning and thriving, but there 5 is always something new to talk about. There are some 6 old things to talk about, too. And I'm grateful for the 7 platform. So thank you. 8 MS. KOLCHIN: Hi, I'm Katie Kolchin. I'm head 9 of equity and options market structure for SIFMA. I 10 wanted to thank the Chairman, the Commissioners, Jamie 11 and Richard and the whole team for inviting me to join 12 this important conversation today. And I want to thank 13 Commissioner Peirce for some inspiration earlier. 14 Both Jamie and Richard had asked me what 15 animal I was going to come up with for today, and I was 16 struggling until Commissioner Peirce said butterfly. 17 And it dawned on me, despite their small size and their 18 delicate nature, butterflies are actually extremely 19 resilient and adaptive, and that's what the options 20 markets have been. 21 MR. MAYHEW: Thanks to the Commission and the 22 Division of Trading and Markets for inviting me. My 23 name is Stewart Mayhew. I am the honorary former 24 academic on the panel. I started my career teaching 25 MBAs as a finance professor at Purdue University. I	Page 36 1 Nasdaq Exchange Board. I look forward to discussing 2 these topics today. 3 MR. SOSNICK: Hi. My name's Steve Sosnick. 4 I'm the chief strategist at Interactive Brokers. A 5 little background is I started -- I joined the firm 30 6 years ago. I joined this little market making firm 7 called Timber Hill. I co-managed our options market 8 making for many years before we exited the business to 9 focus on customer business, to speak to that chart of 10 declining market maker participation. We felt it was 11 better to serve our customers by not wearing two hats. 12 But over the years, I sort of morphed into a 13 talking head, basically. Right? Mostly writing, 14 presenting, things of that nature. 15 A quick thing, I last spoke in front of the 16 SEC at a panel you guys did after Dodd-Frank in New York 17 when that came in. And there was a panel basically 18 that -- 19 MR. SELWAY: Welcome back. Let's do better 20 this time. 21 (Laughter.) 22 MR. SOSNICK: So, yeah. The talk was, like, 23 Congress handed us this legislation. Can you help us 24 figure out what to do with it? And it was a roundtable 25 of this nature. So I'll let everybody else decide how
Page 35 1 came to the SEC. I was here for eight years, from 2002 2 to 2010, where I worked on many of the option SRO 3 exchange rulemaking projects. I was in the Office of 4 Economic Analysis, which is now known as DERA. And 5 options has been the focus of my academic career, it was 6 a focus of much of what I did here at the SEC. 7 For the last 15-plus years, I've been at 8 Cornerstone Research, where I co-head our securities 9 enforcement practice area. I work on a lot of civil 10 litigation matters and internal investigations. But one 11 of the things I do there is assist market participants 12 to evaluate and analyze and comment on proposed SEC 13 rulemaking, including in the trading and markets space. 14 So I'm pleased to be here, and I look forward to hearing 15 everybody's remarks. 16 MR. SCHULTZ: Hello. I'm Andrew Schultz from 17 Susquehanna. I would like to thank the SEC and the 18 other participants for including us in this roundtable. 19 I've been with Susquehanna for 29 years, beginning my 20 career as an options market maker on the AMEX floor. 21 For the past 15 years, I've served as head of strategic 22 options business development, working closely with our 23 market making and technology teams to prioritize and 24 advance our options initiatives. I previously served on 25 the MIAX Exchange Board and I currently sit on the	Page 37 1 that went. 2 And so I am very happy to be here and happy to 3 represent my firm on behalf of this. And thank you to 4 the Commission, the Commissioners, and to Richard Holley 5 for putting this together. 6 MR. TYRRELL: Hi. I'm Kevin Tyrrell. I am 7 the head of markets at NYSE. I would like to thank the 8 Commission and the Staff for having me here today and am 9 very happy to be put on a panel with so many esteemed 10 NYSE alumni. 11 NYSE operates two options exchange, NYSE 12 American, NYSE Arca. We have a little over 21 percent 13 of market share in multi-listed trading volume. And 14 uniquely, we have two trading floors in addition to the 15 full electronic offering. 16 In terms of the options industry, we view the 17 industry as fundamentally strong, echoing many of the 18 sentiments already spoken here today, and we think 19 that's really created this environment for the 20 phenomenal volume growth we've seen over the last few 21 years. So we are eager to work with the industry on 22 keeping the ball moving forward, keep advancing topics. 23 I think the industry is strongest when it works together 24 and collaborates. And I think upcoming topics like 25 extended hours trading are going to need a lot of

Page 38 1 industry collaboration, so we are here to work with 2 everyone. 3 MR. MANOHARAN: All right, fantastic. So 4 first we are going to turn to Katie, who is going to 5 provide some context on the options market that will 6 help inform today's discussion. 7 Katie, the floor is yours. 8 MS. KOLCHIN: Thank you. So we thought since 9 this is panel one, it would be nice to set the scene. 10 So some of which I'm going to say everyone in this room 11 knows. But for the benefit of everyone who is going to 12 tune in, either live or on the recording of this, so 13 people like to draw comparisons between the options and 14 equity markets, but they have very different market 15 structures. Options are quote-driven markets versus 16 order-driven in equities. So at a high level in what's 17 going to be important for this panel, this means options 18 markets are determined by those who make the markets 19 rather than by the investors. 20 There is no off-exchange trading in options, 21 whereas equity markets currently trade just under 50 22 percent off exchange. If you turn to products traded, 23 options have between 1.9 to 2 million strikes, depending 24 on the time period you're looking at, versus over 10,000 25 stocks and ETPs in equities. So that's 188 times more	Page 40 1 million contract level, and that's a 260 percent 2 increase since 2019. There is growth in venues, again 3 the 18 going on 20. You can get to a similar 260 4 percent growth rate if you go back to 2000 when there 5 were only five exchanges. But even since 2010, there 6 has been around 100 percent growth in number of venues. 7 There's growth in strikes. If you think about 8 that 1.9 to 2 million, depending on time period again, 9 that's an over 100 percent growth rate since 2019. 10 The team presented earlier the growth in 11 messaging. And the number was over 1,300 percent since 12 2017. There's growth in products to be traded. So if 13 you look at the CBOE data, there's more than half the 14 volume now. The split has shifted, if you split it by a 15 less than one week to expiration versus over one week. 16 Now it's more towards the less than one week. And as we 17 saw earlier, 28 percent of that is zero DTE. 18 So what does all of the growth mean? Well, 19 for retail, it has produced a positive experience. I am 20 sure you are going to hear this 50 more times today, but 21 retail has never had it better. 22 So does that mean our conversation ends here? 23 No. First, we can always strive to be even better. And 24 second, growth comes with a darker side, too. Let's 25 talk about strike proliferation, which I'm also sure
Page 39 1 quotes for a market maker to manage. 2 As to market participants, there has been 3 growth in retail participation in both options and 4 equities. While equities has leveled out around 20 5 percent, you can think about, depending on how you break 6 this out, retail participation in options is around or 7 above 30 percent. Although if you look at some data, 8 that's focused in on the retail and self-directed 9 brokers, they're about 50 percent of total volume. 10 The next comparison I'm going to make might 11 come off looking more like a similarity than a 12 difference. This is the trading venues. So options 13 currently have 18, soon to be 20 exchanges, versus 17, 14 soon to be 19 in equities. So that doesn't sound so 15 different. Right? 16 Well, here's the difference. Let's draw a 17 line at a 1 percent market share per exchange. All of 18 the options exchanges, again, depending on time period 19 you're looking at are over this threshold. You turn to 20 the equities markets, and 10 out of the 17 exchanges are 21 below a 1 percent market share. And seven of those 22 exchanges are less than 0.5 percent market share. 23 So let's move on to the growth in options. 24 And there's been plenty of growth to discuss. There's 25 growth in volumes. ADV is now just shy of the 70	Page 41 1 we're going to hear a lot about today. 2 This is also exasperated by the increase in 3 number of exchanges. So this means market makers are 4 managing -- just looking one sided -- over 35 million 5 quotes. When the other two exchanges come on board, 6 this increases to 39. That's an 11 percent increase 7 just for adding two more exchanges. So strike 8 proliferation is increasing the complexity and the cost 9 for market makers. 10 And speaking of cost, I'd be in hot water with 11 my members if I did not bring this up. We've got costs 12 continuing to balloon, that's data and connectivity fees 13 for every exchange. And, of course, there's ORF. There 14 was a Bloomberg article that showed for 2025, ORF cost 15 the industry and investors in the range of 181 to 234 16 million. 17 So this panel is about competition. If you 18 think about that, what does that mean? When you are 19 making a strategic business decision to either enter or 20 remain in a business, your equation has a cost and a 21 revenue side. So this panel is going to tackle a lot of 22 the revenue decisions. But isn't it time we also took a 23 serious look at the cost side? Could it be that the 24 ante just to get a seat at the table has now grown too 25 high?

Page 42 1 So markets are evolving. Kevin already 2 alluded to the fact that extended trading is coming to 3 options, too. And we should keep asking these questions 4 and analyzing the data to assess the current 5 environment. And that means studying and questioning 6 both sides of the strategic equation, the revenue 7 opportunities, and the costs. That is a healthy thing 8 to do. 9 Thank you. 10 MR. MANOHARAN: Thanks, Katie. That was 11 really helpful. And I'm sure we're going to touch upon 12 all those issues in this panel, as well as the following 13 two. 14 All right, for our first topic, let's turn to 15 market maker guarantees. Panelists, from your 16 perspective, how would you describe the state of 17 competition between specialists and market makers? In 18 particular, what effect does the 40 percent guaranteed 19 allocation as well as the specialist small order 20 guarantee have on competition? 21 MR. DUCKLES: Thank you. From Jane Stret's 22 perspective, we believe the principle that ought to 23 guide the SEC here is that facilitating competition 24 means that participants that are capable of providing an 25 equal service are on an equal competitive footing. And	Page 44 1 approach this. 2 And some of the things we've done in the last 3 few years is we've taken a hard look at the way we have 4 a process to determine who is a specialist in a name. 5 We have competitive elements to that. We introduced 6 something last year where we had sort of a check to make 7 sure the primary and secondary specialists, our AMEX 8 exchange were truly providing volume and truly helping, 9 you know, our competitive positioning. 10 So I think there is a lot that can be done 11 here, I think, just by competition. We have 18, to be 12 20 exchanges. I think there's enough sort of 13 competitive landscape and sort of exchange capacity in 14 the industry, that if there were ways to try new 15 incentive programs, there's a lot of opportunities for 16 people to do so. There's a lot of exchange medallions 17 out there that could do that. You know, we're trying to 18 make sure our model evolves as the competitive landscape 19 changes. And as we've seen, a few new market makers 20 enter the space, and market makers getting into new 21 lines of business, we're trying to keep the market kind 22 of up to date with what's happening. 23 MR. FISCHER: Yeah, I think it's helpful to 24 set the scene here. So we'll hear many times today that 25 options markets are quote driven and specialists are
Page 43 1 so the -- we see no issue, per se, with exchanges 2 choosing to incentivize services such as quoting up time 3 or opening quotations with things like small order 4 guarantees or guaranteed allocations. The issue that we 5 see is that the specialist for life model that exists on 6 certain exchanges or noncompetitive specialist 7 allocation processes functionally mean that new entrants 8 face barriers that don't exist for incumbent market 9 makers. 10 So we don't think that the SEC needs to take 11 on the task of dictating what the right model is for an 12 exchange. But we do see a lower touch path towards 13 fostering innovation by allowing exchanges to embrace 14 new models for incentivizing liquidity or up time. One 15 example here would be supporting exchange models where 16 any market maker who can fulfill the same obligations 17 has access to the same rights that a specialist would, 18 so you'd have multiple market makers fulfilling that on 19 a single exchange. 20 MR. MANOHARAN: Great. Thanks, Nathan. 21 MR. TYRRELL: So from our perspective, the 22 exchange perspective, you know, to us a lot of this is 23 key to our competition relative to other exchanges. So 24 we are really trying to balance the right incentives and 25 also make sure we're not too stagnant in the way we	Page 45 1 critical to that ecosystem. They have the most 2 stringent quoting requirements of any market maker and 3 any market participant. Also, just to set the stage in 4 additional context, not all options exchanges have 5 specialists. Eleven of the 18 options exchanges have 6 specialist assignments. And it is primarily the pro 7 rata venues. 8 In addition, not all market makers choose to 9 be specialists. There are 14 market makers that have 10 specialist assignments today. That is in large part 11 because of the higher quoting obligations that 12 specialists have. So specialists have increased quoting 13 presence times of 90 percent versus 60 percent for other 14 market makers. They have requirements to support the 15 opening for series. And they have to quote a broader 16 range of strikes, including leaps and adjusted 17 contracts. 18 So it's important also to remember that most 19 options are illiquid. That includes in liquid 20 underliers. Without specialists, there wouldn't be 21 screens, or there would be very wide screens in many of 22 these options, which would cost investors. 23 So in return for those obligations, 24 specialists have certain benefits. There's a 40 percent 25 participation in marketable order flow. That 40 percent

Page 46 1 rule exists throughout many aspects of options market 2 structure, including in auctions, directed order market 3 makers, as well as on the floor. Specialists also have 4 the benefit of 100 percent allocation of orders that are 5 five lots and less. 6 I think guarantee there is a misnomer. The 7 specialist must be at the NBBO to be participating on 8 any of that order flow. So at a minimum, investors 9 always get the best available price. Also any firm or 10 any market maker on any venue, including venues that 11 don't have specialist assignments, can improve the 12 specialist price by one tick. And the specialist then 13 gets no benefits. So I think those nuances are very 14 important. 15 The addition to that is directed order flow 16 bypasses specialists. So almost all activity today is 17 directed to a market maker. And when directed to a 18 market maker that is not the specialist, the specialist 19 gets no advantage over any other market maker. 20 So just to recap, there are significant 21 obligations. And with those significant obligations 22 come small benefits that come after being at the NBBO, 23 after nondirected orders, and only on specialist venues. 24 MR. JOHN KINAHAN: I think group one's 25 position is like philosophically the market functions	Page 48 1 have a sip of your coffee. 2 So, John Fischer, thank you. It was about 30 3 seconds into this panel, I think, when we heard that 4 phrase. 5 I'm making a little bit of a joke, obviously. 6 But it's true. We've got very healthy markets. We've 7 got an excellent customer experience. We saw a lot of 8 statistics earlier. There are many ways to slice pretty 9 much all of them. And thank you, by the way, for that 10 presentation. But it's certainly true that overall 11 we've got a very good experience for investors. 12 That said, Katie said this very well, the 13 competitive dynamics on the liquidity providing side 14 have been skewed through no generally bad action but 15 sort of through inaction in the natural evolution of 16 markets over decades. It's interesting to me to hear 17 that there was an options market concept released back 18 in 2004. I have to go back and look for that. But it's 19 certainly been some time. So thank you again for having 20 us here today and fostering this discussion. 21 Imagine the counterfactual. Pretend there's 22 no five lot rule. So I am going to mostly talk about 23 the five lot rule, that says that specialists, they call 24 them DPMs, various things on various markets, but 25 specialists get all of orders up to five contracts if
Page 47 1 better when, you know, there are fewer like set-aside 2 guarantees on different segments of order flow. But I 3 do acknowledge that there are increased burdens for 4 compliance purposes, and also to build on Nathan's 5 comments, like there are different levels of service 6 that are provided by different market participants, too. 7 That has to be acknowledged. 8 But I will also say that in a simple kind of 9 experiment, like if those market maker guarantees 10 didn't exist, we would make different markets. And my 11 guess is they would be tighter or deeper or some 12 combination thereof. I will also say, though, that 13 that's not the only thing that would change and it's not 14 immediately predictable as to exactly what that outcome 15 would be. You'd see routing behavior change, the price 16 of order flow would probably change. So it would be 17 pretty complicated. But from a strictly simple, 18 philosophical point of view, the fewer guarantees that 19 are out there, like the -- my guess is, in the long run, 20 the tighter market you'll have. 21 MR. CRUTCHFIELD: All right, so I have 22 proposed with some friends a drinking game. And it's 23 called the envy of the world drinking game. Which is 24 you go to an industry event and every time somebody says 25 that the U.S. markets are the envy of the world, you	Page 49 1 they're routed to them when they're on the quote. 2 Now pretend that rule doesn't exist. And 3 someone says, I have a great idea. Exchanges are going 4 to get to pick a market maker in every class based on 5 some opaque process and then that market maker will get 6 all the five lots routed to them whenever on the quote 7 on that exchange for the rest of their lives. And then 8 there's something about quoting obligations, which I'll 9 come back to in a second. But basically, that's the 10 story. 11 If somebody suggested that in a world where we 12 didn't have that, I think precisely nobody would say 13 that's a great idea, that's a market structure that we 14 should have. So my view, respectfully, is I think all 15 the arguments you hear in favor of this are either 16 status quo bias, which we all have it, including me, but 17 we're used to this thing. It seems normal. Oh, yeah, 18 we have five lots. Or a little bit of self-interest or 19 maybe a little bit of column A and a little bit of 20 column B. 21 So as was alluded to briefly earlier, the 22 reason we have specialists in the first place, or at 23 least going back several decades -- I started my career 24 on the floor of the Cboe as an intern in 1997, they only 25 had what they called DPMs in a very small number of

Page 50 1 issues. It was the most illiquid classes where there 2 was not enough natural liquidity provision from market 3 makers who have an incentive to make a two-sided market 4 for customers to have a good experience. And that made 5 a ton of sense. And, by the way, it's entirely 6 appropriate for an exchange to be able to say, we really 7 need help in this name, we're going to give you some 8 special incentives to provide liquidity in this name 9 because the natural liquidity on the screen is not 10 sufficiently healthy. And that's where the DPM, the 11 special assistance came from, that's where the five lot 12 rule came from. It was one of those incentives. 13 But I would respectfully submit it makes zero 14 sense today in a Tesla, an Nvidia, an Amazon, an Apple, 15 or any of the top one, two, three, 500 symbols where 16 competition is intense among market makers 17 electronically, beyond anything that Cboe or anyone in 18 the '90s would have envisioned. 19 A DPM appointment in a name like Tesla 20 provides precisely zero marginal market quality, while 21 awarding a massive benefit that then sits with that 22 party essentially forever. So the effect that has on 23 competition it's stifling. I respectfully would say I 24 think John Fischer is completely mistaken in saying that 25 the reason parties don't get DPM allocations is because	Page 52 1 symbol, not the one for which you're giving away the 2 specialist allocation, because the big order routers 3 know they have that leverage over you as an exchange. 4 So, yeah, not a good rule. I would say it 5 just doesn't make any sense. 6 Oh, a last point. Sorry. 7 I don't think exchanges can fix this on their 8 own. I don't think competition is going to get you 9 there. Because Kevin's got an incentive. You know, he 10 wants five lots. And he could say, you know, I'm going 11 to do the right thing, I think this rule creates 12 perverse incentives and is not an appropriate reward for 13 the amount of marginal liquidity actually being 14 provided. So I'm going to get rid of my five lot rule. 15 Are you going to do that unilaterally? You're not. 16 Right? Because you know, okay, all those three lots and 17 five lots and one lots and two lots are going to go to a 18 competitor that says, you know what, I think I'm going 19 to keep my five lot rule, I like this order flow. 20 So this is where, and Commissioner Peirce used 21 the phrase earlier, a gentle regulatory nudge or 22 friendly nudge from the SEC I think would be incredibly 23 valuable. If I were to get to, you know, respectfully 24 propose a change, I would say five lot appointments, the 25 five lot aspect -- I've conflated this a bit with
Page 51 1 of the heightened obligation. The obligation is not 2 material at some market with -- in a higher percentage. 3 Most of us who have electronic market making systems, 4 you can turn a knob in your system, you can meet that 5 obligation. 6 The reason more market makers don't go after 7 these DPM allocations, number one, is we can't. I can't 8 just sign up and say, I want to be the specialist in 9 Apple now on the Cboe. Somebody already has that 10 appointment. And they're not going to lose it in the 11 next decade, probably, unless they screw up or sell it. 12 Two, there is no benefit to having that 13 appointment unless you have the order flow. I could be 14 the specialist in Apple. Nobody is going to route five 15 lots to me because I don't control an order flow 16 relationship that has the ability to decide what 17 exchange those five lots go to. 18 Exchanges will say they review these. I 19 oversaw that process myself for years at NYSE. Ivan's 20 done it, Kevin's done it. There's a massive incentive 21 among exchanges, no matter the best intentions you have 22 in fostering liquidity, to ensure that big guys have 23 these specialist seats. Because if you give it to 24 somebody else, you're going to lose flow. By the way, 25 you might lose flow as an exchange in a different	Page 53 1 specialists and DPMs. But the five lot entitlement 2 specifically should be limited only to the most illiquid 3 classes. For example, the bottom 20 percent of classes 4 by volume. It should be subject to rigorous annual 5 review using metrics other than the market makers' 6 volume, by the way. Because volume is self-fulfilling. 7 If you're the specialist and you get all the five lots, 8 your volume is going to be higher than anybody else, 9 almost kind of ipso facto. So other metrics tied to 10 liquidity provision should be required to be satisfied 11 to keep those appointments. And there should be an 12 expectation of mandatory reallocation every couple of 13 years to prevent these things from being locked up 14 forever. 15 Sorry for the passion, but I think this is an 16 important issue and one that it would be great to get 17 right. 18 MR. MANOHARAN: So I think Kevin's name was 19 invoked, so I'll give him the opportunity to respond. 20 MR. TYRRELL: In some ways, I'm almost going 21 to agree a little bit. Because you mentioned that 22 traditionally, or in the past, this was needed on the 23 less active names where there were some good market. In 24 today's world, you know, the market may not need help on 25 Apple, Tesla, and Nvidia. But NYSE AMEX might, versus

Page 54 1 Cboe and Nasdaq. So it's an incentive program. We have 2 any number of incentive programs across exchanges, 3 across asset classes that we use. This is one incentive 4 program. 5 Like I said before, we realize if you don't 6 handle it right, it could actually limit competition on 7 your exchange. We feel like more competition on our 8 exchange that makes our exchanges more competitive 9 relative to other exchanges. So we do look -- we have 10 been looking at it. We've changed the process since 11 your time. So we've tried to update that a little bit. 12 But, you know, we do view it as a valuable incentive 13 that we need in a competitive landscape. 14 MR. BROWN: I guess I get to bring it home. 15 I'll try and economize my comments. 16 I mean, I think foundationally, right, like 17 options markets function best when there is competition 18 at the late quote, right? And the late quote 19 effectively serves as the backbone of price validation 20 that drives investor confidence and engagement, which is 21 foundationally what we are all in the business of doing. 22 You know, as a technical matter, you know, 23 competition among specialists and market makers isn't 24 shaped as much by market structure as it is by 25 participant behavior. It is technically true.	Page 56 1 more meaningful share of order flow is less broadly 2 available for competition than 18, soon to be 20, venues 3 with otherwise suggest. 4 And rationally, that impacts incentives. 5 Right? If you have a lower probability of interaction 6 and you're more likely to interact with toxic and not 7 benign order flow, then you'll likely be less aggressive 8 in your quoting and commit less capital as a result. 9 And so I think from our point of view, this 10 comes down to balance. Number of participants have 11 highlighted the fact that specialists are a scarce 12 asset, and that creates a distribution between those 13 that have them and those that are new entrants. And so 14 I think from that point of view, you have to look in 15 sort of a balance and coordination is like are these 16 broadly available to all participants? Is the level of 17 competition that facilitates their assignment also 18 commensurate? 19 But whatever we do, it has to be done both 20 holistic in scope and coordinated in application. 21 Because if you eliminate or -- or transfer the way one 22 guarantee functions, it likely redistributes that 23 activity to another venue or mechanism, as opposed to 24 improving competition in and of itself. 25 MR. MANOHARAN: Andrew.
Page 55 1 Guaranteed allocations reduce the portion of order flow 2 that is broadly accessible to others. However, as some 3 of the panelists have pointed out, that serves a 4 purpose. Right? There is a certain rewarding of 5 obligations, capital commitment, you know, service 6 elements of clients, and being at the NBBO. 7 I think the core question actually is one of 8 calibration and balancing the incentives to further 9 vigorous quote competition, and at the same time reward 10 that service that's being provided. I think if you look 11 at like the 40 percent guarantee allocation, for 12 example, that's relatively benign. Right? Because, 13 still, 60 percent is available to other participants to 14 participate with. 15 I think the question that's, you know, the 16 most debate is probably the small order guarantee, which 17 I think is certainly more limiting in isolation. And it 18 is true it perhaps incentivized specialists to direct 19 more flow in general to a venue. But I think the point 20 that I would make is that these dynamics, however, are 21 at the single venue level and, in practice, we compete 22 in a multi-venue ecosystem, where participants can 23 access multiple guarantees and other forms of 24 internalization across multiple venues. And the 25 cumulative effect of those guarantees stacking is that a	Page 57 1 MR. SCHULTZ: I was just going to add a couple 2 points and won't be very long. 3 We're talking about this five lot and this 4 allocation thing. But it's important to remember, and I 5 think John mentioned it, a third of the exchanged are 6 price time, so it doesn't apply there. And roughly two 7 thirds of the volume are spreads and auctions and other 8 trading. So we're talking about this allocation on a 9 very small portion, like marketable, versus 10 nonmarketable, versus complex. So we're talking about a 11 -- you know, it's not the entire marketplace where this 12 40 percent is involved. 13 And then just quickly on the obligations, 14 there was a lot of conversation about kind of quote 15 traffic and, you know, the massive multiplier of quotes 16 that's being sent. I think that that is probably an 17 area where we can take a look at kind of what those 18 obligations really mean. We've talked about the costs 19 and the revenues and whether it's 60 percent or 90 20 percent or 99 percent. I think there is a situation 21 where we could kind of look to see how those obligations 22 pay off. If market makers and all of us here only have 23 revenue when there's a trade happening, and so if you're 24 on a quote that's wide and not on that quote, you have 25 no chance of trading, which is not what any of us really

Page 58 1 are looking to do. So if we're thinking about where our 2 quotes are versus where our quotes are required, I think 3 that's an area where kind of the exchanges could 4 possibly modernize their approach. 5 MR. FISCHER: I appreciate Steve's passion. 6 There was a lot that was said there. Obviously, I won't 7 respond to everything. But I think a couple of points 8 that have been raised, the -- you know, I think the fact 9 that liquid issues don't need specialists because there 10 is plenty of activity across from all market makers is 11 just not true across all series. You know, there are 12 thousands of series listed in the most liquid 13 underliers, and many of them don't have liquidity. And 14 without a specialist, they wouldn't have liquidity. 15 Also I think just the argument anyone is 16 available to participate in new issues and can go and 17 solicit for new listed underliers for those specialists. 18 And so if they were in fact that valuable and 19 obligations were not as significant as they are, many 20 more market makers would participate in that, and not 21 all do. 22 And one more point. Steve, as Andrew said, 23 price time venues, most price time venues do not have 24 specialist assignments. You could ignore all this, this 25 entire conversation, if a market maker priced one tick	Page 60 1 perspective, the reason I'm harping on five lots so 2 much, these are -- if you do the math, and I have on 3 behalf of a market maker that does not have order flow 4 relationships and considers getting into that game, it 5 pretty quickly becomes apparent that the value of five 6 lots is extremely high. These tend to be the least 7 toxic, nonprofessional orders. They occur in vast 8 numbers, especially since COVID. They are very 9 attractive to trade with. And incidentally, that is 10 precisely why you hear various folks saying, like, hey, 11 this is really important, we want to keep this, this is 12 good for us. It's because it's important. 13 So I think arguing that it doesn't actually 14 matter that much is a little bit -- a little bit 15 inaccurate. 16 But even given all of those points, yes, 17 sometimes somebody improves by a penny on Arca and the 18 specialists are all deprived of the allocation. 19 Nonetheless, during the course of the day, there are I 20 don't know how many millions of times a day that a one, 21 two, three, four, five lot is routed by a firm that has 22 control of a router at an instant where they have a 23 specialist somewhere that is on the quote, and strictly 24 as a result of that legacy appointment from in some 25 cases 20 years ago, that firm gets to trade that entire
Page 59 1 inside the specialist. Which those market makers are at 2 a fee advantage versus a specialist in most cases. 3 Those price time venues typically offer a higher rebate 4 for market makers, whereas as a specialist you are 5 normally on a pro rata venue, you're paying a fee. 6 You've also paid for the order flow itself. 7 MR. CRUTCHFIELD: Yeah, just a couple points 8 there if I may. And thank you for responding to that. 9 A couple things. One, so you could certainly 10 make the argument that it is appropriate -- and I did -- 11 in less liquid issues to have someone who has a 12 heightened quoting obligation in return for certain 13 rewards. Sure. You could break it down at the month or 14 at the strike level if you want. But I think it is 15 pretty incontrovertible that the most liquid option -- 16 and again, slice it how you like it, could be by class, 17 it could be by term, it could be by strike. But the 18 most liquid options products in the industry do not need 19 a special five lot allocation to a single party forever 20 as an incentive to keep them liquid. 21 With regard to the price time point that was 22 made by a couple folks, what I would say there is, sure, 23 there are price time markets. There are times when a 24 specialist is not on the NBBO. And in those cases, of 25 course, none of this matters. But just to put this into	Page 61 1 order. It happens every day in massive volumes. 2 So I don't think we could really say that 3 like, well, somebody could -- sometimes somebody could 4 improve the -- sure, sometimes somebody does improve the 5 price. But it is still the case that this distortive 6 allocation practice exists and is massively impactful to 7 markets today. 8 MR. MANOHARAN: Great. Wow, what a good first 9 question. Okay. 10 All righty. So staying with competition, 11 directed market makers are a unique aspect of options 12 market structure. They enable order flow providers to 13 send an order to interact with a specific market maker, 14 quoting at the best price, who may potentially be an 15 affiliate, which can then facilitate internalization. 16 What are panelists' experience with the directed market 17 makers or other ways in which brokers might seek to gain 18 market share? 19 I know we've touched upon this already, but 20 Steve. 21 MR. CRUTCHFIELD: Thank you, Arun. 22 We actually -- I have a somewhat unique 23 experience with this, because Interactive Brokers really 24 started as an outgrowth of our market making business. 25 We had this market making business and we built all this

Page 62 1 extra electronic trading capacity and said, wait a 2 minute, the fixed cost's already in. Maybe we could use 3 some of that to route it to our market making books or 4 our DPMs and get the five lots et cetera. That kind of 5 thing. And we've also uniquely walked away from a lot 6 of this. 7 And one of the -- one of the things that 8 you're going to hear from me pretty much as a mantra is 9 it's always about what's best for the customer. And I 10 think to some extent, best execution sometimes is good 11 enough execution, not necessarily best execution. A lot 12 of times, you have to work hard to get the best 13 execution. And what I'm going to say there is we have 14 two models for our customers to choose from. One is 15 light, which is basically in stocks, you know, free 16 trading, and the stuff gets routed and, you know, pretty 17 much hands off. And we have pro, which is basically we 18 will use all sorts of proprietary algorithms to try to 19 get best -- the best execution for our customer. And 20 the vast majority of our customers opt for the pro, 21 meaning they see the price improvement, they appreciate 22 the price improvement. 23 So how does that come into direct routing? We 24 will do it. But, you know, only if we can really feel 25 that it achieves the best outcome for the customers.	Page 64 1 informative evidence from other markets. Not as much 2 from the option market, but there is some pretty 3 interesting research going back to when Nasdaq was not 4 an exchange but was a network of dealers that were 5 quoting. And there's research on how preferencing 6 impacts the incentives and the tendency of dealers to 7 quote aggressively, and the extent to which the dealer 8 quote attracts order flow. 9 I think it would be a good exercise for the 10 Staff to go back and look at some of that, that old 11 research on Nasdaq and over the years. 12 With respect to option markets, there was an 13 interesting thing that happened in the early 2000s. You 14 know, before that, option markets had a structure where 15 a single market maker in the crowd would disseminate the 16 quote for that exchange. And if a marketable order came 17 in, there was a wheel or an allocation mechanism where 18 any market maker in that crowd would share, according to 19 a formula. And then what happened? Well, ISE came in 20 with a different model where any market maker could put 21 their own quote in the spread and they would only get 22 the order if they were at the best quote, and they had a 23 narrower spread than anyone else and they got huge 24 amount of market share. And a couple years later, all 25 of the other floor-based exchanges changed their rules
Page 63 1 That can be measured a few different ways. It can be 2 done with price improvement, it can be done with mark- 3 outs, markdowns. But in general, you know, PFOF is nice 4 if you're just going to -- I hate to say it -- be a 5 little bit lazy about it and just sort of say, you know, 6 here you go, we'll take the payment for order flow, 7 thank you very much. 8 But as a result, we expose our -- we tend to 9 expose our orders to a lot of different counterparties. 10 I know at least -- I know at least a couple of firms on 11 this panel, not specifically the people, have said, oh, 12 can you please just make us number one on your list? 13 And like I can't -- we won't do that. 14 And so I think it's not a bad thing, but it's 15 not necessarily the optimal thing. 16 MR. MAYHEW: So the question of order 17 preferencing is a perennial issue. For decades, we have 18 been talking about what is the impact of order 19 preferencing. A lot of that discussion has been in the 20 context of equity markets. And I think if your 21 regulatory question and your concern as a regulator is 22 the question how if at all does order preferencing 23 impact market quality, how does it impact the quoted 24 spread in an ostensibly quote-driven market, we have a 25 lot of evidence over the years that we can look to as	Page 65 1 so that individual market makers could get their quote 2 in the spread. 3 Overnight -- I was at the Commission at the 4 time. I looked at the data. Overnight, the quoted 5 spreads on all the floor-based exchanges dropped 6 significantly when you introduced competition across the 7 market makers for narrowing the spread. So I think the 8 lesson there is that the more an individual market maker 9 can attract order flow by quoting a better price, that 10 gives them the incentive to quote a better price. And 11 that matters. 12 The question of -- then the question becomes 13 to what extent does preferencing or directed order flow 14 weaken or undermine that incentive. You know, in theory 15 there's an argument for why it might undermine that 16 incentive. Again, the massive amount of research in the 17 equity markets suggests that there might be some effect 18 there, but it's not -- perhaps it's not a major concern. 19 MR. MANOHARAN: Great. All right, for our 20 next question, let's discuss the possibility of order- 21 driven markets. Outside of the most liquid symbols, 22 resting orders are less common for options than they are 23 for equities, in large part due to the number of listed 24 series. Nevertheless, maker-taker fee models and 25 customer priority models seek to incentivize the posting

Page 66 1 of customer orders. 2 Are there any impediments to attracting more 3 liquidity, adding customer options orders? What could 4 be done to incentivize them? 5 Andrew. 6 MR. SCHULTZ: Thank you. I'll just start with 7 letting Steve have a cup of his coffee and say that, you 8 know, the U.S. markets are, in fact, the envy of the 9 world -- 10 (Laughter.) 11 MR. SCHULTZ: -- and we've seen a growth that 12 has been quite remarkable with our quote-driven markets. 13 We've talked about kind of how many quotes are out 14 there. 15 I think the thing to think about is that 16 market makers cannot control the concentration of the 17 products that they trade or exactly how they trade. 18 Aggregators are generally responsible for all the 19 exchange-facing fees, so the distinction between lifting 20 the market and posting the market may not even be fully 21 apparent to the customers. 22 Approximately half of all the single order 23 volume is marketable. Meaning customers are regularly 24 receiving executions inside the posted screens on those 25 other halves.	Page 68 1 to secure better execution on a wider market when 2 they're posting, rather than, you know, added liquidity 3 is probably correct. 4 MR. MANOHARAN: Stewart? 5 MR. MAYHEW: Well, if you measure whether the 6 option market is a quote-driven market or an order- 7 driven market by the number of quotes it disseminates, 8 it's definitely a quote-oriented market. But I found 9 interesting numbers in the supplemental data that was 10 provided by the Trading and Markets Staff. They had a 11 couple of tables showing marketable orders, execution 12 quality, nonmarketable limit order execution quality. 13 And adding up the numbers in the rows, it looked to me 14 like there was about 50 million customer orders that 15 were nonmarketable limit orders and about 20 million 16 orders that were marketable. So that -- while it's true 17 that if you pick a random series and you look at the 18 limit order book, it's going to be empty. Well, the 19 median trading volume across options series is zero. So 20 vast majority of the strike prices and maturities on 21 many, many series, there's no customer limit orders 22 there because there's no trading volume on that series. 23 When somebody does want to trade, as Andrew 24 mentioned, it's very common for them to trade by 25 submitting a nonmarketable limit order inside the
Page 67 1 Mechanisms such as flash and complex auctions 2 allow customers to access liquidity without needing to 3 focus on whether they are taking or posting in any given 4 market. In addition, trading platforms may employ 5 algorithms that initially post an order for a short 6 period of time but ultimately cross the spread if a 7 timely execution is not achieved. So the quotes are 8 there to provide it, but I think the customers are kind 9 of thinking about what I want to trade and at what price 10 I want to trade and aren't necessarily concerned with 11 the exact execution style that that trade requires. 12 MR. MANOHARAN: Nathan. 13 MR. DUCKLES: I think we largely agree that I 14 think it would probably be misguided to think of 15 customer posting liquidity as a vector for deepening the 16 limit order books, just given the number of quoted 17 series that there are. It's probably best most of the 18 time to think of, you know, customer non-market limit 19 orders as just a demand for liquidity that they are 20 seeking a better price on rather than actually an 21 attempt to deepen -- you know, deepen the markets. And, 22 you know, there is no real fee structure that is going 23 to incentivize a meaningful amount of customer liquidity 24 on millions of options series at any given point. So 25 I'm thinking of it mostly as just, you know, an attempt	Page 69 1 spread, so that the price that's determining the trade 2 occurs is not necessarily the quote but it's the order. 3 So in a sense, options are an order-driven market, not 4 really as much of a quote-driven market as we say. 5 So I think as the Commission considers 6 possible policy rulemaking or amendments or anything 7 like that focused on competition across market makers, 8 they should consider both types of competition; 9 competition to quote narrower spreads, but also 10 structures that enable and encourage market makers to 11 fill nonmarketable limit orders inside the spread, as 12 well as competition in the option mechanisms that offer 13 price improvement inside the spread. 14 MR. CRUTCHFIELD: I'd hoped to add a lot of 15 fresh stuff here, but I've got to say that most of what 16 I was thinking was already said. You know, to the -- 17 the one thing I will sort of add is there is like an 18 exception where it in some ways is almost order driven. 19 First of all, Stewart, I agree with you a hundred 20 percent on the wider markets. It becomes order driven 21 because somebody puts -- somebody establishes that I 22 want to pay this or offer this. But there are, I think, 23 in some of the most liquid markets, I'm going to call 24 them quasi-market makers who are in some ways -- I can't 25 really tell if they're quote driven, order driven, or

Page 70 1 somewhere in between because in some ways they're sort 2 of quasi-market making in the sense that they're posting 3 tight, two-sided prices, which may or may not be order 4 driven, may or may not be price driven, that mimic that 5 behavior. 6 So there's -- I don't know that I want to 7 dwell too much on the distinction, because I think it 8 becomes, you know, certainly to Stewart's point, a sort 9 of blurry topic at some level. 10 MR. MANOHARAN: All right. For this next 11 topic -- I spent a lot of time reviewing this one -- 12 let's talk about competition in retail price improvement 13 auctions. Price improvement auctions have a variety of 14 different fees and features that assist an initiator in 15 gaining a greater allocation of an order. There are fee 16 differentials between initiators and responders that 17 make auctions more expensive for responders. Auto match 18 allows initiators to match better priced responses, and 19 breakup credits are given to the initiator when their 20 order is filled by someone else's better priced order. 21 Do these features, as well as potentially 22 others, impact the willingness of other market makers to 23 respond with an improved price to an auction? 24 Steve again. 25 MR. SOSNICK: Well, I am glad you invited me	Page 72 1 strongly about and we advocate their use and use them 2 heavily. 3 MR. MANOHARAN: John Kinahan. 4 MR. JOHN KINAHAN: I think as a 5 straightforward answer to your question, if the fees 6 matter to an auction responder, they definitely do. And 7 fee differences between the solicited side and an 8 auction responder, they're significant. And this is an 9 extremely competitive industry. Fractions of a cent 10 count. The difference between a highest tier solicited 11 -- the paired side of an order and an auction responder 12 are, you know, it can be a very significant amount. 13 So again, from a simplistic standpoint, like 14 if the idea was to make that auction more competitive, 15 make it cheaper. And again, I don't mean to harken back 16 on my comment on the five lot topic, but that would have 17 complications to it. That type of change wouldn't exist 18 in a vacuum. You would see auction dynamics change as a 19 result of it. 20 But, you know, the simple answer to your 21 question, yes, they matter. 22 MR. MANOHARAN: So make it cheaper for the 23 responder? 24 MR. JOHN KINAHAN: Yeah. 25 MR. BROWN: So I think as it relates to
Page 71 1 to speak on this topic. We are immense users of 2 auctions. You know, that's one of the ways that we 3 believe we can best foster competition and competition, 4 we believe, gets the best price for customers. 5 We do this through our routing mechanisms, and 6 we route to over 20 different liquidity providers from 7 whom we solicit, you know, auction responses from. So, 8 to the extent that there's incentives for using 9 auctions, we take advantage of them too. 10 And I thought that there were some great 11 statistics in the paper that was presented. As spreads 12 widen, it's in many ways the best way to get customers a 13 best execution. Yes, you don't need an auction if it's 14 a penny wide. You don't need an auction on an at-money, 15 SPX, zero-dated call. It's irrelevant. It does matter 16 when the spreads widen a bit. And you could see from 17 the paper how much more price improvement could be 18 gained from customers by using this auction mechanism. 19 So we -- you know, we've got our own statistics toward 20 this, but I'm glad that a source like the Commission can 21 prove this point for us to some extent. 22 And so, right, I mean, if spreads were always 23 a penny, we wouldn't have this discussion. But they're 24 not. And there's plenty of good reasons why they're not 25 across all items. But this is a topic we feel quite	Page 73 1 auctions, it's probably a tale of two cities. You know, 2 auctions are, as Steve pointed out, a critical tool to 3 provide customers with meaningful price improvement 4 opportunities beyond the displayed quote. And I think 5 that's accomplished in a variety of ways, right? The 6 ability of auctions to trade at prices that have greater 7 granularity than their quoted NPV, and the fact that the 8 auction is in fact broadcast to all participants who 9 potentially want to provide price improvement. 10 I guess if the room is willing to indulge me a 11 little bit on the nerdery of the auction, though, if you 12 think about a typical like retail auction work flow, 13 it's going to be typically a customer initiating parity 14 with an away market maker, right? And economically 15 speaking, if that's a customer, that typically is zero 16 fee. There's a contra fee that's generally anywhere 17 around a nickel, high single digit pennies. But that 18 participant often times is tiered and is subject to a 19 customer rebate as well. So what looks like a five-cent 20 charge is probably a seven- to 12-cent credit depending 21 upon the exchange. And that happens irrespective of 22 whether the order is interrupted or price improved or 23 not. 24 But in the circumstances when the order is 25 price improved by an unrelated party, the portion of the

Page 74 1 trade that is broken up, there's also a rebate that is 2 received on top of that. So if you take a look at 3 initiating fee plus initiating credit, plus the breakup 4 rebate in relation to a participant that's price 5 improving and probably paying 50 cents, for example, in 6 a penny name, the difference there is well north of half 7 a tick. And so from an intellectual point of view, one 8 could argue that that likely would frustrate someone's 9 ability to be as competitive at each price point because 10 of that variance in economics. 11 Now, I think like none of this can be, you 12 know, done in a vacuum. And perhaps that does create a 13 structural impediment. So things that we could think 14 about doing is sort of rationalizing that differential. 15 You could also take a look at it and say things like 16 auto match potentially could also frustrate competition 17 in one way, shape, or form. 18 The thing to think about from that point of 19 view, though, is that whatever we do again, just like 20 five lots, also has to be coordinated and holistic. 21 Because if every exchange that operated a price 22 improvement auction eliminated auto match, for example, 23 except for one participant, you know, one exchange, then 24 a lot of flow would go to that one exchange. 25 So I think those two things have to be	Page 76 1 The design of auctions does strongly and 2 intentionally favor the party that initiated the order 3 flow. And building on some of the things Kevin said 4 earlier, certainly full disclosure, I had a voice in the 5 design of some of these mechanisms historically, so I 6 certainly have some skin in the game there. 7 But I think that the incentives could be 8 improved, so I will build on Ivan's comment a little bit 9 about auto matches, is the topic I wanted to focus on. 10 So just a reminder for everyone or those who may be less 11 familiar, the way that auto match works -- we call it 12 auto match. There are different names for it. But 13 typically the egregious example would be the market on 14 the screen for some option is \$1 bid at \$2. A customer 15 comes in and is willing to pay 99 cents in some option, 16 the trade is in penny increments. The initiator says, 17 okay, I'll sell it to you at 99 cents. I'm going to 18 start an auction. 19 Somebody else could respond to that auction 20 and say, I'm going to sell it at 50 cents. The 21 initiator has the right to automatically have their 22 price updated to 50 cents. So they get to participate 23 on the auction. And uniquely, they are the only party 24 that has this entitlement by automatically matching 25 response prices.
Page 75 1 obviously, you know, balanced. And I think the fact 2 that the Commission has this data to study where it is 3 appropriate to leverage price improvement auctions, as 4 Steve talked about, in most liquid names perhaps not, I 5 think that should be taken into consideration in light 6 of some of these other suggestions. 7 MR. MANOHARAN: Nerdery is a great word. 8 Go ahead, Steve. 9 MR. CRUTCHFIELD: I was going to say the same 10 thing. Thank you. Always trust Ivan for the best 11 nerdery. Meant as a compliment. 12 MR. BROWN: I'll take it. 13 MR. CRUTCHFIELD: So first, I liked the way 14 Steve kicked this off. I think markets are great market 15 structure, highly appropriate for the options market, 16 where we do have a less natural confluence of buyers and 17 sellers simultaneously than could exist in equities. 18 There's often an opportunity for price improvement. The 19 statistics bear it out. It's great that we have them. 20 It's an excellent boon for the ultimate customer 21 experience. Always an opportunity to improve design 22 again. I would look to competitive dynamics. Ivan and 23 John both spoke a bit about the fee disparity that 24 exists, and I agree with the points that both of them 25 made.	Page 77 1 It pretty obviously diminishes their 2 incentives to provide the best price out of the gate. I 3 think you could argue a better market structure would 4 likely be one where all participants had the maximum 5 incentives to show their best price, rather than sort of 6 waiting for someone else and saying, well, you know, if 7 he does, then maybe I'll do it, too. 8 So that's the skewed incentive. And, as Ivan 9 said, it's competitively very difficult for exchanges to 10 move away from this incentive because once it existed on 11 one market, it's a powerful incentive, again, for 12 parties that control the routing of flow to go to that 13 market in cases where they have a desire to interact 14 with that order. 15 So overall, would recommend a review of 16 whether the auction incentives for initiators, both 17 pricing and allocation advantages, are appropriate to 18 the unique value provided by the order initiator, with a 19 particular focus on, in my view, auto match is kind of 20 the most obviously distortive thing in that family of 21 incentives that impact an otherwise very good market 22 structure mechanism. 23 MR. SELWAY: Could I just ask a follow-up on 24 auctions? So we talked about auto match, we talked 25 about pricing. Are there any other details, you know,

Page 78 1 sort of data connectivity, frequency, timing, you know, 2 that we should hear about as we consider? 3 MR. SCHULTZ: I think one thing kind of 4 related to that and the timing in the auto match is the 5 aggregators or the committed party is starting that 6 auction 100 milliseconds before it actually trades on 7 the exchange. So my -- on the auto match, that is a 8 large discrepancy, certainly in some of the, you know, 9 fast-moving products. And so these auctions, unlike 10 some of the other trades, you know, if a quote moves or 11 someone, you know, doesn't -- you know, cancels an 12 order, auctions are almost guaranteed to trade. Nearly 13 100 percent of those things trade. 14 And so I believe that that auto match and that 15 100 millisecond timer, those offset because the 16 aggregator is adding liquidity and/or adding price 17 improvement. You know, you could have a market that's 18 1, 1.10, 2 up, and you could start an auction for 100 in 19 order to provide extra liquidity and extra kind of price 20 improvement. 21 I think the move from blind to nonblind was a 22 positive move that you mentioned. 23 MR. FISCHER: Yeah, I think aligned a lot with 24 what Andrew said in terms of evaluating the length of an 25 auction period, the initiating market maker is at a	Page 80 1 of buck the trend there and gain share. 2 But, you know, on the fee structure 3 especially, that's not an SEC rule. Right? That is, of 4 course, where the market is right now. But again, with 5 18, soon to be 20 exchanges, I think there's a lot of 6 room for innovation. And if there are, you know, better 7 ways to do it that would result in better outcomes for 8 customers, I think given the involvement of so many 9 firms handling customer order flow with exchanges, 10 either direct ownership or just even good relationships, 11 there's a lot of opportunity there to come up with a new 12 mechanism outside of, you know, SEC rulemaking. 13 MR. SCHULTZ: I do think you could take that 14 timer down. I remember when it was three, and then it 15 went to one, and now it's 100 milliseconds. You could 16 easily make that 10 milliseconds and most of us are 17 using electronics, computers to respond anyway. And so 18 the difference between 100 milliseconds and 10 19 milliseconds wouldn't change much. 20 MR. SOSNICK: If I just may, I don't want to 21 quibble with some of the ideas for improvement. 22 Because, you know, yes, we've steadily taken down the 23 amount of the timer. But the one thing I will say is, I 24 can understand the need for improvement. Just don't 25 mess this up for the customers. Because the data shows
Page 79 1 disadvantage when initiating an auction, given that 2 they're committing to provide that capital 100 3 milliseconds in advance. So I think the ability to 4 respond by auto matching does take into account the fact 5 that the market is moving and other market makers could 6 choose to participate or not. And that initiating 7 market maker may want to change their price and match. 8 I think overall, though, we are open to 9 evaluating price improvement auctions and I think it is 10 worthy of a review. They are the primary mechanism to 11 provide price improvement for retail orders, so I think 12 that's very important. But it's worth evaluating 13 whether or not they've -- their use has changed, versus 14 what was originally intended. 15 And then just quickly to touch on the pricing 16 mechanics. I think agree -- agree with all of Ivan's 17 math in terms of the overall fee structure. I think the 18 one major exception there or outlier there is that it 19 didn't take into account the payment that was provided 20 by the initiating market maker to take on that risk and 21 bring in the retail order to the market, which offsets 22 all of the fee differential that's been raised. 23 MR. TYRRELL: I was kind of following up on 24 fees, and I kind of concede some of the point of auto 25 match and how it could be tough for an exchange to kind	Page 81 1 -- and your data showed this -- well, your colleague's 2 data showed this. There is a lot of price improvement 3 here. And make sure that that is -- however we do this, 4 just make sure that price improvement quality does not 5 diminish as the rulemaking may evolve. Please. 6 MR. SELWAY: Well, it's investors' data, 7 because it's from CAT. And I can't miss an opportunity 8 to point that out. 9 But Steve, I did want to ask you, it's 10 fascinating that most of your clients choose pro from 11 light. So when you quantify the benefit of using 12 auctions and doing, you know, the nerdery to optimize 13 options, what does that look like vis-a-vis your light 14 clients, if you could say? 15 MR. SOSNICK: You know, the numbers exist. I 16 don't have them at my fingertips. It's meaningful 17 enough that they're willing -- it's greater than the 18 amount that they would save by just routing orders. I 19 should have brought that number with me as a follow-up. 20 I don't have it, Jamie. I'm sorry. 21 MR. MANOHARAN: Am I allowed to say I use pro? 22 But not for options. 23 MR. SELWAY: And now he will. 24 MR. SOSNICK: And other panelists have told me 25 that as well. And other people in this room have told

Page 82 1 me that as well, so there you go. 2 MR. MANOHARAN: All right. For this next 3 topic, let's talk about another execution venue, the 4 trading floor. What's today's use case for physical 5 trading floors for multi-list options? 6 MR. TYRRELL: So when we look at our floors 7 and look at the activity there and talk to the users of 8 those floors, both the market makers and floor brokers 9 and also all of the upstairs users of those services, 10 what we generally see and what we generally hear is that 11 the floor is handling larger, more complicated orders. 12 Where electronic execution either isn't ideal or may not 13 even be possible, at least on certain venues or through 14 certain pipes. So, you know, this means a lot of multi- 15 leg, very large orders. 16 When we looked at our data, 75 to 80 percent 17 of everything that happens on our floor is some sort of 18 multi-leg or, you know, tied to stock type of trade. So 19 these are not just simple outright trades, there's a lot 20 going on there. 21 And we've heard from, you know, several 22 upstairs users that having that extra set of hands on 23 that order at the actual point of execution can provide 24 just an extra layer of really risk management and allows 25 the folks on the floor to getting the last bit of the	Page 84 1 printed on the tape. 2 And there are -- kind of just one last point 3 on the electronic side of things. There are a lot of 4 electronic mechanisms, some auctions to some extent, 5 that are trying to replicate some of the interactions or 6 benefits of the floor experience. And, you know, we've 7 seen in many cases sort of modest uptake. Right? The 8 market has grown tremendously; the floor has not grown 9 at the same pace as overall options volume. But it has 10 sort of more or less kept up. You know, it's losing 11 share overall, but it hasn't disappeared yet. The 12 competitive dynamics haven't pushed it away. 13 So I think over time, as electronic tools, if 14 they were to get better, if they were to adapt more or 15 be adapted more by the industry, we may see the floor 16 lose share sort of more organically, sort of like we saw 17 in the equities market, where the market kind of moved 18 beyond the floor. We haven't really seen that yet. And 19 I think we may see it in the future, but I think we'd 20 rather let the market decide that than any sort of 21 exogenous force. 22 MR. MANOHARAN: Go ahead, Andrew. 23 MR. SCHULTZ: A few years ago, Susquehanna 24 submitted a comment letter recommending that all trades 25 be exposed electronically. At that time, there were two
Page 83 1 execution done. Those upstairs sales traders can focus 2 on what they're doing and working with their clients. 3 So it's sort of a helpful bit of the ecosystem for them. 4 And when you think about what would the 5 alternative be, you know, handling some of these large, 6 complex orders in electronic systems, it can introduce 7 some risk, but also can introduce, you know, additional 8 fees or burdens. So you would have to build or buy or 9 use, you know, algorithms to execute these orders. And 10 in practice, many people are doing, you know, a little 11 bit of both, using both the floor and electronics. But, 12 you know, we kind of hear that there's still a nice use 13 of the floor for some of these larger ones where there 14 is more risk involved. 15 In terms of competitive dynamics, one thing 16 we've seen on the floor is certainly a mix of how many 17 orders come to the floor with kind of the order already 18 matched versus not. And I think there's a perception of 19 some people that everything that comes to the floor is 20 matched. And we don't see that. We see some partially 21 matched. And we have some segment of flow that is 22 coming to the floor really looking for the floor market 23 makers to provide liquidity. It's solely one sided. 24 So there is sort of a lot more going on there 25 than just paired orders coming down and sort of getting	Page 85 1 fewer trading floors. And we continue to support that 2 position today. 3 In the current environment, we believe that 4 electronic exposure where any interested party, 5 participant, can respond will result in better and 6 fairer executions for the end customer and provide fair 7 access for the entire trade. 8 Floors are attempting to recreate the 9 electronic auctions. But we believe they are doing so 10 less efficiently. Price discovery for block size 11 liquidity is overwhelmingly achieved upstairs before a 12 block is presented to an exchange. Because the floors 13 almost never price improve on an exposed block order 14 price but merely rather seek to participate at the 15 proposed cross price. This is not adding liquidity but 16 rather taking it while providing little market value. 17 A modified approach could include establishing 18 a minimum size for floor trades. There are already 19 electronic restrictions in place for solicitations in 20 QCC trades. For example, a requirement that any trade 21 under 500 must be exposed electronically would help 22 ensure best execution for the majority of retail 23 trading, while still allowing trading floors to provide 24 pricing and liquidity for larger and more complex 25 trades.

Page 86 1 Lastly, we believe that any type of clean 2 cross rule would go against all of these points. It 3 would block participants from possibly providing better 4 prices. 5 MR. JOHN KINAHAN: I think whenever time I 6 hear this question, my first question is, well, what are 7 we going to replace the floors with. And I think Andrew 8 brings up the idea of, you know, creating an auction 9 mechanism to expose these types of order flow. I think 10 we'd have to think very carefully about how that auction 11 mechanism gets structured. But it could theoretically 12 work. And I think that could be viable if done 13 correctly. 14 If the alternative is to just close the floors 15 and allow that type of order flow to be clean crossed or 16 even an expansion of, you know, the ideas behind QCC, I 17 think the industry should be very wary of that. I 18 think, with all acknowledgement to the role that like 19 brokers and solicited market makers and facilitators -- 20 with acknowledgement to the role they bring to the 21 marketplace, the marketplace needs a check. And I think 22 the role of the floor right now is to provide that 23 check. 24 MR. SCHULTZ: We have those mechanisms, 25 though. Aims and Pixels and PIMMS and all those would	Page 88 1 Orders being shopped around floors to minimize 2 participation is a major issue. As well as exchange 3 policies that are intended to limit market maker 4 participation is a problem. 5 So I think, you know, with that, similar to 6 what Andrew said, we're supportive of looking at 7 mechanisms to migrate activity away from floors into 8 electronic mechanisms that could be done through a cap 9 such as a 500 contract or a minimum threshold such as 10 500 contracts, and kind of start there. 11 I think as others have said, and I think as 12 maybe all of the panelists will likely say, a clean 13 cross rule would certainly be problematic, and we would 14 caution the SEC in considering that. I think as the SEC 15 has done in all of their rulemaking, evaluating the 16 impact to displayed price discovery with approvals of 17 certain new mechanisms is warranted. And that would 18 certainly be the case if you were considering a clean 19 cross rule. 20 MR. CRUTCHFIELD: Yeah, I agree with most of 21 what's been said, and particularly with almost 22 everything that John just said. 23 I think you could make a case -- I'll just 24 mention this, because I don't think anybody else has, 25 that in single list products where there is a natural
Page 87 1 just work. You can just put those in electronically. 2 MR. JOHN KINAHAN: Understood. But they don't 3 get used in that fashion today. And things may change 4 between, you know, where we sit today and that world 5 where they get used. 6 MR. FISCHER: So we have a unique perspective 7 on this. We have one of the largest institutional 8 market makers in options. And then we also have 9 participation and presence on all of the options trading 10 floors. And I think with that view, it's unclear to us 11 that the options floors continue to provide the benefit 12 that they once did. 13 I think that's evidenced by COVID. When all 14 options floors closed, we saw an improvement or increase 15 in price improvement, versus price improvement on the 16 floor. And I definitely would welcome the SEC to study 17 that further. I think that the data that was provided 18 today was interesting. But looking at the subsegments 19 of equivalent activity executed electronically in an 20 auction versus on the floor and what price improvement 21 looks like would be beneficial for the market. 22 We all -- we do have specific concerns around 23 the floors as well. So there are a few activities that 24 warrant review. We see internalization of small or 25 retail-size orders on the floor as a major issue.	Page 89 1 liquidity concentration on a single floor, for example 2 SPX -- there are others -- you could make the case that 3 that's a reasonable process. You're going to bring an 4 order to be placed and that is where the liquidity is 5 and that is where the market makers are. And that -- 6 that actually does provide some pricing benefit to 7 investors. 8 But focusing then mainly on the multi-list 9 products, which I think is what most of this 10 conversation has been about, just a kind of a note on 11 the structure. Floors right now, as I see, really exist 12 in sort of a regulatory inadvertent gap through the 13 confluence of three things. We require orders to be 14 exposed in the options markets in almost every case, 15 with very limited exceptions like QCC, which I would 16 also not want to see expanded. 17 We count announcement on a floor as exposure, 18 just like laying the order down electronically. And 19 liquidity seeking orders don't ordinarily go to floors. 20 So almost everything of note that goes to a floor, I 21 think candidly, even if it is looked at on the floor as 22 being liquidity seeking, it was already shopped upstairs 23 and if they didn't find the other side, it's because 24 nobody cared at the price. It's not because the floor 25 is providing additional value.

Page 90 1 So electronic markets are extremely efficient. 2 So basically the only reason that orders go to floors is 3 when someone is looking to internalize a big cross. And 4 it's become very obvious over the years, and I don't 5 think anyone will disagree, those orders tend to go to 6 the floors where there is the last friction tends to be 7 I think the term of art. Those orders are seeking low- 8 friction crossing opportunities. 9 Yeah, I'm getting some agreement up here. 10 So what happens on the floors is market makers 11 have to spend money to put people on floors so that when 12 an order goes to that floor seeking a low-friction 13 cross, there is an opportunity to potentially 14 participate, maybe provide price improvement, but 15 typically I think most of that price improvement again 16 happens upstairs. And exchanges then, through no fault 17 of their own, and I've been in this situation as well 18 again, exchanges have an adverse incentive to compete 19 for flow by making the floors as frictionless as 20 possible. And that is every exchange, while potentially 21 getting more volume on their floors, is always about how 22 can we make this quicker and easier and faster and less 23 likely for there to be market -- those annoying market 24 makers who get in the way of these crosses that we want 25 to be able to print on our floors.	Page 92 1 (Laughter.) 2 MR. MANOHARAN: All right. So we recently had 3 another roundtable to discuss the trade-through rule for 4 equities. But options are not governed by the Reg NMS 5 trade-through provision but rather by an NMS plan. Is a 6 trade-through restriction still appropriate for options? 7 Katie? 8 MS. KOLCHIN: Yes. So I will go back to my 9 comments at the beginning. You know, options differ 10 from equities. Big one, when it comes to trade- 11 throughs, there is no off-exchange trading. Right? So 12 if the original intent of the trade-through rule was to 13 ensure that investors are getting a great experience, 14 let's look at that. We've already discussed, and I'm 15 going to be the first who says it the second time on the 16 same panel, but retail has never had it better. So they 17 are being served very well. 18 If you think about the institutional side of 19 the concerns around executing large orders, I know we 20 just had a healthy debate about floors. But they do 21 have a floor option. And I'm sure if floors were to go 22 away, the creative minds up here would find a way to 23 service that customer set well, just as retail is 24 served. 25 So I am also going to go back to my beginning
Page 91 1 What does not happen on floors is price 2 discovery and multi-lists. It's just not happening. 3 So for the vast majority of orders, I would 4 certainly agree with Andrew. By the way, at CTC, my 5 former employer also signed that letter, if we're 6 talking about the same one. It's many years ago, now 7 that I think. But certainly would recommend that, for 8 the vast majority of orders, mandatory electronic 9 exposure should be the goal. I don't think we need to 10 let the perfect be the enemy of the good. 11 If I were to humbly make a recommendation, it 12 would be that the SEC should signal a moratorium on 13 approving additional trading floors. As Andrew said, 14 the number of floors has grown after many years of 15 stability, first with Box, then with Miami. We do not 16 need any more. 17 But if the regulatory's position continues to 18 be that it's okay, floors are a perfectly cromulent 19 place to trade options, then inevitably IEX and MEMEX 20 and the Texas exchange will open floors in the next 21 small number of years. And I think that would be to the 22 detriment of market structure. 23 MR. BROWN: I will just add that we're going 24 to focus on launching first. Not so worried about the 25 floor.	Page 93 1 comments about that equation with the revenue 2 opportunity, but also the cost side of this. And this 3 is where options is similar to equities. 4 So any removal of the trade-through 5 restrictions is not going to guarantee that the firms 6 sitting up here are going to be able to disconnect from 7 exchanges. It may not alter the cost side of the 8 equation. 9 So the question becomes, not just on this 10 particular one but sort of what we are getting at all 11 day to kind of sum it up is, what is the problem we're 12 trying to solve for here? And what results will we 13 anticipate would come from any changes we would make to 14 market structure? And then how would we measure those 15 results if we do implement changes, and then what would 16 be our plan to adjust accordingly as we continue to 17 monitor the environment as it changes? And I think John 18 was kind of getting at this. What if we make it worse 19 for people? 20 So I think that's just sort of my way to end 21 -- this is my last segment today to speak on -- to sort 22 of end for the day. Again, what is the problem we're 23 trying to solve for? Before we come up with any 24 changes. Even though I know Jamie and Richard have made 25 it clear this is more of discussion rather than a

Page 94 1 rulemaking today, but just to end with that. 2 MR. MAYHEW: I mentioned earlier that 3 nonmarketable limit orders are sort of a crucial way 4 that customers can obtain better prices and price 5 improvement relative to the spread in option markets. 6 And I think one thing that facilitates that is the 7 display rule and the trade-through protection that 8 they're given through the option linkage plan. 9 You know, one of the explicit stated goals of 10 the national market system is to seek to allow, where 11 possible, orders to -- public orders to interact 12 directly with each other without the need for 13 intermediation of a dealer. That goes back to the 14 beginning of the national market system. And that may 15 not happen a ton in option markets, because it's so 16 fragmented across so many series that there often dealer 17 intermediation. 18 But a trade-through protection in option 19 markets feels to me to be very consistent with the goals 20 of the national market system and empowering investors 21 to get their limit orders executed by getting them 22 displayed and having them protected. My understanding 23 is the exchanges have already sort of hard coded into 24 their rules and into their routing logic the ability o 25 reroute orders where there's a better price. So I think	Page 96 1 that it could necessarily happen that way in options. 2 But I think there are kind of things that are worth 3 thinking about if you need to clear some hurdle for the 4 protected quote. Or to, you know, Citadel's points that 5 they've made, to get the protected quote and/or 6 abilities to charge for certain products. You know, 7 maybe that should not be sort of open to anyone who gets 8 the filing in and starts an exchange, you know, from 9 zero. 10 MS. KOLCHIN: If I could just add onto that, 11 it goes back to what I did in the beginning where I did 12 that 1 percent market share threshold. And in equities, 13 you've got seven of the exchanges are under 0.5 percent 14 market share. Yet you're right, Kevin, that from day 15 one that they open a door, they're collecting market 16 data and connectivity fees. And that's one of the 17 things that I would put on a list, a question we should 18 be asking, how do we stop that. 19 MR. FISCHER: Yeah, I think just to expand 20 upon that, I know I mentioned in my opening the 200 21 million estimate for the impact of the industry from 22 small venues. I think, yeah, the exchange proliferation 23 is a major cost to the industry. You know, we are at 18 24 options exchanges with 20 expected by the end of the 25 year. So a lot of that is driven by the benefits to
Page 95 1 it's operating pretty seamlessly is my understanding. 2 MR. TYRRELL: I'll follow up on one thing 3 Katie said, the cost line of this. And I think this is 4 probably similar between equities and options, in my 5 opinion, that if you were to introduce some sort of 6 change to the approach today of all exchanges have this 7 protective quote, I don't think a lot of exchanges or 8 any exchanges go away, and I don't think costs reduce. 9 But I do think, looking to the future, as we keep -- 10 there's certainly an incentive to keep adding exchanges. 11 And I think you'd have to think about how do you handle 12 the upside or the growth in costs. And we're very 13 cognizant that, you know, fragmentation is a bit of a 14 cost for us but I think it's much more impactful to most 15 of the other folks up here. 16 So I think it's worthy to ask is it right to 17 have a protected quote and an obligation to connect to a 18 venue on day one of that venue. Or do you need to have 19 a proving ground or a proving period. 20 And we haven't really seen this approach in 21 options. But in equities, we've certainly seen ATSs 22 start, you know, go from zero to something substantial 23 as an ATS, and then become an exchange. IEX obviously 24 followed this path very successfully. And the market 25 structure is different, so it's not a perfect analogy	Page 97 1 launching an exchange. So there is ORF, which was 2 discussed earlier. There's fixed connectivity and data 3 fees as well. 4 So we did an analysis to look at, you know, 5 how do we come up with this 200 million number. So we 6 looked at all venues under 4 percent market share, which 7 in options, given everything trades on exchange, that's 8 a slightly different number than what we've used 9 previously in equities. And we looked at the ORF they 10 collect, as well as our estimates on the connectivity 11 and proprietary market data fees that they charge. And 12 that number is substantial. It is a major cost to the 13 industry. 14 I agree with the other panelists that simply 15 changing a trade-through rule wouldn't address this 16 cost, given that most industry participants are already 17 connected to these venues. And as an order router, to 18 fulfill best ex obligations, you likely need to continue 19 to connect to those venues. 20 So I think the potential solutions that we've 21 proposed previously are evaluate a market share 22 threshold for participation in CIP revenue, evaluate a 23 market share threshold for exceeding certain 24 connectivity and market data costs as well. Which, you 25 know, we hope should curb some of this exchange

Page 98 1 proliferation. 2 MR. DUCKLES: The fact that all these 3 exchanges have above 1 percent of the market share, I 4 think we should treat as evidence that they are actually 5 serving a real purpose here. It's not just, you know, 6 de minimis. And to the extent that we've already talked 7 about how, you know, reforming ORF has decreased at 8 least some of the sort of unnecessary cost of 9 proliferation. 10 But if you want to look at why is there this 11 incentive for the new exchanges, and part of it is, to 12 go back to our first topic, that they represent -- they 13 are serving a real market need of a more competitive 14 specialist allocation process. And so having that 15 process be more competitive and more ongoing, I think, 16 would at least reduce some of the artificial incentive 17 that currently exists for those new exchanges. 18 MS. KOLCHIN: And just for the numbers, for 19 the below 4 percent, when I pulled these data, it was 20 nine of them are below 4, and then there is a tenth 21 that's right at the 4 percent. So almost half are below 22 your 4 percent number. 23 MR. SCHULTZ: One quick point on John's point 24 about the best ex. I do feel like if you did something 25 where exchanges under 4 percent or 3 percent were not	Page 100 1 MS. KOLCHIN: Yeah, and just to Steve's point, 2 that was what I got at in the beginning. Like I think a 3 very important question here is have we made the ante 4 way too high for new participants to come in, or even 5 people to remain in the business, given all the costs in 6 the industry? 7 MR. SELWAY: So I got the sense there are a 8 couple of sellers of QCC up here. Anyone want to take 9 the other side, or argue the counterpoint? 10 MR. TYRRELL: Sorry, to QCC? 11 MR. SELWAY: Yeah, the qualified -- the 12 exemption. 13 MR. TYRRELL: I think, I mean the one thing we 14 are I guess cognizant of, QCC to me is part of it, is at 15 this point it has kind of been brought up a couple times 16 over the day on a couple different things. It's great 17 to think that the options market has order interaction. 18 And obviously, QCCs are different. But providing tools 19 like that where overall the market is, you know, focused 20 or sort of biased towards exposing orders, allowing 21 market participants to participate is great. And I 22 think, you know, a far better situation than the 23 equities market where so many orders, retail orders -- 24 you name it are not exposed to an exchange and are not 25 really broadly available for trading.
Page 99 1 considered protected in the options market, we don't 2 actually believe it would impact the prices that the 3 customers achieve, because I think the customer firms 4 are evaluating whether it's EQ or liquidity. And so 5 whether that seventeenth, eighteenth, and nineteenth 6 exchange is at 1.09 or not I don't think actually 7 changes kind of how that execution would happen. 8 And then one other one to John is that there 9 are massive fixed costs, too. I have a feeling that 10 might be near 200, but you didn't say it. So I point it 11 out. 12 You know, the connectivity data center boxes, 13 cross connects, all that, are a real burden when you 14 start to go from what was five exchanges to now 18 and 15 soon to be 20, and I guess 21 soon. 16 MR. SOSNICK: As a former market maker, I will 17 say that is probably the biggest impediment to having 18 new market makers come in. There's a big cost. There's 19 a big cost to starting a market making firm. And that's 20 not shrinking. 21 MR. FISCHER: And to speak to the numbers too, 22 so, yeah, progress has been made with ORF. In our 23 estimates, ORF was 25 percent of that \$200 million 24 number. And agree with Andrew, the fixed connectivity 25 costs are a major portion of the number.	Page 101 1 So, you know, I think QCC is helpful in the 2 sense that, you know, broadly, we are still keeping this 3 exposure. You know, there is a carve-out for a 4 particular type of trade. Certainly understand, you 5 know, concerns if it were to be, you know, expanded or 6 the clean cross type order type introduced. You know, 7 obviously, people would have concerns with that. 8 But overall, I think maintaining tools that 9 allow the ability of most orders to interact in the 10 exchange world is a positive thing. So it's something 11 we think about in terms of that particular capability. 12 MR. MANOHARAN: All right. For our last 13 question today -- and it's been a great panel. Finally, 14 for our last topic, we are going to talk about 15 liquidity, specifically quote width. 16 Outside of the most liquid symbols, quotes 17 seem to be wide and getting wider. What can be done to 18 facilitate tighter quotes? 19 John. 20 MR. FISCHER: Yeah, I think a key question to 21 ask there is what aspects of market structure create 22 excess complexity and costs for market makers? And 23 ultimately, that results in wider quotes. So we think 24 there are a few areas that are worth evaluating there. 25 One is capital frameworks and the fact that they're not

Page 102 1 always sufficiently risk based in evaluating the full 2 risk of your portfolio. Within that, I think there's 3 alternative net capital rules and their availability to 4 market makers is an issue worth evaluating, as well as 5 allowing model-based risk controls as part of that. 6 Also clearing fund methodologies or clearing 7 fund allocation and margin methodology is worth 8 evaluating, you know, to ensure that they're better risk 9 based. 10 Strike proliferation, which is an issue that 11 has come up today, is another issue that impacts market 12 makers and ultimately results in wider quotes. 13 I think roughly half of options series have 14 zero open interest, so there are nearly two million 15 strikes and half of them have no open interest, have 16 never traded. 17 And we also think, you know, as said earlier, 18 worth evaluating auctions. I think they are -- again, 19 they clearly are the main mechanism to provide price 20 improvement to retail investors. But at the end of the 21 day, if it's deemed that they are resulting in wider 22 quotes, it's worth evaluation. 23 MR. MAYHEW: If I could just expand on some of 24 those ideas, think about what it means to be an option 25 market maker and how options are different than stocks.	Page 104 1 aggressively compete on narrower quotes on series that 2 never trade? How much resources do you want to dedicate 3 to that. 4 So if that's the reality, then as you think 5 about what type of competition do you really want to 6 focus on? I'm not saying it's unimportant to consider 7 encouraging competition across quotes. But it becomes 8 more important to really ensure that there is robust 9 competition after an order arrives to allow market 10 makers and other market participants to wake up and say, 11 oh, somebody actually wants to trade this option. How 12 much price improvement can we get? So focus on the 13 auctions, focus on what effects does exchange 14 proliferation have on the ability of market makers to 15 offer price improvement to marketable orders. Perhaps 16 other ways of focusing the competition, rather than 17 imposing additional risks and costs on market makers for 18 quoting series that never trade. 19 MR. MANOHARAN: To follow up on that, would a 20 periodic or one-sided auction be useful? 21 MR. SOSNICK: One-sided quotes, you mean? 22 Or -- 23 MR. MANOHARAN: One-sided auction. So an 24 auction would just start, and so if someone -- so it 25 wouldn't need a market maker to start the auction.
Page 103 1 I mean Kaite mentioned some of the things. 2 One important way in which an option is 3 different than a stock is that an option market maker is 4 quoting 100 or 1,000 or multiple thousands of different 5 series on the same underlying. I looked the other day, 6 I think Apple has 3,200 different series, over half of 7 which did not even trade on the day I was looking at it. 8 And the option market makers have exchange 9 obligations to maintain most of the time two-sided 10 quotes on all of these series. And then there's other 11 market makers on other exchanges quoting those same 12 series. And any time your spread on any one of those 13 3,200 series is going to cross with some market maker on 14 some other exchange, there's someone out there who could 15 pounce and try to do an arbitrage against your two 16 quotes. Or if your quotes are stale and not updated 17 frequently when the underlying market moves, you're 18 subjecting yourself to arbitrage. 19 So there's sort of a question of what is the 20 optimal width of your spread that you're going to quote 21 on thousands of series that never trade, given that it's 22 costly to update. You have a complex, model-based 23 system that you're updating the parameters of to run 24 your auto quote system. And, you know, does the 25 Commission want to strongly incentivize market makers to	Page 105 1 MR. SOSNICK: Go ahead, Andrew. 2 MR. SCHULTZ: I think that would hurt the 3 displayed liquidity. It would hurt the prices that are 4 shown on the screens. And I think you would have 5 potentially even wider screens in a way, because those 6 quotes are out there. And to Stewart's point, the one 7 thing I would add is those 3,000 quotes have often very, 8 very correlated risks, too. If the Apple stock moves 9 and their calls and puts tilt is -- but, no. I think if 10 you did that kind of open auction, you'd potentially 11 hurt the screens even more. And it would be very hard 12 for investors of any type to understand what the kind of 13 pricing of that option is. You can just imagine a world 14 where like an entire expiration in Apple could go, you 15 know, no bid at 50 and there'd be no sense of what the 16 volatility is or what the real risks are because there 17 would be kind of no trade on those quotes. 18 MR. SOSNICK: You know, I'll answer the 19 question and I guess get to my point, if you don't have 20 a follow-up on that. 21 I think it's important here to realize that, 22 you know, there is a disincentive for market makers to 23 quote too tight. And I think we don't want to further 24 disincentivize them. 25 To John's point, one of the things that I've

Page 106 1 thought about for years is I know strike mitigation has 2 been a topic forever. But if we still have one million 3 out of two million strikes that have no open interest, I 4 will argue we have too many strikes. And from a market 5 making point of view, I understand this because I did 6 this plenty, is you can't put your best foot forward on 7 every strike all the time. It's impractical. And you 8 know, especially now that the statistic was what? We 9 went from 3,400 to about 8,500 quoted names, each of 10 them have multiple strikes. Do we want to be moving 11 high delta options? You know, at some level, you're 12 just increasing more quote traffic without a lot of 13 benefit. So I do think that's important. 14 And what we do is we use the auction mechanism 15 to mitigate that. Beyond that, we actually basically 16 have market access controls that prevent customers from 17 trading off of too wide of a spread. We -- to a certain 18 extent, we won't put in an order if it's too wide of a 19 spread. We will seek liquidity at a better price for 20 them. 21 And part of it is also education. At any 22 given point, we pretty much know what the fair value is 23 of that option, even if it's a wide spread. The wider 24 it is, the harder it is to determine. But in any given 25 case, you can pretty much figure that the midpoint is	Page 108 1 a little negative. I would agree with that. But I 2 would also say I think you could make all those same 3 points about two-sided auctions. Right? I mean any 4 time you have an auction mechanism that allows someone 5 to jump up and improve the price beyond the quote, in a 6 way you're disincentivizing putting that quote up there 7 in advance because it doesn't have a participation 8 entitlement. 9 Now, there's an important balancing act there. 10 We want customers to get those better prices that they 11 are through auctions as a market structure mechanic. 12 But there is that risk. 13 So am I going to improve the quote? Well, 14 when the order comes in, someone is just going to start 15 an auction anyway. And maybe I could just not improve 16 the quote and respond to the auction. And then, you 17 know, why am I sitting out there? Conversely, if I am 18 sitting out there on the quote, I do have this risk that 19 I am going to get picked off by someone whose price feed 20 is a couple of microseconds faster than mine. 21 By the way, I think there is a solution there, 22 which is allowing exchanges to be creative and, you 23 know, having the regulators sort of stand out of the way 24 as exchanges try to do interesting things. We supported 25 -- I shouldn't say we -- my former employer supported
Page 107 1 the fair value as far as the Street has determined. And 2 we go to a great extent to educate the customers to say, 3 look, you know, here is the fair value on this option. 4 You know, let's say it's 10 bid at 20. Okay. So, you 5 know, you're probably not going to get it if you bid 15. 6 But try 17, try 18. Odds are someone -- one of these 7 guys here will hit you if you're above -- if you're 8 above his fair value. And that's the way we try to do 9 it. 10 And so I think that it's a bit of an art as 11 much as a science. I think a lot of it is on the 12 brokers, because I don't know that we can rely upon the 13 market making community and the -- and just the amount 14 -- and just the pipes to manage, you know, if we had 15 tight spreads on every single line everywhere. 16 MR. CRUTCHFIELD: I think a question or a 17 useful way of thinking about this question is what are 18 my incentives as a market maker to marginally improve 19 some wide spread in some illiquid thing? And what are 20 the things that I would worry about that are 21 disincentives to doing so? And I think some of them 22 have already come up. 23 John Fischer made the point a couple of times, 24 which I agree with. Generally -- and you asked about 25 one-sided auctions. I think the response was, you know,	Page 109 1 the work that IEX has done along those lines with market 2 makers protections. Other exchanges have looked at 3 other things, speed bumps and other market mechanics 4 that can reduce that pickoff risk. 5 And then the third does get back to something 6 that we spoke about extensively before, but it is the 7 question of allocation. It used to be why do I want to 8 improve my quote? Well, I'm on a pro rata market and if 9 I show 10 and then, you know, an eight lot comes in, 10 maybe I'll get a couple and that's a good order, I want 11 to trade with that order. 12 Nowadays, as I spoke about a lot previously, 13 up to five contracts, I'm never going to see that order. 14 Because whoever controls that order is probably going to 15 send it to another exchange where either they or their 16 affiliated market maker is a specialist and is entitled 17 to trade all of it. And that's true even if I improve 18 the quote. Right? I can improve the quote, they can 19 match it, and now they get the order. I never see a 20 single contract. Why am I exposed to potentially lose 21 on those more toxic fills. 22 So not -- you know, a lot of issues at work 23 there. But there are -- I think a lot of the things we 24 touched on earlier could help to improve the story about 25 better incentivizing market makers to improve quote

Page 110 1 quality on screens in some of these less liquid 2 products. 3 MR. SCHULTZ: Can I just mention one thing, 4 sorry, on the strike mitigation versus the strike 5 proliferation? I was on LOMSWG and it took a couple 6 battles about the mitigations, and it didn't always go 7 well. But I will say that there is a large amount of 8 friction in adding the strikes kind of intraday when the 9 moves happen. And so I think while we do have lots of 10 strikes that don't have open interest, we have an 11 environment that allows the customers, institutional or 12 retail, to make the trades they want even when news 13 comes out. So there is a balance between the two. 14 I actually think that we've reached a 15 reasonable balance. You know, when the markets move 10 16 percent or 15 percent over a two-week span, you kind 17 pick up strikes and there's not much you can do about 18 it. But I think there is certainly a friction of going 19 too low on strikes, because then that product is not 20 available to trade. And that's real hedging costs and 21 trading opportunity. 22 MR. BROWN: I was just going to say on the 23 strike rationalization part, you know, Steve and Andrew 24 make a good point. This has sort of been a longstanding 25 topic for a period of time. Ellen Gigante, a number of	Page 112 1 Director Jon Kroeper and Eric Juzenas, who is associate 2 director leading our Office of Market Supervision. 3 The next panel will focus on evaluating the 4 customer experience with listed options. So Eric and 5 Jon, take it away. 6 PANEL TWO 7 EVALUATING THE CUSTOMER EXPERIENCE 8 MR. KROEPER: Great. Thanks, Jamie. 9 We had a great first panel, hopefully we can 10 live up to that. And I'd be interested in hearing if 11 anyone wants to share their spirit animal. Butterfly is 12 taken. 13 So over to you, Eric. 14 MR. JUZENAS: Thanks, Jon. 15 First, any volunteers on spirit animals? 16 MS. RUSSELL: Mine is a swan, actually. 17 MR. JUZENAS: Swan? All right. I was 18 thinking I'm going to go with orca. 19 Okay, so this one is going to discuss the 20 customer's experience with options and a focus on the 21 retail customer. I think as we heard on the first 22 panel, there's obviously been a huge growth in retail 23 trading. Also to get people drinking their coffee, I'm 24 going to change a little bit, you know, our markets are 25 the -- I forget. What was the actual phrase? The envy
Page 111 1 folks on the Listed Options Market Structure Working 2 Group have tried to tackle this. 3 I would say as a practical matter, it's very 4 difficult -- actually impossible for exchanges to 5 actually coordinate on this particular matter, as you 6 can imagine, for antitrust concerns. And so I think 7 this is an area where some direct initiative from the 8 Commission to help support a more intelligent strike 9 regime and rationalization might be a very practical, 10 you know, practical application. 11 MR. SELWAY: So floats like a butterfly, 12 stings like a bee. 13 Please join me in thanking Arun as moderator 14 and these wonderful panelists. 15 (Applause.) 16 MR. MANOHARAN: And if you have more to say or 17 if our audience has some thoughts, the comments file is 18 open. 19 MR. SELWAY: So we're going to take a short 20 break. Be back here at 11:30, please. 21 (Recess.) 22 MR. SELWAY: All right, so welcome back. 23 We're going to go ahead and get started with our second 24 panel. 25 I am pleased to introduce to the group Deputy	Page 113 1 of the world? I'm going to qualify that by a little and 2 just say that the national market system really is the 3 envy of the world, because I think one of the factors 4 that was cited by several people, including Katie, was 5 when it comes to the options market, the breadth and, 6 you know, some might call it fragmentation, but the fact 7 that you have numerous exchanges with significant 8 volume. And that was obviously one of the goals of the 9 national market system way back when. 10 But also what makes our markets the envy of 11 the world is obviously the customer participation. And 12 so I think that's why this panel is a nice follow on 13 from the previous one, because we talked about, you 14 know, some of the emerging issues and some of the 15 challenges. But now we're going to really try and hone 16 in more specifically on the customer experience. 17 So our panelists today bring a wealth of 18 experience and varied perspectives on options trading. 19 They have been carefully selected and vetted to make 20 sure the conversation is going to be entertaining and 21 hopefully, you know, not too much tension but some 22 tension. And we're going to start with an introduction 23 to the panelists, starting with GERALYN. 24 MS. ENDO: Hello, everyone. My name is 25 GERALYN Endo. I am head of options business development

Page 114 1 at MEMX. Thank you to the Staff and to the Commission 2 for hosting an Options Market Structure Roundtable. 3 Yes, I do remember the ISE. I hold it very near and 4 dear to my heart. It's where I started my options 5 career. But here I am now at MEMX, also referred to as 6 the Members Exchange, which was founded by many of you 7 in this room or watching back in 2019. 8 Our mission is to create healthy competition 9 among exchanges, as well as advocate for market 10 structure reform that results in a more efficient and 11 effective trading experience for all participants, 12 including customers. MEMX currently operates one U.S. 13 equities exchange, one options exchange. And, yes, we 14 will be launching a second exchange later this year, 15 contributing to that increasing count. And we also 16 provide technology to other market centers. 17 Since I know Steve loves his coffee. You 18 changed it on me a little bit, so I don't know what to 19 say. But the U.S. options market is the envy of the 20 world. The customer experience has never been better, 21 resulting in the significant growth that we've all been 22 benefitting from. 23 While certain incremental changes certainly 24 may prove to be beneficial, any fundamental market 25 structure changes simply are not necessary. We should	Page 116 1 billion contracts traded last year, largely as a result 2 of retail participation. This unprecedented 3 participation is a success story that should be 4 celebrated and protected. 5 During our discussion, we must acknowledge the 6 options marketplace is dramatically different than the 7 equities market. The market structure is very, very 8 different. 9 To ensure customers get the best experience 10 possible, we urge the SEC to take an evidence-based 11 approach to any possible changes, rather than rushing 12 prescriptive rules that could effectively limit retail 13 access. Instead of broad structural overhauls, we 14 believe our immediate focus should be on solving three 15 organizational challenges that directly impact the 16 market and everyday investors today. 17 First, the options regulatory fee. We 18 appreciate the steps taken by exchanges already, but 19 we'd like to see further transparency and accounting for 20 what and how these exchange fees are used, and if they 21 are unnecessarily burdening retail customers. 22 Second is strike proliferation. Up to 60 23 percent of listed options are ghost strikes with zero 24 daily volume or zero open interest. These unused 25 strikes strain the system and create targets for bad
Page 115 1 focus our efforts on the current industry-led 2 initiatives. 3 Thanks, and I'm looking forward to continuing 4 the conversation with everybody. 5 MR. HOSTY: First of all, I just want to say 6 thank you to Chairman Atkins, Commissioners Peirce and 7 Uyeda, Director Selway, and the rest of the SEC Staff 8 for convening this roundtable on such an important 9 topic. 10 I'm grateful for the invitation to participate 11 on the panel. I am Ed Hosty, vice president of 12 execution services for Robinhood Financial and Robinhood 13 Securities. 14 As an initial matter, we want to emphasize 15 that option trading, and specifically retail 16 participation in option trading, has existed safely for 17 decades. Every day investors use option strategies for 18 prudent reasons, whether it be to hedge current 19 positions, generate income, or manage risk with greater 20 capital efficiency. 21 Representing Robinhood, I am proud of the role 22 that we played in democratizing access to the option 23 market for a new generation of retail investors. The 24 options market has fundamentally transformed. Lower 25 barriers to entry have led to a record breaking 15.2	Page 117 1 actors. Culling them is essential for market integrity. 2 Finally, operational resilience. Disruptions 3 to data feeds and delayed obvious error rulings leave 4 retail investors exposed to unacceptable financial risk. 5 By addressing these immediate issues and fostering 6 responsible innovation, we can preserve the unique 7 strengths of the options market. 8 Thank you. And I look forward to the 9 discussion. 10 MR. JJ KINAHAN: I'm JJ Kinahan, Cboe Global 11 Markets. I guess I have unique perspective in my 12 opinion. I've only been at Cboe since January. I was a 13 market maker for many, many years, then went to work on 14 the retail side for many years. Basically, I'm saying 15 I'm old. And now on the exchange side. 16 Much to Crutch's chagrin, I think we have to 17 change the logo for this panel and the spirit of it to 18 retail traders have never had it better. And we'll 19 change it from coffee to whiskey. It's almost noon 20 somewhere. 21 But anyway, no, all that said, quite honestly, 22 I think we have to be, echoing a little bit of what I 23 had said, very careful about some of the things we do. 24 Can the market use improvement? Absolutely, of course 25 it can. Everything always can. But I think you have to

Page 118 1 be very targeted in the things that you change. Because 2 as, you know, my cousin John was up here a moment ago 3 saying some of the things that sound actually simple 4 really change a lot of the infrastructure that's related 5 to it. There's a lot of interdependence in how these 6 systems have been designed. And so because of it, as we 7 consider what we do, I would say we really have to 8 consider not only that thing we are changing, but all 9 the downstream effects. I think one of the things that 10 we've all been guilty of is not necessarily doing in the 11 best way before some things have been changed in the 12 past. 13 That said, if you look -- any business is 14 judged by the success of its end user. Well, I remember 15 being in meetings -- you know, it was interesting, when 16 that chart was up earlier and it showed how market 17 makers went down in 2016, 2017, 2018. Many of you in 18 this room will remember we were sitting in meetings and 19 our biggest concern is how are we going to get younger 20 people interested in the markets. It's not a surprise 21 to me that we saw market makers leave the market then, 22 because the volumes looked like they had tapered off and 23 may be even starting to fall a little bit. 24 Then, of course, in 2020, we didn't think 25 every young person was going to come at once. But they	Page 120 1 structure while providing our clients with full 2 transparency and control over their orders. 3 Our clients include global investment banks, 4 market makers, retail firms, broker-dealers, 5 institutions. So we pretty much touch all market 6 participants. 7 In 2025, on average, we executed 15.5 million 8 contracts per day, representing approximately 25 percent 9 of the daily OCC volume. Thank you for allowing me to 10 speak today. 11 MR. POMEROY: Good morning. I am Nate. I am 12 principal at Wolverine Execution Services. I'd like to 13 thank the Commission also, and Commissioners and Staff 14 for inviting us today. I always love talking some 15 option market structure. 16 WEX is an agency-only executing brokerage with 17 offerings in EMS algorithmic execution focused on 18 options, OMS products, as well as high-touch execution 19 in options specifically. 20 I have worked at Wolverine for my entire 21 career, and very early on learned about this new sort of 22 product that we were building at WEX called the smart 23 order router that focuses on retail options execution. 24 I've been working on that product for basically my 25 entire career and like to tell friends or new
Page 119 1 all did. And it was the best thing that happened to our 2 markets. And if you look at volume measured from 2019 3 until the end of last year, OCC volume is up over 200 4 percent. I don't think there are many businesses that 5 are 50 years old where that is happening. So again, 6 it's awesome. 7 And I should have started it -- my mother 8 would have slapped me -- with a thank you for everyone 9 having this panel. It's absolutely important. you 10 know, options have been something -- anybody who knows 11 me knows I'm incredibly passionate about. And it's 12 great to see options get their day in the sun, if you 13 will, with the SEC, and considering how to improve the 14 markets. 15 But again, if you're going to measure any 16 business by its end user, I think any business anywhere 17 in the world that's more than 50 years old would love to 18 have a 200 percent lift over the last six years. 19 MR. MILITO: Hello. I'm Stino Milito, the 20 president of DASH Financial. I too would like to thank 21 the SEC for organizing today's roundtable and inviting 22 DASH to be a part of it. 23 DASH was founded in 2010 as an agency-only 24 executing broker. Our routing technology is designed to 25 efficiently navigate today's complex options market	Page 121 1 acquaintances that my day job is to try to figure out 2 how to save ordinary Americans millions of dollars a 3 day, which is kind of cool. 4 And, yeah, looking forward to participating 5 with everyone on this panel today. 6 MS. RUSSELL: Good morning. I am Racquel 7 Russell, SVP in FINRA's Office of General Counsel, where 8 among other things I'm responsible for options policy in 9 support of FINRA's investor protection and market 10 integrity mandate. I have been with FINRA for 17 years. 11 I started my career here at the Commission in 2001 in 12 the Division of Trading and Markets. And thank you to 13 the Commission and the Staff of the Division for having 14 me here today and I look forward to the discussion. 15 MR. SCHWARZ: Good morning. My name is 16 Christopher Schwarz. I am a professor of finance at the 17 University of California Irvine. I am officially here 18 as an academic, but I actually am a retail options 19 trading customer of many of the firms on the roundtable 20 today. So rather rely on anonymized or voluntarily 21 provided data, my coauthors and I perform experiments. 22 We place the same trade across multiple brokers at the 23 same time -- with our own personal money, I should add. 24 Over the last two years, we placed 20,000 option trades 25 at nine brokers across two dozen symbols at various

Page 122 1 trade sizes. By doing so, of course, we know the broker 2 we placed the trade at, we know which wholesaler handled 3 our trade, we know which exchange our trade went to, we 4 know it was executed, auctioned, unbundled, split 5 allocation, and we know what price we paid. And then we 6 use those trades to do research on the economics of the 7 retail options microstructure markets. So it's based on 8 those academic findings and experience as a customer, on 9 which I will make my comments today. And so I thank the 10 Commission for having me here today. 11 MR. SIKES: Hey, everyone. I'm Stephen Sikes. 12 I'm the COO of Public, and I am the CEO of our broker- 13 dealer and sort of deal with all of our capital markets 14 and markets and market structure issues, especially from 15 a policy perspective. 16 First of all, thanks to the Commission for 17 hosting this. I remember in the prior administration 18 having many conversations at the SEC specifically with 19 Commissioners Peirce and Uyeda about how the attention 20 paid to equity market structure in the last 21 administration might have been better placed here. So 22 I'm very excited that we're here to talk about the 23 options market. 24 Because while I do think we do have the best 25 market we've ever had for retail investors, there's	Page 124 1 just broad asset class selection. 2 The second thing that we focus on is enabling 3 access to the best tools and data available. And one of 4 the things I think will be interesting as we talk about 5 investor education and options specifically is how the 6 use of AI for both research, portfolio construction and 7 strategy construction is increasingly becoming important 8 to helping influence better retail investor outcomes. 9 Generally speaking we are relatively young, 10 but we have been a part of these, you know, market 11 structure conversations for, you know, going back to 12 GameStop era, if I'm being honest. And our goal in all 13 of these market structure conversations is the same: to 14 help retail investors get the best deal possible, the 15 lowest cost of trade, the best execution quality, and so 16 on, regardless of the asset class they participate in. 17 And we don't do this because we're altruists. 18 We do this because we think that's the best business. 19 It's the best business for two reasons. One, better 20 cost structure, execution quality, and transparency 21 allows us to compete effectively and acquire customers 22 on the basis of the quality of our products in a heavily 23 and highly competitive and very expensive market to 24 acquire new customers. And the second is, maybe 25 intuitively for everyone in the room, the better
Page 123 1 certainly lots of opportunity to improve and we 2 shouldn't, you know, let better be the enemy – or 3 perfect be the enemy of better – however you want to 4 say that, whichever way. You guys know what I mean. 5 Anyway, just being from Public, we're a 6 relatively young retail broker. Let me give you a quick 7 second on who we are, and I think that'll inform many of 8 the conversations and my points of view as we go 9 through, and I think having that grounding will be 10 helpful. 11 So in the highly competitive space that we 12 operate in, we differentiate by focusing on serious 13 investors and traders. And while we can make that 14 distinction between serious and nonserious in many ways, 15 I think what we like to say is we serve investors and 16 traders, not gamblers. And so we do that specifically 17 focusing on two different sets of things. One, ensuring 18 broad access to multiple asset classes. Effectively, 19 every asset class that we can imagine a serious retail 20 investor or trader incorporating in their portfolio, we 21 want to show them in the Public experience. So that's, 22 of course, equities, fixed income including corporates 23 and treasuries, the options market and the crypto 24 market. And again, there are many others as well, and 25 we are going to continue marching on that path towards	Page 125 1 outcomes an individual investor has with their broker, 2 the more they're going to invest, the more they're going 3 to trade, and the longer they're going to stay on that 4 platform. 5 And so while there's a tradeoff between 6 optimizing for short-term revenue against sort of taking 7 some of these more long-term oriented steps, we believe 8 focusing on the long term, you know, allows all these 9 factors from customer acquisition and better outcomes to 10 compound into the best business possible. 11 Thank you. 12 MR. JUZENAS: All right, thanks everybody for 13 those introductions. 14 And so the first topic is account opening and 15 investor education. As we've talked about previously, 16 retail investors are trading options and even beginning 17 to use more complex options trading strategies. In 18 light of this, what considerations and best practices 19 should broker-dealers consider when authorizing a 20 customer for options trading. In addition, what 21 resources are available to educate investors about 22 options? And how can industry raise the awareness of 23 the unique aspects and risks of options? 24 And we're going to start with Racquel. 25 MS. RUSSELL: Thank you. I think it's really

Page 126 1 important to take a step back and talk about this 2 threshold stage in a retail investor's participation in 3 the options market. And so let's talk about the 4 baseline regulatory framework and what the effective 5 practices are. 6 Opening an account, there are some rules of 7 general application that will come into play. Know your 8 customer, account information, you know, margin 9 accounts. There's margin disclosure. But we have FINRA 10 Rule 2360, which is an options-specific rule. And that 11 rule lays out, among other things, some kind of basic 12 due diligence that a firm has to undertake when it's 13 looking to review and approve or disapprove a customer 14 for participation in the options market. 15 And when we talk about this, we've been 16 talking about the landscape of options market 17 participation, and including retail participation. And 18 an important thing for retail customers is having 19 information for their account opening to be right sized 20 to what they seem to be aiming for from an investor aim 21 perspective, as well as other things that the broker- 22 dealer takes in to learn about where this customer is. 23 So for example, 2360 requires the firm to look 24 to collect information on the customer's investment 25 objectives, their age, their income, net worth, their	Page 128 1 particular additional disclosure statement needed there. 2 So this process is needed whether or not the 3 account is a self-directed account. It's for every 4 account that the firm is permitting to trade options. 5 And we've looked closely at what firms' practices are in 6 this space. And firms have a lot of different practices 7 that they've tailored to their business. Which, you 8 know, is always fine. Some firms use more automated 9 processes, and some firms use more manual hybrid 10 processes to review and approve the options accounts. 11 But regardless of what process a firm uses, 12 asking certain questions will help the firm get to a 13 place where they have best practices about their 14 program. So, for example, does the firm have minimum 15 review standards for approving the account at all? If 16 the account is to be approved for higher levels of 17 options trading, are there enhanced requirements in that 18 case? Like are there minimum years of experience or 19 exposure to different types of products that come in 20 advance of that? 21 Whether or not the firm is reviewing for red 22 flags. I think Ed mentioned the fraud concerns in the 23 space of zero DTE. This baseline information helps 24 later as the firm is overseeing the activity that's 25 occurring in the account. So do you have someone
Page 127 1 employment status, and their experience in trading in 2 general, in trading options in particular, how long, how 3 frequent. Things like that are key bits of information 4 that the member can then use to review the application 5 and then ask -- they're required to consider what level 6 of trading is appropriate for this customer and whether 7 the requested level is in alignment with the information 8 that they collected about the customer. 9 So if you have a customer that's looking to 10 preserve principal but they're looking to engage in like 11 level five options trading, that's something to explore. 12 And, by the way, firms generally use five or 13 six levels to describe the degree of risk and complexity 14 to options trading. 15 So once the firm gathers this key information, 16 the firm undergoes the determination as to whether or 17 not the customer will be approved at all. And if so, 18 for what level of trading. 19 And then there's disclosure, which is also 20 very important. The broker has to provide the options 21 disclosure statement. But at a minimum, depending on 22 the level approved, the broker may also need to provide 23 supplemental statements like a statement referred to in 24 Rule 2360 as the statement for uncovered options. So if 25 they're going to right uncovered options, there's a	Page 129 1 applying for an account that says they have 10 years' 2 experience but they're 21? Or their employment is a 3 student, but they make a half a million dollars a year. 4 Is there -- are there any red flags just that are 5 observable either from the information that the firm 6 already has about the customer in other contexts, or 7 just logical inconsistencies in the application? 8 And if the firm reviews these on a fully 9 automated basis, is there a process for testing later 10 on? Are there ways that the firm is embedded to look 11 for potentially erroneous approvals? 12 And so all of these things are important to 13 that baseline experience that hopefully sets the 14 customer up for a more right-sized and informed 15 experience with trading options. 16 And you also mentioned investor education, 17 which is very important as well, obviously. And, you 18 know, the Commission's data describes, I believe, about 19 70 million individual customer accounts that have traded 20 options already. And FINRA has a very robust investor 21 education program in the FINRA Foundation, does periodic 22 surveys. We have one that was put out in December of 23 2025. And part of that looks at options in particular. 24 And as I think we've already acknowledged on this panel, 25 it does skew younger.

Page 130 Options retail participation skews younger. Forty-three percent of 18 to 34 year olds trade options as compared to just 10 percent of those that are 55 and over. And, you know, in alignment with that age, it also skews less experienced. So 33 percent of those with less than two years' of investing experience trade as opposed to 13 percent of those with 10-plus years' experience. And the survey, in addition to kind of that general sort of demographic information, also includes -- we call it a national financial capability survey, so it includes substantive questions to try to assess understanding of fundamental concepts. And there are a couple of questions that indicate that there are mixed levels of understanding that people have, even if they are actively trading options. So of the respondents that are actively trading options, only 22 percent responded to the call option question correctly and 54 percent answered it incorrectly. And the margin question, only 18 percent answered the margin question correctly and 70 percent answered it incorrectly. So, you know, that demonstrates that we all have some opportunities to help investors sort of be more informed. And, you know, FINRA has increasingly looked	Page 132 use the education. We do thousands of webinars, including 1,100 with partners, many of whom are speaking at some point today. Doing options education has really morphed. When I first started back at Think or Swim in 2006, I was flying around the country with a projector and a computer going to ballrooms and doing it. Now you're trying to get somebody's attention in 15 seconds on a TikTok, so that you can get them further to explain how an options vertical spread works. But it really is amazing how well people are doing it to engage the retail client overall. Everybody has a great interest, be it if you're on the brokerage side, the exchange side, the market maker side, in making sure that these clients are educated. Because if they're educated, they are going to stick around for a lot longer time. So I think as an industry, we actually have a responsibility to make sure that people are as educated as possible and you turn them to all the resources. The other amazing thing is how great the education is. And it's free. And that's really one of the biggest changes in the industries over the last 20 years also, is all this great stuff that is done for free. And, you know, again, we want to make sure that
Page 131 to diversify its approach to investor education. We have a lot of publications, including specific options-focused publications that are available on our website. But we also do in-person outreach, whether it be through libraries or senior centers. And increasingly heavy social media presence to kind of get people in the different demographics. And, you know, social media, videos, and articles and, you know, trying to get to investors that way. And another good thing that came out of the survey, which is an opportunity for the member firms, is that 75 percent of the survey respondents said that they use the materials that their firms provide and that they rely on the tools and the resources that they can get through their broker. And so that means that there is an opportunity for all of us to work together to try to close that understanding gap. MR. JUZENAS: All right. Thank you, Racquel. JJ? MR. JJ KINAHAN: You know, we at Cboe take education very, very seriously through our Options Institute. I think any good brokerage firm or options exchange has built themselves by education, quite honestly. We do our education in six different languages. Last year we had people from 139 countries	Page 133 when people come to the markets, as Raquel just talked about, there's all these different tiers et cetera at the different brokerage firms. You want to give people the opportunity to move up their tiers as they get more experience, they get more comfortable with the product overall. I really think that the industry is doing a good job of it. Obviously, you want to be doing a great job of it overall. But people are anxious to use the resources that are out there. But again, the challenges -- there's two big challenges for it, number one being, as I jokingly said, but quite seriously, how do you get somebody in 15 seconds of a TikTok to suddenly take an interest? Like I said, when I started doing this, we did them for five hours. Now we do webinars for 20 minutes. And you're hoping to get people -- and obviously, we do a lot longer ones also. But you're hoping to get people to interact. We did 164 different topics at the Options Institute last year. And you want to make sure that you're just getting in front of people as often as you possibly can. Because in the long term, they'll become better investors and they will use our products. There's nothing more satisfying than seeing somebody go from doing a covered call to doing a vertical spread, to

Page 134 1 doing -- we've talked about butterflies, so why not? 2 And iron condors. And, you know, so that people start 3 to use all the different products. It's great for 4 everybody. And if you look at the amount of complex 5 trades that are happening on, you know, coming from the 6 brokerage firms, I think that's also a great measure of 7 how well we're exceeding -- succeeding, I should say, in 8 terms of the education that everyone is providing. 9 And as well as I think sometimes it's lost on 10 people that complex trades in many ways, particularly 11 vertical spreads, are usually good because it means 12 people are defining their risk. Which is a great thing 13 overall for the markets. 14 MR. JUZENAS: Thanks, JJ. And I think that 15 one point you hit on there is that there is a certain 16 element where there is so much material that there is 17 more of this education that is self-directed, too. 18 So Ed. 19 MR. HOSTY: Yeah, we want to make sure to hit 20 both topics here. I think the first one about account 21 opening, I think what, again, we want to be careful on 22 is whenever the topic of account opening comes up, it's 23 generally an indication that people, or some market 24 participants believe that there might be a problem with 25 such a process.	Page 136 1 people's customers on this panel, other people that were 2 on the first panel, and the third panel. What we 3 understand is our customer and their needs. 4 For education, we want to meet them where 5 they're at. We are doing things like short form videos, 6 learning articles, in app experience guidance is huge, 7 giving them an understanding of sometimes how these 8 things play out is huge for customers. 9 What I do know it's dramatically different 10 from is the way in which we had traditionally taught 11 options or relied upon rule sets to teach options, and 12 things like characteristics and risks of standardized 13 options. I don't know the last time somebody probably 14 read that end to end. JJ might have been the last one 15 35 years ago. 16 (Laughter.) 17 MR. HOSTY: So we want to make sure our 18 customers always have the best information, and they 19 demand it of us. That's going to continue to change and 20 morph as we go on, especially with the adoption of AI. 21 And we just want to make sure that they have everything 22 that they need. 23 MR. JUZENAS: Thanks, Ed. 24 Stephen. 25 MR. SIKES: I absolutely want to echo a lot of
Page 135 1 What we want to be clear about is that we want 2 to make sure that retail engagement remains high and the 3 customers that are looking to trade options or are 4 trading options are best informed and can utilize to the 5 best of their abilities. 6 So I think we think it's extremely important 7 for broker-dealers to have an intense understanding of 8 their customers and the evaluation of them and their 9 suitability to trade options. We don't think the 10 benchmark there remains the same for everybody. It's 11 not -- necessarily doesn't have to be prescriptive. But 12 broker-dealers should have flexibility in how they 13 accomplish that. I think -- that's the one piece. 14 The second piece on investor education, JJ's 15 right. Customers are everywhere engaging with content 16 for options -- all of our asset classes, actually, be it 17 on platform, off platform, across platforms with things 18 like the learning tools offered by Cboe. 19 Robinhood is really, really cognizant of -- we 20 don't want to just democratize access to markets, but we 21 want to empower these customers to make the best choices 22 they can. We want to make investing understandable for 23 them in the ways that lands with them. What this means 24 is that we generally have to be everywhere. 25 Our customers are different than other	Page 137 1 what Ed said, meeting investors where they are. You 2 know, I think anyone who has been plugged into the 3 options world both recognizes the quality of some of the 4 TikTok videos and then also the dangers of some of the 5 others. Right? And I think that's, you know, something 6 that we have to grapple with as an industry, is that 7 there is an entire third party ecosystem, you know, 8 introducing retail investors to options strategies that 9 are technically correct but maybe, you know, the risk 10 profile of this specific opportunity that's being 11 described in a given TikTok video might not be strictly 12 accurate. 13 Far be it from me to exactly identify how we 14 should change our regulatory environment to improve 15 there. But I will give one tactical, forward-looking 16 thought. 17 One thing that we've seen at Public is we've 18 begun, as I alluded to in my intro, to build a bunch of 19 AI-forward products to help our investors, you know, 20 both research strategies, educate themselves, and 21 ultimately starting to move into more effective strategy 22 execution. And as we've done so, we've run into a few 23 different, you know, reasonable societal and regulatory 24 questions about how we should grapple with AI from an 25 educational perspective in that experience.

Page 138 1 So let me start -- like tell a little story. 2 Right? Let's just imagine again -- not everyone here, 3 probably most of you haven't used Public's AI products. 4 But let's just assume that there's something that's 5 roughly equivalent to a Claude or a ChatGPT that is 6 nested within the Public experience and has access to a 7 customer's, you know, account information and a bunch of 8 really, really high quality market data and other 9 information. 10 So let's say, and this is an exact work flow 11 that we've seen many, many times from our members, and 12 you'll sort of understand in a second where the issues 13 are that we might need to grapple with as an industry. 14 So a customer comes in with a broadly 15 diversified portfolio, but with an understanding that 16 they want to let's take maybe two of the more healthier 17 use cases in the options market, they want to generate 18 income from their existing portfolio because they have a 19 present need and they, you know, still believe sort of 20 the underlying equities but they want to generate some 21 income. Or they want to protect some risk because 22 they're -- again, they have a short-term or a near-term 23 cash need, and therefore they want to change the sort of 24 overall deltas or the overall risk of their portfolio. 25 Again, two things there I think retail	Page 140 1 But there's also a world where that's a 2 recommendation on behalf of a broker-dealer. We don't 3 know what recommendations are. You know, everyone 4 knows, I think, is familiar with sort of the facts and 5 circumstances of recommendation, but I would say, hey, 6 that's more tilting towards education and that's a sort 7 of specific high-quality education we should want to 8 see. Again, well supervised and governed within the 9 experience of a broker-dealer, especially, you know, 10 accurate execution. 11 Now let's take it a step further. Right? The 12 customer -- so the AI gives the response about 30 to 45 13 days expiry, 5 to 10 percent. And the customer says, 14 oh, well, what specific options should I look at in that 15 realm. 16 Now, I could make an argument that the 17 response there should be a specific set of, you know, 18 using the available market data, it should be a specific 19 set of expiries and strikes and should give a rough idea 20 of the liquidity in each of those and where would be the 21 optimal place to execute the intent that the customer 22 wants. And I would argue is that a recommendation or is 23 that a screener? Right? 24 So as we think about where the AI is taking us 25 over the next several years, there's these questions
Page 139 1 investors actually become in this recent -- the last few 2 years have become deeply aware of the opportunity to use 3 options for those ends. But let's say they're not the 4 best at executing them when given an options chain. 5 Right? 6 AI can be incredibly helpful there. So when a 7 customer comes in and says, hey, I'd like to generate 8 yield from my portfolio. How might I do that? 9 Now let's think about our Claude or GPT-like 10 experience nested within a broker's UI. What's the 11 answer we want to see there? 12 Again, I could make an argument that the next 13 answer should be let's say you want to protect the 14 portfolio. The answer might be, hey, you should 15 evaluate -- you know, I've looked at your portfolio. 16 You should evaluate, you know, you're more tilted toward 17 tech so you should evaluate QQQ puts that are 30 to 45 18 days expiry, you know, because you've told me there's 19 some time horizon that matches that, and maybe you 20 should look 5 to 10 percent out of the money. I think 21 that's probably a pretty helpful educational 22 conversation for a retail investor to participate in. 23 It'll help them actually clarify exactly what they want 24 in the moment, how they can execute a strategy according 25 to their intent.	Page 141 1 about how you might treat those different conversations. 2 And what we ultimately should arm retail options 3 investors, retail options traders with to help them 4 actually just have better outcomes and better match 5 their intent with the execution that they choose. 6 And I think there is a huge opportunity to do 7 it well. But I think as we look at that technology and 8 the way we're implementing it within Public, we're 9 nervous. Right? I don't know that we know how to 10 answer those questions. And frankly, I think that we 11 can make a really strong argument that that's a positive 12 sum outcome for retail investors. It is education 13 followed by a screener, and that's wonderful, and it's 14 going to lead to much better outcomes for our investors. 15 But I can't guarantee I'm not going to end up in a, you 16 know, regulatory matter addressing recommendations 17 through an AI in three years. And that's hard. 18 You know, I think we have to grapple with the 19 idea that there are some of these difficult questions in 20 how we deploy education versus how we, you know, 21 regulate our broker-dealers in terms of recommendations. 22 And I don't know that we're having that conversation. 23 Again, I think we're very early to this space. 24 But I would say as we leave and we talk about 25 education in the retail sector, we have to -- you know,

Page 142 1 we have to assume a world where the AI we have today is 2 the worst we'll ever have and the quality of that AI 3 creates new opportunities for how to better educate 4 retail options traders. 5 MR. JUZENAS: Thanks. And thanks for that 6 overview of an issue that is only going to grow from 7 here, I think. And so that was helpful. 8 We're running a little bit behind. We're 9 going to move on to the next panel. But just encourage 10 people to try and limit their remarks to a couple 11 minutes. 12 So the next topic is payment for order flow. 13 As people here probably know, retail brokers generally 14 use consolidators to execute their retail order flow and 15 then reserve payment for order flow or PFOF in return. 16 Unlike equities, because OCC-cleared options 17 have to trade on an exchange, the consolidator really 18 doesn't have the ability to execute off exchange with or 19 without price improvement. 20 So the question for the panel is what impact, 21 positive or negative, does PFOF have on the retail 22 customer experience with options? And we're going to 23 start with Chris. 24 MR. SCHWARZ: So, you know, I think the PFOF 25 model, having it is definitely a good thing for	Page 144 1 I remember when we got six different prices at 2 six different brokers at the same time. My first 3 question to someone at FINRA was, how can that be 4 consistent with best execution? And so if you read the 5 rules and notices with plain language, it's not 6 particularly helpful. Right? 7 So FINRA Rule 5310 says, my broker has to go 8 to the best market and get me the best price. Are 9 brokers who use the wholesalers and execute their trades 10 on the same exchanges not in the same market? FINRA 11 Notice 21-23 says almost unambiguously that a broker 12 can't negotiate payment for order flow that impacts 13 execution quality. But yet our correlation is near 14 perfect. So it's kind of hard to reconcile those rules 15 and notices with kind of the findings of our paper. 16 It seems to us the only thing that's really 17 binding in terms of execution quality is Rule 611. And 18 if that were abolished, to be honest, I have no idea 19 what the lower bound on acceptable price improvement 20 would be for customer trades. 21 Now, so the bottom line is I think the PFOF 22 model is great. It gives consumers choices. But there 23 shouldn't be preference given to how costs are disclosed 24 to investors over one business model over the other. 25 Right?
Page 143 1 customers. Right? So certainly some customers are 2 better off under the fee-commission model. And I'm sure 3 some customers are better off under the PFOF model. 4 You know, with that said, one of the issues 5 with the PFOF model is it takes very salient fees and 6 commission costs that customers can see and turns them 7 into hidden PFOF execution-related costs that they can't 8 see. So if you look at our total trading costs in our 9 experiment, about 70 percent of those costs are these 10 opaque execution costs that currently retail customers 11 have no idea how to measure because, as far as I know, 12 outside the data in our paper, there's simply no public 13 disclosure about that information. 14 And the variation across brokers is huge. So 15 if you look at the highest quality fills that we get 16 from one broker versus the lowest quality fill broker, 17 it's literally the entire quoted spread is the 18 difference in our fill price, on average. And so we try 19 to figure out what that was correlated with. And it's 20 almost perfectly correlated with the amount of payment 21 for order flow. Right? 22 And again, these things are completely unknown 23 to customers. And, you know, this kind of came up on 24 the first panel. But, you know, exasperating this issue 25 is kind of this ambiguity with regard to best ex.	Page 145 1 And so on a pretrade screen, you know, fees, 2 commissions, and estimated execution cost should be on 3 there. Statements, trade confirmations should have 4 execution costs included. And I'm going to be honest, 5 we either need to strengthen what best ex means or we 6 have to tell retail customers, hey, it's up to you to 7 get to the best price, because the broker only has to 8 get a good price, not the best one. 9 MR. JUZENAS: Thanks. 10 Geralyn. 11 MS. ENDO: I thought I'd take a moment and 12 step back and define an aspect of payment for order flow 13 for everybody here. We also in the options space, we 14 refer to it often as the marketing fee. And it is a 15 little bit different than in the equities space. 16 The marketing fee is actually posted on 17 exchange fee schedules where it's charged. What that 18 means is that the fee is transparent and reviewed by the 19 SEC. 20 At a high level, the marketing fee is charged 21 between customer transactions that trade against market 22 maker transactions. So for example, a market maker on a 23 trade against a customer gets charged by an exchange 25 24 cents in a penny name. That 25 cents goes into a pool 25 to the respective market maker. And then at the end of

Page 146 1 the month, the market maker decides and tells the 2 exchange where to disburse those funds. 3 This collection and allocation is negotiation 4 of funds. There are change of hands of funds. It 5 happens independent of how the retail order is actually 6 executed. 7 MEMX, MX II launching later this year, as I 8 mentioned earlier, we intend to not have a marketing fee 9 on our exchange. In general, fee schedules are designed 10 to attract liquidity and ensure displayed quality of 11 market. The marketing fee is simply one component of 12 how the retail order actually gets executed. 13 MR. JUZENAS: Thank you. 14 Ed. 15 MR. HOSTY: I think we wanted to speak on PFOF 16 in the -- what we generally understand is that our best 17 ex obligation exists no matter what, and it is to do 18 best for customers at order entry. And I think that's 19 -- what that generally is driven by is a product of the 20 customer base that we have and the way that they engage 21 with the market. 22 We really, really respect the relationship we 23 have with the consolidator intermediaries, because of 24 their -- A, they have that same obligation. And, B, 25 some of the burden that would otherwise be put on	Page 148 1 Nate. 2 MR. POMEROY: Just I'm going to hazard a joke 3 to start, which is that if Kamala Harris was an option 4 market structure practitioner, she might say that 5 payment for order flow did not simply fall out of a 6 coconut tree but exists in the context of all that came 7 before it. 8 (Laughter.) 9 MR. POMEROY: So let's see. To start, I think 10 it's very appropriate to frame PFOF in the consolidated 11 model as part of a relationship that is primarily driven 12 by the execution quality statistics that WEX and our 13 competitors like DASH and others deliver to our 14 customers. I'd say over 99 percent plus of retail order 15 flow that we handle is directed to certain consolidators 16 based on the execution quality statistics that we 17 deliver. 18 There's also a massive expectation of 19 consistency in that deliverable, both intraday and 20 across symbols, and across days and across months. And 21 at times even like quarters or multi-year horizons. 22 So we view that as kind of the primary factor 23 in which we win order flow. And our affiliate, 24 Wolverine Trading, has to deliver a significant portion 25 of the vast majority of that price improvement to our
Page 147 1 somebody like an end Robinhood to have to maintain some 2 of this architecture is put in an appropriate spot and 3 actually delivered by firms that know this business 4 intimately inside and out. 5 What we strive for is a competitive 6 environment that can reward people for the performance 7 that they give our customers. And what we see is that 8 it works. And the prices that they receive is generally 9 driven as a product of probably what the value of that 10 order flow is for an intermediary. But in general, it 11 is -- we have a competitive environment in every type of 12 asset, whether a wide market or a tight market. And 13 what we see is customers get really good results. 14 I think that when a customer will see they get 15 an execution price and they see a total price for that 16 transaction, that's largely the same. We don't have 17 multiple line items, we don't have a commission charge. 18 We have an ORF fee. So that does come into play. But 19 there is not a commission in addition to another built- 20 in cost or anything along those lines. 21 We think that the customer outcome is very 22 clear to them as they get that execution, and very easy 23 for them to see without any -- without having to go hunt 24 and search and figure out the total cost to transact. 25 MR. JUZENAS: Thanks, Ed.	Page 149 1 introducing broker-dealer partners on a daily basis. 2 So every day for WEX or for DASH, we kind of 3 start the day knowing that we are going to be on the 4 hook for some amount of payment to our introducing 5 broker-dealers, which is not an area of competition 6 between us. Those are fixed rates between all the 7 different venues that an introducing broker-dealer might 8 choose to route. And we know that we're going to be 9 competing on execution quality, which is going to mean 10 delivering a significant millions of dollars of price 11 improvement to those customers. And that's primarily 12 going to be handled by our -- or provided by our 13 affiliate, Wolverine Trading. 14 In that context, I think it's important to see 15 this -- see the model overall as in some ways an end-to- 16 end revenue share between the introducing -- the 17 customer themselves, in the form of an improved 18 execution, the retail broker-dealer that is collecting a 19 payment for order flow, and then the executing 20 consolidator and their affiliate. 21 How those dynamics end up playing out I think 22 is extremely competitive. We've seen really aggressive 23 performance in terms of the effective over-quoted 24 spreads that we and our competitors have been delivering 25 for the past five years. We've seen dozens of

Page 150 1 percentage points of improvement as ourselves and our 2 competitors continue to want to gain market share, want 3 more order flow at increasingly better levels for those 4 customers. 5 And to kind of finalize and conclude these 6 things, I think it's important to note in this 7 consolidator context that while Wolverine Trading will 8 route orders to trade with their affiliate, it's not as 9 large of a number as you would potentially think. And 10 there's robust competition for WEX order flow between 11 all market participants. 12 So this should inform, I think, the 13 Commission's view of some of the topics that were 14 covered in the first panel with respect to things like 15 specialist allocations, auction allocations, things like 16 this. Like Wolverine Trading is on the hook for 17 millions of dollars of price improvement every day for 18 sure, and they're going to have to backstop that to 19 continue to receive another order from a Schwab or 20 Robinhood. They're the person who's always going to 21 have to take the stand in that context. And while other 22 market participants might try to participate, they have 23 the option not to. 24 So in the context of say like auction 25 mechanisms, that's to us the negative selection or, to	Page 152 1 what we can, but there is very little third party or 2 publicly available information about what competitive 3 execution quality looks like. And therefore 4 understanding the interplay of rebates, PFOF, and 5 execution quality. 6 Again, it's maddeningly difficult because of a 7 lack of transparency. And I really respect the work 8 that Chris is doing to try and bring that transparency 9 to retail investors who have even less information and 10 less understanding than we do. 11 As we entered this business two years ago 12 because of that context, we decided to go with a no- 13 commission and rev share model with our customers on the 14 rebates that we receive, the PFOF that we receive from 15 our wholesalers, we rebate that back to our customers. 16 They receive, you know, incremental dollars every trade 17 and every contract they trade. Because we couldn't find 18 a route where we had a lot of confidence that trading 19 off on the rebate we received would yield dramatically 20 better EQ. 21 And while I totally believe that that's the 22 relationship that Chris sees, sitting in my seat it was 23 very hard to build an operational model where I could be 24 very confident that that would be true. And so we took 25 the sort of guaranteed transparent route, because that
Page 151 1 Wolverine Trading, the negative selection or the last 2 look. There's almost a sort of reverse view of that 3 wherein like every other market -- every other market 4 participant has the ability to say I'd prefer not to 5 trade at that price level. But those consolidators, 6 their affiliates, ultimately do have to provide that. 7 So I don't think you can really contextualize some of 8 those prior conversations about that interaction and 9 that relationship as being anything other than 10 ultimately to the benefit of those end customers in the 11 form of improved execution quality that we've seen in 12 this industry for the past -- as long as I've been in 13 the business. 14 MR. JUZENAS: Thanks, Nate. 15 Stephen. 16 MR. SIKES: Eric, I will respect your request 17 and keep it brief. 18 I really want to echo what Chris started off 19 saying, which is PFOF is likely good for the market 20 structure. But the lack of transparency is a real 21 issue. 22 Even sitting in my seat, managing, you know, 23 retail flow, it's maddeningly difficult for us to 24 understand the specific relative execution quality that 25 we receive as a broker-dealer for our customers. We do	Page 153 1 was sort of the opportunity that we had in front of us 2 where we felt the most confident we were living up to 3 our best execution obligations. I mean, again, aligned 4 with our own business interests as I described in the 5 outset. 6 So, you know, something like SEC 605 reporting 7 for venues, brokers, wholesalers in the options space, 8 you know, we would welcome it. 9 MR. JUZENAS: Thanks. And my remark was not 10 directed to you. I thought the information you shared, 11 it's just that Jamie said John and I's performance 12 review is going to be based if we keep everybody on 13 time. So it's really about us. 14 MR. SIKES: Dozens of dollars on the line. I 15 get it. 16 MR. JUZENAS: All right. Stino. 17 MR. MILITO: So I don't see PFOF as a flaw in 18 the system. You know, I see it as one of the core 19 components on why the system has worked so well for 20 retail investors today. 21 You know, as we all know and what the SEC data 22 has described is that we've seen unprecedented growth in 23 volume, scale, and surging retail participation. And 24 that doesn't happen in a market that's failing retail 25 investors. That happens in a market that's working

Page 154 1 exceptionally, you know, well for them. 2 You know, today retail is trading in markets 3 that are often only one or two pennies wide and often 4 receive executions, you know, inside of that. If you 5 contrast that with sort of the distant past, those 6 numbers were measured in dollars not pennies. And I 7 think that's a pretty incredible story. 8 And I also want to mention there seems to be 9 an uninformed view circulating that all retail flow is 10 very lucrative and desirable to trade against. And, 11 while certainly some flow has a higher expected value 12 than others, the wholesalers who are succeeding the most 13 today have made a substantial commitment to trade 14 against, you know, all flow in all symbols, you know, 15 every day. Good markets, bad markets, fast markets, 16 slow markets. They don't get to selectively choose. 17 And that's no small task for these firms to undertake. 18 And further, the retail brokers today they're 19 highly sophisticated with robust best execution 20 procedures. And they hold these market makers 21 vigorously accountable to produce, you know, good 22 outcomes. 23 So I'm just going to shift a bit here, in the 24 sake of time, and building on a lot of the strong 25 outcomes that have already been outlined here today, I	Page 156 1 strike that balance. And that's why we're -- what 2 we're, you know, here celebrating, you know, today. 3 So I don't believe that the benefits exist, 4 you know, independently. They rely on the rigorous, 5 visible competition. And if we change the foundation of 6 that, I think we have the potential to, you know, 7 fundamentally change the success that we've had. 8 And let me just say one more thing really 9 quick as another sort of subtopic. I just want to touch 10 on the DASH ATS that was mentioned sort of in the -- so 11 the DASH ATS is an options-specific ATS. It operates 12 very differently than an equity ATS because we have no 13 resting orders like a typical equity ATS does. And how 14 the DASH ATS works is very simple. We send out a 15 request -- when we send an order into it, we send out a 16 request for response to a pool of liquidity providers 17 who return a market back to us. And, you know, if we 18 get a response that matches, meaning that we get a 19 marketable bid or offer that is at or better than the 20 NBBO, we have a paired trade. We are then able to take 21 that trade down to the exchange, you know, and cross it. 22 So three things happen. Three potentially 23 good things can happen when an order goes through our 24 ATS. We could find price improvement, we could find 25 additional liquidity than what's available onscreen, and
Page 155 1 think the important question for this discussion is 2 actually what underpins that success and what risks 3 disrupting it. 4 You know, the performance we've seen in the 5 options market over the past decade is not just a 6 function of PFOF in isolation. It's the result of a 7 tightly integrated, highly competitive, quote-driven 8 structure where market makers are required to 9 continuously display prices and compete on exchange. 10 One of the subtopics here was the TRF. You 11 know, and I think it's really important to mention that 12 a move towards a TRF model in options I think would 13 fundamentally change, you know, those incentives. 14 Right? If retail order flow could be internalized off 15 exchange, you would create a two-tiered system, one 16 where all the retail flow would go off exchange and all 17 the institutional flow would trade on exchange. And the 18 inevitable result of that would be much wider spreads, 19 much less liquidity, and price discovery would weaken 20 substantially if something like that were to occur. 21 You know, the success that we've had is a 22 byproduct of a highly competitive ecosystem. You know, 23 Crutchfield sort of alluded to in the last panel how 24 it's kind of a delicate balance. And I think what the 25 option industry has done so incredibly well is really	Page 157 1 we could mitigate some exchange fees. And then when we 2 do take that cross to the exchange to cross, there is a 3 second moment for price improvement. 4 So it works really well. It's been very 5 effective. I think it sort of answers the question that 6 was brought up in the last panel of, hey, you've asked 7 these market makers to quote on 1.2 million plus 8 symbols. It's hard to say that every quote at every 9 second is going to be their best quote. It's not. It 10 is a lot of the time. It isn't all of the time. Our 11 mechanism tries to solve that, where we give market 12 makers a chance to, you know, firm up and provide a 13 better price. 14 And just some quick stats on that, in 2025, we 15 matched 86 million contracts in our ATS and we received 16 \$266 million in price improvement versus the far side of 17 the market. So I'll stop there. 18 MR. JUZENAS: All right, thanks. And thanks 19 for the discussion on that panel, everybody. 20 So moving on to the next topic in the customer 21 experience. Zero day options, which refers to the 22 ability to buy -- an investor to buy an option on the 23 last day before it expires with lower time premiums. 24 This is nothing new, because obviously all options have 25 to trade prior to the last day of exposure. But what is

Page 158 1 new is that there's more series that expire on more days 2 of the week, as has been previously noted, not just the 3 standard third Fridays of the month. And this creates 4 more opportunities for zero dated options. 5 So what are the panel's experiences with zero 6 day trading and does this trading raise any issues. 7 Ed, we're going to start with. 8 MR. HOSTY: So I think that the shift towards 9 short-dated contracts, specifically trading on day of 10 expiry and the immediate time frame before that, has 11 been fairly natural from our perspective. Customers 12 have really, really, really engaged with this product. 13 The find it to be a meaningful way for them to manage 14 their portfolios and manage their risks. They've just 15 naturally gravitated toward it. As a result, there are 16 exchanges or market participants that are putting more 17 of these products in front of people because of what 18 they see as natural usage. 19 Customers are engaging with this in ways that 20 they don't necessarily engage with historically what we 21 thought about trading, like longer term buy rights on 22 single stocks. These are customers that have, you know, 23 either exposure that they want to manage in a short-term 24 time frame, especially in a news cycle in which day over 25 day you have dramatic swings in things like the market,	Page 160 1 right ways. They are not trading zero DTE on things 2 that are not going to be moving and things that are not 3 -- you know, not necessarily suited towards this. 4 We've been offering these since they've come 5 up. And again, since the beginning of time. Now you 6 just get more strikes or you get more dates. So I think 7 that's -- we have experience and systems in place to 8 support some of this process. We recognize that there 9 are operational concerns here. There are asymmetric 10 risks that is more by retail, and we think this might be 11 an opportunity to address some of that, and also ensure 12 that all market participants including some of our 13 market infrastructure participants are best equipped to 14 manage this on a go forward. And we recognize that some 15 of these things -- a corollary would be moving to a 24/5 16 market for equities, which Robinhood trades today. 17 We're settling in a world where the majority 18 of participants will be participating 23/5 because of 19 probably limitations in some of our market 20 infrastructure. We want to make sure that in options we 21 don't run into those same barriers, and that we can 22 address these as quick as we quick as we possibly can 23 and be ready for when customers continue to engage here. 24 It is just something that is a natural use 25 case that they're trying to accomplish.
Page 159 1 the total markets are going to move in ways that 2 volatility has been that elevated. Our customers are 3 trading these differently than they are single stocks. 4 They are trading these in ETPs and indices in ways that 5 are different, that demonstrate that they do understand 6 the way in which they are participating. 7 You see some participation again in some of 8 the single stocks. But again, those are ones that 9 actually have like news and market-moving events on a 10 daily basis. 11 AI has caused volatility in a handful of 12 stocks for years at this point, or at least a full year. 13 Customers are engaging there. They are engaging in ways 14 that they are trying to manage their own risk or 15 capitalize on what they see as an inefficiency. 16 I think that's what we are seeing, is that 17 these are -- these are customers that are skewing 18 younger. These are customers that are naturally more 19 inclined to take risk in the market. They recognize 20 they are earlier in their earnings potential. They are 21 engaging in ways that are possibly slightly riskier, but 22 more so are aligned with what they are trying to 23 accomplish. 24 I think that's -- the concentration, again, is 25 another signal that they are probably engaging in the	Page 161 1 MR. JUZENAS: All right, thank you, Ed. And 2 now Nate. 3 MR. POMEROY: Thanks. So I think in general, 4 folks in the industry have talked about zero DTE has 5 existed forever. WEX commented when the Monday and 6 Wednesday expirations were first listed that one of our 7 concerns was with respect to obviously some things like 8 corporate actions and events affecting the trading of 9 those symbols on those days, which obviously in its 10 current form, is kind of they avoid the corporate action 11 days when they list these expirations. 12 But as a matter of fact, like the number of 13 events that affect a particular single stock equity 14 option name are numerous. And as we kind of harmonize 15 or unify those additional expirations with potentially 16 trading in extended hours after market close and pre- 17 open, we do have to recognize, although market making 18 firms will be highly effective in managing all of that 19 cost and complexity, there will be a cost to it. 20 There's going to be a lot of detail-oriented work 21 required to be able to support managing risk around 22 those events. 23 It's also going to require, obviously, 24 increased staffing. And at some point considerations 25 regarding things like what exactly we're going to think

Page 162 1 about assignment windows or exercise when and as options 2 move towards overnight trading. So there are 3 significant risks that we do need to be thinking about, 4 and I think everyone in this room probably thinks of it 5 as a matter of when and not if. 6 But we -- I think one kind of more -- it seems 7 likely to me that in pre-open, post-close, single-name 8 trading, out of the gate there's going to be 9 significantly less liquidity. It's going to be highly 10 -- market makers are going to be at risk for a lot in 11 those sessions, especially when there's news hitting the 12 wire that has generally -- is generically related to AI 13 or generically related to any of these hot button 14 issues. 15 At the very least, with respect to 16 corporations themselves, I would think that it might be 17 beneficial at some point for like the listings company 18 -- like the listings exchanges to more harmonize the way 19 in which at least corporate information is delivered to 20 the -- to the -- like the liquidity provider and the 21 trading community. Because it's pretty open. It's 22 post-close. It's -- sometimes the time at which this 23 information is released to the Street is not unified. 24 And so those are things that we want to 25 encourage, you know, supporting trading listed, you	Page 164 1 minutes, I have to do one of two things. Right? Either 2 one, I'm going to lose all of my money or, two, I have 3 to do another transaction where I'm going to have even 4 more transactions cost, right, because I have to do a 5 sell. It's not like an equity where I can hold it 6 forever. And so, you know, I think that's one part of 7 it that's unappreciated. 8 Now, I'm discounting people who take delivery 9 outside of say Roaring Kitty. I don't think many retail 10 traders are doing that. Sorry, we're on the bird theme. 11 I went with a kitty for the animal. 12 And these issues of I'm going to call them 13 like contracts per dollar you can trade in an account 14 are only going to get worse. Two days ago, you know, 15 the pattern day trading restriction was removed, so 16 we're going to have a lot of cash accounts that were set 17 up as non-margin accounts to make sure they could trade 18 a lot. Those can now convert to margin accounts and 19 trade twice as much as they could before. So I think 20 the proliferation of these very short duration, low 21 premium cost products which allows retail traders to 22 trade more contracts just amplifies my prior comments 23 about disclosure requirements. 24 MR. JUZENAS: All right. Thank you all for 25 your thoughts on that panel.
Page 163 1 know, SEC-regulated products as opposed to more risky, 2 sort of off-exchange alternatives. But at the same 3 time, we do recognize that there will be significant 4 barriers to liquidity provision and continuing -- 5 continuing to manage that and protect our customers is 6 really crucial. 7 MR. JUZENAS: Thanks, Nate. 8 Chris. 9 MR. SCHWARZ: So, you know, I think there's 10 been a lot of complaints today. First, consumer choice 11 is good. That's consistent with my other comment. But 12 I think there's been a lot of complaints today about the 13 number of quotes and quoting complexity, and all these 14 other things. So as we add more and more products, the 15 question becomes what happens to the quote quality on 16 other strikes and expirations for the same company. And 17 then of course what happens across the market. 18 I'm keeping my reply short because I know 19 we're behind and I want you guys to get a good raise. 20 But the other thing I will just mention is 21 zero DTE options, these options create a lot more churn 22 on retail accounts. Right? 23 You know, I can go on my app right now. I've 24 got nine brokers to choose from. I can buy a zero DTE 25 option right now and within the next three hours and 24	Page 165 1 So the last topic that we've got, and in the 2 interests of time, you know, we'll have to do this maybe 3 lightning round style. So it is enhancement and 4 emerging issues. 5 So what are the emerging issues in the retail 6 and institutional customer space that you're watching? 7 Is there anything missing and so forth? 8 But in the interests of time, let's just go 9 through the folks we have. And please keep it brief, 10 but tell us where you think the enhancement or the 11 emerging issues could be? 12 And we'll start with Racquel. 13 MS. RUSSELL: Thank you. I'll just quickly 14 mention two things. I think account fraud is something 15 that firms are fighting really hard in options. Certain 16 options strategies are particularly attractive, like 17 zero DTE is particularly attractive. We have been 18 building out additional resources to support members in 19 their efforts to catch this stuff. We have a fusion 20 center. We have a potential intrusions report card. 21 So, you know, there's new account fraud, 22 there's account takeover fraud. And that's a constant 23 sort of effort of vigilance. 24 And I had been also thinking about mentioning, 25 but Nate covered it pretty well, but just to tie in the

Page 166 1 investor education piece with extended hours trading, 2 the compressed time frame that will impact opportunities 3 and value. And including assignments during the 4 overnight period of time and making sure that that is as 5 successful for investors that may choose to trade 6 overnight as it could be. 7 MR. JUZENAS: Thanks, Racquel. 8 Stino. 9 MR. MILITO: Okay. So again, I'd just like to 10 thank the SEC for organizing this roundtable. I do 11 think it's really valuable to bring the industry 12 together like this, and I hope we continue these 13 discussions, you know, going forward more frequently. 14 So two issues I want to shed some light on. 15 The first is the current SRO model for exchanges. Today 16 we have 18 exchanges, with more on the way. And while I 17 support that from a competition perspective, from a 18 regulatory standpoint we effectively have 20 regulators, 19 when you include FINRA and the SEC. That creates 20 duplication, inconsistent rule interpretations, and at 21 times conflicting obligation. It is not an efficient 22 system. 23 I could theoretically receive 20 inquiries 24 from 20 different regulators on a single order that I 25 send. It's possible.	Page 168 1 cross-exchange surveillance and some recent guidance 2 that we'd seen. There's been a lot of concern regarding 3 all that, so thank you for saying that. 4 The other one I wanted to highlight, or other 5 area of concern, is there has been increasing 6 sophistication in some subsets of activity, especially 7 in the retail order flow space, what we'll call pro- 8 tail. We estimate and kind of across the entire retail 9 broker-dealer space that as many as 10 percent of orders 10 on a daily basis could consist in this subset. And they 11 tend to basically -- they are very sophisticated traders 12 where, if you looked broadly speaking across introducing 13 broker-dealers, and at times even within the same 14 broker-dealer, they are vastly in excess of the 15 professional customer designation. 16 We appreciate Nasdaq's recent filings to 17 shorten the duration of that. But we don't view that as 18 a final review of that matter. 19 There are a significant number -- a small 20 number of professionals who are essentially capturing 21 price improvement dollars from true retail customers 22 right now that are commingled with those customers. And 23 we would like to see more in the industry to segment 24 those actors out. 25 MR. JUZENAS: Thanks, Nate.
Page 167 1 That leads to a more fundamental question. 2 Should for-profit exchanges, many of them multibillion 3 dollar public companies, continue to act as SROs? At a 4 minimum, it raises concerns about conflicts or the 5 perception of conflicts, when commercial entities are 6 also responsible for regulating marketwide conduct and 7 decisions to access their competitors. 8 Okay, second, you know, we're seeing 9 increasing concentration, you know, in the clearance 10 space. So there's only two major clearing firms today, 11 and they're executing about 65 percent of the market. 12 And capacity is becoming a real constraint that is 13 affecting our industry. 14 The technology does exist to manage risk more 15 efficiently, and that is something we as an industry, 16 you know, need to address to sustain the growth. We've 17 seen an -- remain low. We need to take a first 18 principles approach to risk and margining, or it 19 absolutely will become a bottleneck for the future 20 growth of this industry. 21 MR. JUZENAS: Thanks, Stino. 22 Nate. 23 MR. POMEROY: So first, I would like to plus 24 one everything Stino just said about concerns about 25 regulatory overreach, and particularly with respect to	Page 169 1 JJ. 2 MR. JJ KINAHAN: Yeah, a couple of things. 3 First of all, I think you guys get an exceeds 4 expectations on your rating. I hope that was noted. 5 All right. Thanks, Jamie. 6 With that said, I think there's a few things. 7 So first of all, where we started about being thoughtful 8 about things going forward, someone in the last panel 9 said we got here not by necessarily purpose but by 10 things that happened, and so we ended up in this space. 11 So as we consider a lot of the things that were talked 12 about today, you know, we covered many topics, be it 13 payment forward or flow or how orders are routed, 14 whatever it may be, I ask that the SEC consider how you 15 are the ones who've helped form this going forward, so 16 it's not this is how we got there. 17 As a particular issue, I would say that, you 18 know, anything with more clarity around prediction 19 markets, et cetera, how those are done, because 20 obviously the other regulatory agency is doing a lot 21 there. And I think in terms of things that truly are 22 securities, they should be on the securities side of the 23 ledger. And so again, as we think about, you know, 24 going back to where I started, we're going to come up on 25 24/7, we're going to come up on tokenization. So

Page 170 1 really, let's try and make sure that we don't come back 2 in 10 years and say, well, we just kind of ended up 3 here. 4 MR. JUZENAS: Thanks. 5 Geralyn. 6 MS. ENDO: I have two things also that have 7 been touched upon a little bit, 24/7 or expanded hours. 8 We know that our customers have access to other markets 9 that are available 24/7. We also know that there's 10 global demand for participation in our markets. So it 11 makes sense that the options markets move towards 12 expanding hours. 13 Having said that, though, we should focus on 14 creating a solution that is harmonized across the board 15 and considers long-term implications like JJ just said, 16 and makes sense for the entire marketplace. 17 I will skip over to strike listings that also 18 have been touched on. The OLPP, the Options Listing 19 Procedure Plan was recently approved. Thank you, Cboe, 20 for moving that forward. We are looking forward to 21 working with members of the plan to come up with a 22 solution for strike listing sand delisting process. 23 What will that mean for customers? That will 24 mean in the end better execution quality, a better 25 overall experience for them, and it will also alleviate	Page 172 1 care deeply about because there is a U.S.-registered BD 2 that sits on one end and is helping these scammers and 3 fraudsters profit through these scams. 4 And, you know, we've flagged it many times to 5 people at DOJ, FINRA, and the SEC. And it still sits at 6 a place that a year on, we're still continuing to see 7 these attacks. And it feels like something we should be 8 able to mass law enforcement to prevent. 9 So Racquel is a hundred percent right, it does 10 come back to strikes. And there are things we can do in 11 the options market structure. But there are also things 12 where there is a U.S. BD on the other end that should 13 not be facilitating these transactions and should be 14 able to detect and prevent them before those funds leave 15 the U.S. ecosystem. So one, that was one. 16 Two, zero DTE, the primary issue we're seeing 17 with retail clients in zero DTE, and it's going to grow, 18 to Chris's exact point, with pattern day trader rule 19 going away in the next, you know, two months, are retail 20 investors who are carrying out-of-the-money positions 21 into the close that they could not support an exercise 22 or assignment in. So what we end up doing as a retail 23 broker is we force close all of those positions. The 24 reason we do that is because there's a gap between when 25 those options are no longer tradable and when the
Page 171 1 some of the pressure on the ecosystem infrastructure. 2 Think about capacity improvement that we've talked about 3 a little bit. And in the end, that will of course 4 ultimately benefit customers as well. 5 MR. JUZENAS: Thank you. And the changes to 6 OLPP, I think, are very positive. And thanks to 7 everybody on our Staff. 8 And for the folks who aren't familiar with 9 that, these were changes to the OLPP plan that will 10 allow discussion of things like the strike prices that 11 can be a little difficult, just because you have a lot 12 of competitive entities. 13 So last and certainly not least, Stephen. 14 MR. SIKES: Outstanding. Thank you all again 15 for your deft moderation of this panel. 16 I have two things. One, the first, I would 17 love to build on Racquel's point about fraud. We have 18 seen organized crime out of Mainland China that are 19 using our illiquid options as the way to profit from 20 taking over real Americans' individual brokerage and 21 retirement accounts. And the exit -- their profiting 22 comes and flows directly through a U.S.-registered BD 23 that serves clients in Hong Kong, Mainland China, and 24 Singapore. And there are a few of them. And the idea 25 that this is still going on is something we should all	Page 173 1 assignment and exercise decisions happen. And that hour 2 and a half, you know, hour and 15, hour and half gap 3 happens to exist in the most volatile time in our 4 markets. Right? It's when all corporate news comes 5 out. And that means we have to have incredibly wide 6 bands of forced liquidation, forced closeouts at the end 7 of the day. And the dead weight loss there for retail 8 investors is huge. It's, I would estimate, somewhere 9 between 10 and 20 cents per contract opened by retail 10 investor in the U.S. because of those forced moves. And 11 it's only going to grow with PDT. 12 So we have to figure out how to condense the 13 difference in time or the disparity in time between when 14 we can trade these options and when the options exercise 15 and assignment decisions are made, you know, condense 16 that as much as possible to the least volatile period we 17 can. I'm not an expert, don't work at OCC. But there 18 has to be a better way than having it be in the most 19 volatile hour and half period of every trading day. 20 MR. KROEPER: Great. Thanks, Stephen. 21 And thanks to all the panelists for such a 22 lively and instructive panel. 23 A reminder that written submissions on these 24 topics or listed options markets structure generally may 25 be submitted to Comment File Number 4-887. Search

Page 174 1 Options Roundtable on the SEC.gov website for more 2 information. And we really do appreciate your comments. 3 We will now break for lunch. Please be back 4 here and seated promptly at -- before 1:45, when we are 5 going to hear remarks from Chairman Atkins. 6 So thanks again to the panel. I really 7 appreciate all your efforts. And it's not the landing 8 at the destination on time, but it's the content of the 9 journey. So thank you very much. 10 (Applause.) 11 (Whereupon, at 12:49 p.m., a lunch recess was 12 taken.) 13 A F T E R N O O N S E S S I O N 14 MR. SELWAY: Well, welcome back to our final 15 session. I hope everyone had a good lunch. We're going 16 to kick off with remarks from Chairman Atkins. 17 Mr. Chairman. 18 REMARKS FROM SEC CHAIRMAN PAUL S. ATKINS 19 CHAIRMAN ATKINS: Well, thank you, Jamie. And 20 good afternoon ladies and gentlemen, and welcome back 21 after a productive morning. 22 So in just a few moments, Jamie is going to 23 head up the third and final panel of the day. But 24 first, I want to acknowledge the Division of Trading and 25 Markets for organizing today's program and thank our	Page 176 1 terms. Yet a sustained focus on listed options has 2 eluded the Commission for some time. And thanks in 3 large part to Commissioner Hester Peirce, I am pleased 4 with today's program we're bringing that stretch to a 5 close. 6 Now I should note that this roundtable is 7 neither a prelude to nor a harbinger of any options 8 rulemakings in the immediate term. Rather, today is a 9 chance to celebrate the strengths of our options markets 10 and to recognize the important place that they have cm 11 to occupy in the broader financial ecosystem. Today's 12 panel discussions also offer an opportunity for leading 13 experts and practitioners to examine what's working, to 14 identify where closer attention is warranted, and to 15 consider opportunities and challenges that lie ahead. 16 In that spirit, I should also like to 17 acknowledge the important work that's taking place 18 beyond the Commission's walls. Through the Listed 19 Options Market Structure Working Group, or LOMSWG -- I'm 20 not sure why it's not LOMSWG, SWAG, or SWUG -- but 21 LOMSWG, as I understand its members have cm to call it, 22 SIFMA and the Securities Traders Association convene 23 market participants with sometimes divergent 24 perspectives to discuss issues of mutual interest. 25 That kind of industry-led engagement can be
Page 175 1 more than two dozen panelists for bringing such 2 insightful perspectives to it. 3 Of course, before I move on to my remarks, I 4 have to add the customary disclaimer to make our own 5 compliance people happy that the views I express here 6 today are my own as Chairman and not necessarily those 7 of SEC as an institution or of the other Commissioners. 8 As our panelists underscored this morning, the 9 U.S. options markets have grown remarkably in their 10 breadth and depth over the past decades. Today, there 11 are more exchanges trading more products, generating a 12 dizzying amount of message traffic. So, for example, 13 OPRA disseminates over 3,200 times more messages today 14 than it did back in the year 2000. And a broad cohort 15 of retail investors now participates in these markets 16 with greater ease and at greater scale. 17 Given all that they share in common, it's 18 tempting to discuss the options and equities markets in 19 tandem. After all, the two are deeply interconnected 20 and developments in one market can have profound 21 implications for the other. But commonalities between 22 the options and equities markets can also obscure 23 important distinctions among them. 24 As options markets operate according to their 25 own conventions, so they merit attention on their own	Page 177 1 enormously constructive by helping to develop, 2 socialize, and refine proposals before they make their 3 way to the Commission for formal consideration. 4 So taken together, today efforts like today's 5 roundtable and the ongoing work of groups like LOMSWG 6 strengthen our options market structure in ways that 7 will keep it the envy of the financial world as it gains 8 both volume and scale in the future. 9 Which brings us at last to our closing 10 session. And I am delighted to turn things over to 11 Jamie for a discussion on the growth of listed options, 12 the associated challenges and opportunities that that 13 growth presents, and the issues that the Commission and 14 market participants should consider in the years ahead. 15 So I expect this to be a thoughtful and wide-ranging 16 discussion, and I thank you all once again for being 17 here and watching online as well. Please enjoy the 18 remainder of today's program and thank you all very 19 much. 20 (Applause.) 21 MR. SELWAY: Thank you so much, Mr. Chairman. 22 We will now hear from the final panel of the 23 roundtable. In this panel, we will examine the growth 24 of listed options, the associated challenges and 25 opportunities that growth presents, and the issues that

Page 178 1 the Commission and the market participants should 2 consider in the years ahead. 3 I am joined as a fellow moderator with our 4 associate director, Richard Holley, the ORF slayer. 5 (Laughter.) 6 PANEL THREE 7 OPPORTUNITIES AND CHALLENGES OF GROWTH 8 MR. SELWAY: And we'll begin brief 9 introductions, brief self-introductions from each of our 10 panelists, name, role, and your interest in the options 11 markets. 12 Andrej. 13 MR. BOLKOVIC: Good afternoon and thank you. 14 And thank you to the Commission for including the 15 Options Clearing Corporation in this discussion. My 16 name is Andrej Bolkovic. I am the CEO of the OCC. 17 OCC, as probably many of you know, is the 18 central counterparty to every listed options transaction 19 and we sit at the center of this market. We are deeply 20 invested in its stability and its health and its overall 21 growth. And, you know, to the points made earlier, the 22 growth has been remarkable. 23 If we recall, the last time this roundtable 24 was held was 2004, and at that time the Options Clearing 25 Corporation cleared just over one billion contracts, to	Page 180 1 I have spent the last 15 years helping to 2 build MIAX family of exchanges. And prior to that, I 3 have held a number of senior positions across the 4 industry, including roles at Peak6, Nasdaq, PHLX, 5 Susquehanna, and many years as a floor market maker on 6 Cboe. I have seen a lot of change in the industry over 7 my 45-year career, especially since my first role as a 8 runner on Cboe. 9 Clearly, we have come a long way since the 10 first few exchanges were founded. And today's markets 11 are radically different but in a very good way. I 12 believe the industry has done a tremendous job of 13 building out the infrastructure to support modern 14 markets. The entire industry should be congratulated 15 for its efforts to build out a market that is the envy 16 of the world, with deep investor participation and a 17 resilient market structure. And I believe today will 18 provide a strong foundation for future growth. 19 MS. CRIGHTON: I appreciate the opportunity to 20 be here. And huge thanks to the Commission for the 21 focus on options markets. My name is Alicia Crighton. 22 I work at Goldman Sachs. Amongst a number of roles and 23 businesses that I'm a part of, I head our global options 24 clearing business, and that is the perspective that I'm 25 hoping to share today.
Page 179 1 having cleared over 15 billion contracts in 2025. 2 So that also shows us that the growth is a 3 sign of a healthy and robust market. And it also places 4 obligations on all of us, exchanges, clearinghouses, 5 market participants to ensure that the infrastructure, 6 the rules, and our culture are keeping this market save, 7 can scale alongside it. 8 Thank you. 9 MR. BROWN: I'm Shelly Brown, executive vice 10 president, chief strategy officer at MIAX, also chief 11 executive officer at MIAX Futures. I'm honored to be 12 here today with all of you. I think meetings like this 13 among our peers are what moves the options industry 14 forward. 15 I would like to thank the Commission for 16 inviting me to participate, as well as all of the 17 organizers for putting this program together. I would 18 also like to personally thank Jamie and Richard at the 19 SEC, in particular, for the invitation to be on the 20 panel, and for your leadership on the Trading and 21 Markets team. 22 Today's panels have been incredibly 23 informative and have really reinforced the breadth of 24 knowledge that is typical of senior leadership across 25 our industry.	Page 181 1 As has been discussed many times throughout 2 the day today, the growth in the options markets over 3 the last few years in particular has been nothing short 4 of extraordinary. And there is no better time to 5 discuss how we can continue to maintain that momentum 6 and ensure that the markets are future proofed. 7 So how do we continue to grow and ensure that 8 the ecosystem is serving the needs of all who 9 participate? My focus today will be twofold, really. 10 One is to bring the institutional investor perspective, 11 and two is encourage us to think about execution and 12 clearing more holistically. Both are equal -- in equal 13 parts fundamental to ensuring that we're paving the way 14 for further growth, as well as ensuring stability and 15 resilience. 16 We think some market structure reform will 17 provide the right incentives for competition, execution 18 quality, and most importantly risk management, and 19 maintain the U.S. options markets as the preeminent 20 market, as they are today. 21 Thanks, and I look forward to the discussion. 22 MS. GREENE: Good afternoon and thank you for 23 having me. And thank you to Chair Atkins for 24 recognizing the work that LOMSWG has been able to 25 contribute to and achieve over recent years.

Page 182 1 My name is Ellen Greene and I am with IMC, a 2 global trading firm and market maker. We were founded 3 in 1989 on the floor of the Amsterdam Options Exchange, 4 and have always combined trading expertise and 5 technology, an approach that continues to define how we 6 operate in today's electronic markets. 7 We provide liquidity across equities, ETFs, 8 and derivatives on more than 90 exchanges globally, and 9 are an active participant in the U.S. options market, 10 including both single names and index products like SPX. 11 Options markets are fundamentally quote 12 driven. Market makers compete and continuously manage 13 risk and quote across a wide range of strikes and 14 venues, and that competitive quoting is what supports 15 liquidity and investor participation. From that vantage 16 point, we think carefully about how market structure 17 impacts both quality and growth, as well as the overall 18 customer experience. 19 The listed options market has evolved rapidly 20 in recent years, driven by innovation and increased 21 participation across both retail and institutional 22 investors. As we've heard today, the market continues 23 to evolve. And the question is how to ensure regulation 24 keeps pace while continuing to support this competitive 25 environment that we're in with liquidity and resiliency.	Page 184 1 I am so proud of Nasdaq's role in this 2 ecosystem. But I am equally proud of the industry as a 3 whole. You know, as I look up and down my fellow 4 panelists, to me and the two panels before, it really is 5 like a dream team. You know, I like to put everything 6 in sports or just different competitive terms. And we 7 have like a fantasy team that is incredible in this 8 industry. And I think it is the collective whole that 9 has made us where we are today. 10 So competition among exchanges and market 11 makers continues to power liquidity while innovation in 12 products and access has expanded participation. As the 13 market continues to evolve, future growth -- why we are 14 here today -- will depend on maintaining strong, 15 industrial-grade guard rails, preserving transparency, 16 resilience, and most importantly investor protection so 17 growth reinforces confidence rather than undermining it. 18 The opportunity ahead is not just continued growth, but 19 sustained, high-quality growth, built on this strong 20 foundation. 21 I appreciate the Commission's stewardship of 22 this market and look forward to a constructive 23 discussion on how we support the next phase of the 24 options market together. And before I use the term 25 "envy of the world," I really want to just say that the
Page 183 1 MR. KENNEDY: Well, thank you, Jamie, and 2 thank you, Richard. And I do want to thank the 3 Commission for convening us today. And I also want to 4 thank Chair Atkins, Commissioners Peirce and Uyeda for 5 their continued engagement and leadership on options 6 market structure. 7 For those who I haven't met, I am Kevin 8 Kennedy, executive vice president and head of North 9 American Market Services at Nasdaq. And I have spent 39 10 years in the markets, including my first 20 as a market 11 maker and a specialist providing liquidity. And I have 12 also had the opportunity to serve in industry governance 13 roles, including currently on Andrej's OCC board, as 14 well as the Canadian Investment Regulation Organization, 15 CIRO. 16 Over more than five decades, the U.S. listed 17 options market has evolved into one of the most 18 resilient and competitive market structures anywhere in 19 the world. That success has been driven by deliberate 20 design choices, trading on -- on regulated exchanges, 21 mandatory -- mandatory order exposure for competition, 22 centralized liquidity, and a strong clearing framework. 23 Those fundamentals have produced deep liquidity, tight 24 spreads, and a strong price discovery that benefits 25 investors of all sizes.	Page 185 1 strength of U.S. markets is something we should all be 2 proud of, but it's not something to take for granted. 3 Sustaining this position means doing the work, 4 the work that we're doing that starts today, and 5 obviously it's been going on for decades to get us here. 6 But we want to do it thoughtfully, deliberately, and 7 with investors firmly at the center. 8 And with that, I'll pass it to Matt. 9 MR. MacKENZIE: Thanks. Hi. I'm Matt 10 MacKenzie. I look after U.S. policy for Optiver. 11 Optiver is a global market making firm started by three 12 options traders in Amsterdam 40 years ago this year. We 13 are celebrating our fortieth anniversary this year. We 14 provide liquidity around the globe and we do it through 15 a combination of human capital and technology, much like 16 Ellen described at IMC. 17 One of the core values of the firm is that we 18 improve the market. And that has multiple dimensions. 19 It means we improve the price and quality, but we also 20 take very seriously the responsibility to think deeply 21 about market structure issues and offer our thoughts 22 about ways to improve the market through a policy lens. 23 So that's why I'm so excited to be here and to have been 24 invited to participate. So thinking back two years to a 25 conversation with Commissioner Peirce when she asked if

Page 186 1 it would make sense to do a roundtable like this, it's, 2 you know, it's a real pleasure to be here and we're 3 excited to continue the conversation. So thanks, Jamie. 4 Thanks, Richard, for holding this. 5 MR. MATAKA: Thank you. Hi. I'm Faris 6 Mataka from Charles Schwab. I run trading operations. 7 We oversee about 47 million customer accounts across our 8 retail, self-directed, and RIA businesses. We are 9 seeing firsthand a dramatic increase in options, as 10 noted today. Trading from our existing clients, but 11 also a substantial increase from new clients. As 12 Commissioner Peirce said, the pie is growing. We are 13 seeing a lot of entrants in the market. Also, our 14 younger investors are adopting and utilizing options at 15 a really high rate. 16 Our approach to clients trading options has 17 always been about a focus on client education. And as 18 JJ said, it's free education, whether you're advanced or 19 a beginner. We customize education to your needs. We 20 provide a best in class trading platform with features 21 that help clients manage their own risk and also parlay 22 that with an interactive client service model that is 23 staffed with options specialists so they can help 24 clients, answer any clients' questions. 25 So as mentioned, this is really an exciting	Page 188 1 Our members are individuals. We have 16 affiliates in 2 the U.S. and four up in Canada. It is a diverse group, 3 both by geography and also by the roles that they play 4 in the marketplace. We do maintain a listed options 5 committee at STA. Very proud to say that of the 23 6 firms that are represented on this panel, 21 are also 7 members of that committee. The other two will be 8 getting sponsorship packages tomorrow morning. 9 (Laughter.) 10 MR. TOES: The perspective, just to play off 11 some of the previous remarks here, the perspective I 12 think that I'm trying to bring here is prior to STA, I 13 was on the equity side, 20 years at, you know, Merrill 14 Lynch. And I can't impress upon everyone enough that 15 like this is a different market structure. You know, 16 this is like if you're learning a new language and 17 someone asks you a question in French, the first thing 18 you're going to do is you're going to translate it in 19 your head to what the question was in English, think of 20 your answer in English, and then try to respond in 21 French. Forget it. You have to just really appreciate 22 the fact that this is a different market structure, and 23 it deserves its own, you know, view from that 24 perspective. 25 And the last thing I'll say, too, is I just
Page 187 1 time in options trading and really a timely roundtable 2 discussion. I thank you for the opportunity and look 3 forward for our discussion. 4 MR. MURAVYEV: Well, thank you for the 5 opportunity. I will be brief. My name is Dmitriy 6 Muravyev. I am an associate professor of finance and 7 the Hewlett Research Fellow at the University of 8 Illinois Urbana-Champaign. I wrote many papers about 9 option microstructure, including studying option trading 10 costs, option market makers, and retail trading, and I 11 am happy to provide the academic perspective on those 12 issues. 13 MR. TOES: Hi, I'm Jim Toes. I am president 14 and CEO of the Security Traders Association, also known 15 as STA. I want to thank Jamie, Richard -- excuse me, 16 Director Selway, Richard, and the Commission for 17 organizing this roundtable. 18 You know, roundtables and House hearings play 19 such a vital role in the rulemaking process. You know, 20 it's an opportunity, obviously, for the presenters to 21 kind of get very tight and organized on their thoughts 22 and on their opinions, which provides a lot of the value 23 for the industry for them to play off of. 24 The STA is -- our members are individuals who 25 are employed in financial services. They are not firms.	Page 189 1 want to say thank you to all the people on the LOC 2 committee because they've been very patient with me for 3 the past 10 years on taking an equity guy in and 4 teaching him about how the options market structure 5 works. It's a really cool ecosystem. I don't -- my 6 years in equities, I never saw market makers exchange as 7 clearing firms, vendors, clients, all in a room trying 8 to make the marketplace better. We are all guardians of 9 this marketplace, and I think that the folks in listed 10 options really exemplify that. 11 MR. TREACY: Thank you to the Commission and 12 to Jamie and Richard for the opportunity to participate 13 today. It's a privilege to be a part of this 14 conversation. I was hoping you guys would add a fourth 15 panel about shoe companies transitioning to AI 16 companies, but we'll save that for another day. 17 I'm Mike Treacy. I am the vice president of 18 risk at Apex Fintech Solutions. We are one of the 19 largest independent clearing firms serving retail 20 investors. We cleared over a billion in options 21 contracts in 2025 across 220 correspondent broker- 22 dealers. So when we talk about options market 23 structure, we're talking about the plumbing that our 24 clients and customers depend on every day. 25 My focus in the options space is what I see as

Page 190 1 the defining operational challenge of this era, the 2 secular shift from start-of-day/end-of-day risk analysis 3 to a world that demands continuous, 24/7 risk monitoring 4 spliced into smaller intervals. 5 I look forward to discussing these topics with 6 you guys. And my background is as a volatility 7 arbitrage trader, so I come from a unique perspective, 8 risk taking to now managing a lot of the trades I used 9 to expose in the market. 10 MR. HOLLEY: Thank you. We'll begin our panel 11 with our first question focused on the challenges of 12 growth. 13 As we heard this morning, we now have more 14 than 20 registered options exchange, 18 currently 15 operating, and are well over one million series. 16 Efforts at strike mitigation and harmonization are 17 counterbalanced by expansions in short-term options and 18 new options. 19 Market participants have done an admirable job 20 of keeping up with the enormous growth of options. So 21 reflecting on this remarkable growth trajectory, what 22 options market structure concern keeps you up at night? 23 Let's start with Kevin. 24 MR. KENNEDY: Thank you, Richard. You know, I 25 love to say when I'm in front of other panels or even at	Page 192 1 happen, we all understand what the other exchanges are 2 doing, what phone call we're going to get on, what 3 happens at 3:00, what happens at if this happens at 4 11:00 a.m. So I would love to see some highlight of 5 governance there. 6 So then I want to just jump in, because you 7 may not come back to me, I do want to add two or three 8 other things. One is which those things keep me up at 9 night. However, as I've said in my opening statement, 10 this is an incredible product that we have. And it's 11 really a treasure. But there's always room for 12 improvement. 13 And I would say two things we could probably 14 all three panels and almost everybody in the room, and I 15 think even you and your Staff could execute on is the 16 penny pilot -- the penny program, I guess we call it 17 now. As we see that we're not trading 8,000 securities, 18 I think there's room to do more. We're hearing from 19 clients that we'd love to see -- step on the gas a 20 little bit on getting things into the penny program. So 21 I think that would be something we could all execute 22 pretty quickly. 23 And then the other thing we hear, and I know 24 Cboe has done exceptional work already on this. But the 25 position limits, like they're clunky. And even when we
Page 191 1 work internally, like nothing keeps me up at night 2 because we have such a great team, et cetera. But 3 honestly, there are two things that really do keep me up 4 at night. Because I live, sleep, drink, eat options, 5 just like JJ and so many other people in this room. And 6 systemic risk bothers me. I've seen it go bad in the 7 past with us. As good as we are, we've had issues. And 8 with all the extra interdependence that we now have, and 9 with more exchanges and with more quotes, I'm concerned 10 we're not paying enough attention to it. 11 So when I answer some of these questions 12 today, I want to focus on three things. I want to focus 13 on like reflecting on how we got here and highlight 14 maybe come concerns and then offer constructive 15 criticism or maybe a way to execute. 16 So for this one in particular with what keeps 17 me up at night, I don't have the solution with respect 18 to resiliency. I mean, we've been resilient. But it's 19 coming. Right? Whether it's -- how it comes, we won't 20 know. But we're becoming more and more interdependent 21 every day, with zero DTE, I mean, everything. We all 22 know. 23 So I'd say I want to highlight that for the 24 Commission and figure out collectively how we can 25 improve there and make sure that when something does	Page 193 1 finally get them approved, I think we still need every 2 single exchange to file in order to affect them. 3 So the two things that I would like to 4 highlight that I think we could execute on pretty easily 5 would be let's take a hard look at the penny program, 6 and let's take a hard look at position limits. And 7 maybe just, again, with my sports analogies, but I like 8 to move the chains. Let's just keep moving down field. 9 So I don't want to take up too much time. 10 MR. HOLLEY: Thanks, Kevin. 11 Alicia. 12 MS. CRIGHTON: Great, thank you. I'm going to 13 take the question in two ways, probably a little bit 14 different to Kevin. I actually do have a long list of 15 things I worry about at night. 16 The kind of couple of places I'll focus on 17 here, I'll start with execution and then I'll make sure 18 we cover clearing as well. I think, you know, one of 19 the things that we worry about is how do we ensure that 20 we're servicing our institutional client base. And 21 focusing on what are their needs and what are they 22 coming for us to do and what are the ways that we can 23 service them. 24 And we think one of the most significant 25 impediments to being able to service that part of the

Page 194 1 ecosystem is the current structure around the 60/40 2 rules. And that, I'm sure everyone in the room knows, 3 but it mandates that when an order goes to the floor, 4 market makers are guaranteed 60 percent of that, and a 5 last look by simply matching on price, which means 6 they're not price improving. 7 And when we think about our role and what 8 we're doing, we're providing a number of services, trade 9 ideas, research, risk management, we're intermediating, 10 we're providing capital on many of these trades. And so 11 we think by allowing that 60 percent to automatically 12 trade away, it disincentivizes us from providing what we 13 think is much needed liquidity to the investor community 14 or institutional investor community. 15 This rule is over 25 years old. It came out 16 in a very vastly different market environment where 17 liquidity was a problem. We traded fractions of the 18 volume that we trade today. And so we encourage reform 19 to ensure that markets are fit for purpose for the 20 institutional investors. 21 On the clearing side, clearing capacity is an 22 area that many of us focus on. Options clearing 23 capacity for market makers continues to be a topic of 24 discussion and concern, whether it's for market makers, 25 whether it's for institutions, for the growing ETF	Page 196 1 functionality, and real innovation, which is positive 2 for the market. 3 At the same time, the current structure 4 continues to incentivize exchange entry driven by the 5 linkage plan and the requirement that options be traded 6 on exchange and cleared through the OCC. And just to 7 pause, the work Richard that the Commission has done on 8 ORF has been many years in the making and just 9 congratulations on getting that across the finish line. 10 So as we do look at our exchange venue with 18 11 exchanges, new launches coming, each additional venue 12 increases fragmentation. As we heard in the first 13 panel, there was a lot of focus on what the costs to 14 those market participants, market makers might be. But 15 if we think about it from a different lens, being a 16 market maker requires that we connect to each exchange, 17 process additional market data, maintain quotes against 18 more order books, and allocate more capital more broadly 19 to remain competitive. 20 We see similar pressures in market data with 21 continued OPRA growth and in clearing, as Alicia just 22 discussed, as capital and activity becomes more 23 distributed. This creates real operational and 24 infrastructure complexity at scale. And those costs are 25 not optional. It further introduces growing compliance
Page 195 1 ecosystem. And we think about the resources that we 2 provide as a clearer, they're extraordinary. Right? 3 Whether it's balance sheet, capital, funding, liquidity, 4 that list is extensive, including the technology it 5 takes to support those flows. 6 As this group knows, our job as a clearer is 7 to stand in and guarantee the performance of the firms 8 that we bring to the ecosystem. So meaning the model is 9 based on one where you capitalize and guarantee the risk 10 that you bring. And so we think that actually the OCC 11 rule filing to reallocate the default fund based on risk 12 is appropriate and we fully support it. 13 And so while we've innovated a lot on the 14 exchange side, it's important to think about the 15 protections for clearing firms. And I don't think 16 they've kept pace with the risk in the market, and so 17 that's something that we can hopefully focus on later in 18 this panel. 19 MR. HOLLEY: Thank you. 20 Ellen. 21 MS. GREENE: Thank you. As we heard earlier, 22 the options market structure has been very effective in 23 promoting competition across both market makers as well 24 as exchanges. Competition in the exchange space is 25 driven by meaningful differentiation, new models, new	Page 197 1 complexity as exchanges take differing approaches to 2 rules and their interpretation, creating ambiguity and 3 requiring firms to navigate nuanced and sometimes 4 inconsistent expectations across venues. 5 So what keeps me up at night is whether the 6 incremental benefits of additional venues continue to 7 outweigh the very real costs they introduce. The 8 question going forward is how to preserve the benefits 9 of competition while encouraging the kind of innovation 10 that adds real value and ensures the market remains 11 efficient and resilient as complexity continues to grow. 12 MR. HOLLEY: Thank you, Ellen. 13 Jim. 14 MR. TOES: Listen, I know we talked about 15 operational capability. You know, our markets also run 16 on investor confidence. We rely on that. If investors 17 lose confidence in the marketplace, it's never a good 18 outcome. 19 I think where we're concerned, we've heard 20 some talk about, you know, account takeovers and the 21 proliferation of strikes. I just want to just tell you 22 where we're kind of focused on this. Like, you know, 23 account takeover, first off, this isn't new. Account 24 takeovers, it's not a new phenomenon. They have been 25 occurring for decades. Obviously, with the advancements

Page 198 1 of AI, they're occurring much more frequently and much 2 more sophisticated. 3 Account takeovers, it's not just an option 4 specific problem. You know, account takeovers, where 5 the money is being moved from a legitimate account into 6 a fraudster's account, it's occurring in ETFs and also 7 equities. 8 FINRA is doing an enormous amount of work on 9 this. Racquel touched on it a little bit earlier. But 10 I really would encourage you to, you know, kind of 11 understand the amount of work that they're doing in this 12 area. They've carved out a lot of trust in the industry 13 where there is a lot of information sharing taking place 14 on it. 15 When you look at the data that is there on 16 account takeovers, as pertains to options, listen, it's 17 occurring in these far out of the money strikes where 18 there is no hope in interest and no activity, you know, 19 that those conditions obviously create the opportunity 20 for a fraudster to interact with the account that they 21 have taken over by directing orders to a particular 22 venue. So it's also worth noting too that this activity 23 is very hard to pick up, because a lot of it is 24 occurring within that wide spread or slightly outside of 25 it, so it's hard to detect it. So really, obviously,	Page 200 1 MR. BROWN: A few things. First off, I agree 2 with Kevin on the systematic risk, something that keeps 3 me up. Obviously, things are a function of testing and 4 efficiency. But something we're always concerned about. 5 Another one is the strike listings. We talked 6 a lot about that already. I would like to clarify for 7 folks in the room, for folks who aren't aware. We talk 8 about one and a half million listed series. It all 9 depends on how you define a series. Is a series the 10 eight fifty call or the eight fifty line with the call 11 and the put? We have one and a half million options, 12 and we talk about a large percent of those options don't 13 have open interest. You have to keep in mind, the out 14 of the money puts that have open interest, the in the 15 money calls don't. We have to take that into account. 16 At the same time, we need to be able to clear the way 17 the exchanges can work together, without DOJ 18 interference, to talk about listings. 19 The thing that keeps me up most though is our 20 obvious error rules. I think there, we've done a good 21 job of coordinating with the SEC across all the 22 exchanges having harmonized obvious error rules. But 23 there's a serious lack of flexibility. Everything is 24 predefined on how we act and how we react. The problem 25 is we can't define everything in advance that could
Page 199 1 the only way that we can kind of see this improving is 2 really on the prevention side, preventing these, you 3 know, 30 to 50 percent strikes that are -- that have no 4 volume, that have no open interest. 5 I know the OLPP has with the most recent 6 amendment, there's a form that's been put in place that 7 allows the exchanges to sit down and talk about this 8 more freely than they were allowed to before. We look 9 forward to -- it's a very positive step. We look 10 forward to engaging with that. But this is an area that 11 we're most concerned about. 12 MR. MATAKA: Could I maybe just add one more 13 point to that? Because we deal with those account 14 takeovers all the time. 15 I think the strike mitigation helps. I do 16 think there has to be, and you asked about what policies 17 or frameworks that we can add. I think a framework 18 similar to clearly erroneous, where trades can be 19 broken, customer to customer, that is -- you know, in 20 addition to the strike mitigation, that's really crucial 21 to stop this fraud from happening. So just want to -- 22 and that doesn't keep me too much up at night but maybe 23 2:00 a.m. 24 MR. HOLLEY: Thank you, Faris. 25 Shelly.	Page 201 1 possibly happen. I go back to an 1964 case that was at 2 the Supreme Court and Justice Potter Stewart said about 3 a case that had involved pornography, he said I can't 4 define it, but I know it when I see it. And it's really 5 the same thing that applies to obvious errors. You look 6 back, whether it be a customer account that was stolen 7 and the customer trade needs to be busted, or there's so 8 many different things that can happen. We can't define 9 those in advance. I think we really need to readdress 10 obvious error. The guy that did nothing wrong should 11 not be forced to lose money. 12 MR. KENNEDY: I just want to give one follow- 13 up quickly. When I talked about systemic risk, I want 14 to be clear. First of all, having 18 exchanges, I think 15 we are in excellent shape as far as handling investors, 16 when MIAX has a problem or Nasdaq has a problem or Cboe 17 has a problem. What I'm looking for to highlight is 18 governance and transparency about what the playbook is, 19 the procedures, when something happens. 20 So that's what's keeping me up at night. Like 21 we're not communicating and don't have a central sort of 22 repository to understand what the playbook is. 23 MR. HOLLEY: We'll turn to the next topic, 24 which is going to be market makers and capital. 25 So as we heard from this morning, how

Page 202 1 displaying a continuous quote across so many series and 2 exchanges is not for the faint of heart. We've seen 3 some large firms exit the business recently and some new 4 firms enter. 5 One challenge market makers face is securing 6 access to capital from an increasingly smaller number of 7 clearing brokers, some of which are owned by bank 8 holding companies that themselves are subject to 9 evolving bank capital rules. 10 What challenges are market makers and clearing 11 brokers facing today and what can be done to help 12 facilitate solutions to those challenges? And I'll 13 start with Andrej. 14 MR. BOLKOVIC: Thank you. And I think, you 15 know, a couple of panel members pointed out the clearing 16 capacity is a concern. And having been myself both on 17 the clearing broker's side and on the market making 18 side, there is only a few firms that can actually 19 support market makers, and especially as it relates to 20 index market making. And that has been the case for a 21 while, and it would face concerns in a, you know, 22 catastrophic event, who would be able to absorb any new 23 market entrant or even the entrants that are there 24 today. 25 We've seen stable clearing membership across	Page 204 1 industry can continue to develop at a safe and -- pace. 2 MR. HOLLEY: Alicia. 3 MS. CRIGHTON: Thanks. I think, you know, if 4 we focus on some of the challenges in being a clearing 5 member and providing clearing capacity in particular to 6 market makers, the two sort of broad buckets that we 7 think about are one is operational risk, and that covers 8 a number of different areas. And the second is bank 9 capital and what are the requirements as a GSIB that we 10 need to hold in order to facilitate that. 11 And I think directly correlated to the growth 12 of the options market is the demand for clearing 13 capacity. And it's not just in options, it's actually 14 in every product that's cleared, and also in products 15 that are, you know, coming forward in order to be 16 cleared. So treasury and repo. 17 And we think about what are the operational 18 risks? And I think it's almost been implied in the 19 market that clearing is a utility service. And I think 20 we have to think about that a little bit different on 21 the forward. When you think of the volumes that trade, 22 the pace at which trading is done, you know, I think you 23 said you're averaging 70 million contracts a day. 24 That's one market in the U.S. Granted, it's across a 25 number of different exchanges, but that's one market.
Page 203 1 the OCC in terms of absolute numbers. But the 2 capabilities and the capacity to support market makers 3 is fairly limited. Luckily, we are seeing some new 4 market entrants entering the space, which I think is 5 also supported both by the OCC as well as some of the 6 other clearing firms, who do not believe that it's 7 beneficial for the industry to have this consideration. 8 On the OCC side, we definitely want to make 9 sure that we manage the risk as efficiently as possible. 10 And we do continuously see where we can improve our 11 margin models to make sure that we calculate the risk as 12 appropriately and as efficiently as possible. We do 13 offer different programs to manage some of that risk 14 through escrow deposit program. We are looking to 15 improve our current approach on paying interest on 16 margin. So we are trying to see how we can support the 17 industry. 18 And being a qualified CCP, we do offer 19 benefits to the banking community in terms of the risk- 20 weighted assets that they have to hold against a central 21 counterparty like the OCC. And we do also believe that, 22 you know, we are working with other CCPs to see where we 23 can make sure that our operations are efficient across 24 the board, that the cross-margin agreements that we have 25 are as appropriate as possible, to make sure that the	Page 205 1 And many of us are clearing across a number of different 2 markets. 3 So we are, as we stand in and provide that 4 guarantee, it's very difficult for clearing firms to be 5 able to define the capacity that they want to provide. 6 And so we're sort of implying that we would provide 7 unlimited capacity and unlimited guarantees to clear and 8 settle a market maker or any firm's activity that we are 9 signed up to clear for. 10 So I think starting to think about what are 11 protections for clearing firms, how do you define and 12 size the capacity that you're willing to provide. I 13 don't think the view should be that it's unlimited. And 14 how does the ecosystem come to together? And Shelly, 15 you mentioned like the obvious error rules and the 16 catastrophic obvious error rules, thinking about 17 coordination. What are some additional checks that need 18 to go into the gateway and ensure that we're preventing 19 these types of errors before they happen? What are some 20 things that we can do to coordinate around the industry 21 where there is consistent tooling, maybe portals? You 22 know, there are things that we can do and self-solve for 23 that would reduce some of the catastrophic risk that a 24 clearing firm can face. 25 And then on the capital side, you know,

Page 206 1 clearly the Basel III re-proposal, as we spend time 2 thinking about, you know, what are the implications, 3 there are clearly some benefits that we see in terms of 4 the recognition of netting. Andrej, you mentioned some 5 of the cross-margin programs. I think we were long 6 disadvantaged of cross-margin programs, gave us the 7 ability to recognize risk offset in margin. But we were 8 never able to take those benefits in the capital rule. 9 So having the ability to do that going forward, you 10 know, as we kind of evaluate what's in those rules, we 11 may have more feedback as we continue to dig through 12 them. That is certainly a helpful step forward. 13 But I think, you know, the amount of liquidity 14 that we provide in order to be able to facilitate the 15 trading on these venues around the globe is significant. 16 And so just thinking about some of the protections and 17 some of the things that we can self-solve as an industry 18 and kind of bringing together the advancements on the 19 execution side along with the clearing side help bring 20 that much-needed capacity here and to other markets 21 where we clear. 22 MR. HOLLEY: Thank you. 23 Matt. 24 MR. MacKENZIE: Thanks. Thanks for the 25 question.	Page 208 1 that. And we will see where that is headed. 2 But it is encouraging that that proposal is 3 out and that it has taken a step away from the original 4 version. And I think pretty hopeful that we could see 5 that rule be finalized in the next year, year and a 6 half. And that may help to alleviate some of the 7 constraints that I had described before, so we can get 8 into the business in a day-to-day way of providing 9 liquidity to these markets. 10 MR. SELWAY: So before we leave market making, 11 I wanted to ask, you know, the definition or maybe lack 12 thereof of bona fide activity has come up in the equity 13 context. Is there anything in the options world we 14 should be doing with that definition? 15 MR. MacKENZIE: Well, there is something you 16 are already doing. So I would like to extend thanks to 17 Richard and his team. There's engagement between 18 Trading and Markets and the PTG on the bona fide market 19 maker exemption to Reg SHO. 20 And one aspect of that that I don't know has 21 been discussed that much is, as we're exploring this new 22 world of a tokenized security, you know, one of the 23 challenges for bona fide market making is the locate 24 requirement for a hard-to-borrow security. If it's 25 tokenized, is it going to be locked up and basically
Page 207 1 So I think it has been discussed a lot, the 2 challenges that market makers face in terms of the cost 3 and complexity of these markets, from market data to 4 connection fees to everything else. But there are also 5 constraints imposed just by virtue of the need to use 6 the balance sheet of a clearing bank to access a cleared 7 environment. And those -- those sort of externalities 8 come from the bank capital rules themselves. 9 And this market is moving so quickly that one 10 of the things that Optiver had to do in order to deal 11 with that was apply a fair amount of resources, both 12 human resources and technology, to build our own data 13 visualizations of our clearing partners' risk-weighted 14 assets. And when we're getting close to those 15 constraints, we have to modify our behavior in the 16 market. 17 So we're not behaving in the market the way 18 the supply and demand signals might suggest. We're 19 doing it in order to maintain the RWA measures that our 20 banking partners have. And I do think, you know, the 21 Basel III reproposal that Alicia just mentioned, it's 22 encouraging. I'm not expert in prudential rules, but 23 most prudential rules, in my experience, were not 24 written with trading firms in mind. 25 So I think the devil is in the details on	Page 209 1 impossible to borrow? Like that's a ripple effect that 2 maybe needs some further consideration, more time than 3 we have on the panel to discuss. But there are 4 definitely constraints to that hedging aspect of any 5 market maker's business. 6 MR. SELWAY: Thank you. 7 MR. HOLLEY: Now we will turn to single stock 8 weekly series. 9 So some exchanges have proposed expanding the 10 number of short-term options, weekly series, on single 11 stocks. Unlike for index options, that raises unique 12 issues, like assignment after the 4:00 p.m. market close 13 or corporate action or earnings news, including for 14 related stocks. 15 Is there a balance to be had between offering 16 customers more single stock expirations and the risks 17 and burdens that additional series place on liquidity 18 providers and market infrastructure? And if so, where 19 do you draw that line. 20 Let's start with Faris. 21 MR. MATALKA: Yeah, thank you. 22 I think maybe just taking a step back, and I 23 think to Ellen's point, like the exchange competition 24 today in the environment where, you know, vying for more 25 volume is creating this dynamic of innovative products

Page 210 1 that we haven't seen in a long time, that's a good 2 thing. Right? But I think as with any new product, we 3 need to move slow and methodical, just assess any 4 potential unintended consequence. 5 So but specifically to the -- to those Mondays 6 and Wednesdays, you know, these started in late January. 7 We are seeing strong adoption. I think Ed mentioned 8 that. I think we're seeing that, you know, 9 industrywide. I think the PDT, updating and modernizing 10 the PDT rules is going to probably increase that, so the 11 indication is that will grow even more. 12 The liquidity, to your point, has been robust. 13 We've seen tight bid/ask spreads. I think one thing to 14 note out here is Nasdaq did a great job listening to the 15 industry. Thank you, Kevin, for not listing these on 16 earnings. But I think it was talked about in the second 17 panel there. 18 But, you know, news comes out in non-earnings 19 cycles all the time. Right? So we've seen that, the 20 chip, you know, China ban and the AI disruption as well. 21 So I think I go back to operational risk and proving 22 that operational risk. Right? 23 So I think most firms, and retail 24 specifically, and I think Stephen mentioned that, we 25 need to keep the pace, right, with this innovation. And	Page 212 1 Apex fully supports expanded expirations. But we are 2 already seeing issues. One of the hallmark conditions 3 by which these companies to list Monday Wednesday was 4 that they do not report earnings on that day. What do 5 we have happen yesterday? Amazon came out and announced 6 earnings for Wednesday. 7 So one of the key conditions by which this 8 listing was approved has already been broken. 9 Additionally, I am concerned about broker- 10 dealers in retail who are disadvantaged in the after 11 hours cycle for contra decisionmaking. So many broker- 12 dealers, the cutoff decision is at 5:30 Eastern. But 13 many broker-dealers require their customers to submit 14 their decisions by 5:00 p.m. Now, this gets very tricky 15 with single stocks and with earnings volatility because 16 you often have earnings announcement after the close at 17 4:00. And then you have conference calls often starting 18 right at 5:00. 19 And so there are two tremendous catalysts 20 there that can cause stocks to swing back and forth. 21 And my worry is that you're going to have retail traders 22 that put on seemingly low risk debit spreads and they 23 end up forgetting to exercise the long leg of their 24 contract. 25 I think there are ways to work around this. I
Page 211 1 by that I mean, we need to upscale firms' intraday 2 capabilities and monitoring for expiration and 3 assignment risk. Like, for example, like firms and 4 maybe retail firms may manage throughout the day to 5 maybe a 5 percent move on the options, on Qs or SPOI for 6 the assignment potentially that move after hours. You 7 extrapolate that to single stocks, we could see a 20 8 percent move. 9 Some firms maybe have a different approach to 10 force close. Maybe we don't do that, for example. But 11 I think the key is that increase in scope is 12 substantial. That's hardware, that's faster systems, 13 that's potentially more staff, risk staff to monitor. 14 So I think we -- so since these started trading, I think 15 we haven't seen an event to really pressure test these 16 capabilities until we kind of move to adding more names 17 or even more days. So we need to prove that. 18 So the last point I want to make, look, we've 19 created so much confidence with the retail and the 20 options market over the years, I think all it takes is 21 one adverse event or a headline event that could really 22 erode that trust. So I guess I would say let's move 23 slow to go fast. 24 MR. HOLLEY: Thank you. Mike. 25 MR. TREACY: Yeah. So first and foremost,	Page 213 1 think that if we considered potentially changing that 2 5:30 cutoff and reduced 90 minutes of after market 3 volatility down to potentially 30 minutes, I think that 4 could be helpful. But I just want to make sure we all, 5 again, let's run before we walk on this. Because I 6 think it would be unwise to roll this out to 50 7 securities in the next six months and have us trading 8 Monday through Friday. 9 MR. HOLLEY: Dmitriy. 10 MR. MURAVYEV: Let me offer a somewhat like 11 independent perspective on this. First of all, I think 12 that an individual stock wait list is a great idea. 13 It's a part of the trend for shorter and shorter options 14 which really fueled the growth of them. 15 But I think as we shift to shorter and shorter 16 maturities to the trading course and best execution 17 becomes ever more important, right, for two reasons. 18 First of all, the holding periods become shorter and 19 shorter, for example. I find that the retail investors 20 say in those kind of short-term options, they hold 21 position for about one hour. So if you rotate your 22 positions faster and faster, trading costs are 23 important. 24 And also with shorter maturities, option 25 prices become lower, which is part of the attraction for

Page 214 1 the retail investors, and as option prices become lower, 2 then the reality of bid/ask spreads are higher. So for 3 example, typical option price will be below a dollar, so 4 a one penny tick size becomes binding. 5 So if we think about the best execution in the 6 option market, there is really not much public data. So 7 the SEC report today showed that the effective spreads 8 remain relatively stable in the option market, even 9 though in the stock market in the last 20 years, the 10 bid/ask spreads decreased. So this highlights the need 11 for some kind of like a public disclosure. In the stock 12 market, we have the Form 605. In option market, we 13 largely have nothing. 14 This is especially important for retail 15 investors, right? So for example, a typical retail 16 trade would be around like slightly under a thousand 17 dollars. And if retail investors execute well, they 18 will pay \$5 or less on that \$1,000 option trade. If 19 they pay the entire effective spread, they will pay \$25 20 or so. 21 I think it is important to educate investors 22 not only about what a butterfly or iron condor is, which 23 I think the industry did very, very well. But also 24 about the trading costs. What we find in our research 25 is an individual investor, so they make decision whether	Page 216 1 know, so we've learned. 2 I just want to make sure, and I don't want to 3 put words in your mouth. I think -- I believe you're 4 both advocating we can continue to go, just don't open 5 the flood gates. Because I still think there's room for 6 a few more securities. We'll continue to learn. And 7 whether we get the additional securities or whether we 8 move to Tuesday Thursday, we can talk about 9 collaboratively and collectively. And with extra 10 weight. Because, like I said, you guys are in the 11 trenches. 12 But I don't want us to quote the great Stephen 13 -- let's not let perfect be the enemy of the good. And 14 I think that's what Stephen Sikes was trying to get to. 15 But I do want to keep moving forward, but with 16 a lot of input. 17 MR. TREACY: Yeah, I just want to add, I think 18 the worst thing you can do is shut something down the 19 second it breaks. I think there is a fatal flaw in the 20 market sometimes, and regulation where when something 21 bad happens, we react and turn it off. And I would hate 22 to see that happen in these products. 23 MR. MATALKA: Maybe one point I think, and 24 that ties in to maybe our second topic, but global 25 trading hours expansion, that 15 minutes, I think from a
Page 215 1 to submit market orders or limit orders. And they do a 2 very good job of -- some of them do very good job but 3 some of them don't. So I think it's important to 4 highlight, like educate retail investors about those 5 trading costs and those trading costs become ever more 6 important with shorter maturities. 7 MR. HOLLEY: Kevin. 8 MR. KENNEDY: I thought Dmitriy said that 9 well. But then I also think of what Faris and Mike 10 said, and they're in the trenches. Like this is -- 11 they're there. 12 But now I want to do like the reflection that 13 I talked about earlier. I think the Staff took a very 14 long time to approve us for single stock, and I think 15 that was the right thing to do. And I think we got it 16 right. We're seeing that even with normalizing the 17 volume, that it's accretive. So I think we've had a 18 really good experience so far. 19 One of the things I like about moving measured 20 and deliberately is that you learn. Right? So we 21 learned something in the last 24 hours. We learned that 22 that can happen. We knew it would happen at some point. 23 And meaning that Amazon might have earnings on a 24 Wednesday that we had expiration. We lived through this 25 the day before Good Friday last year with Netflix. You	Page 217 1 risk perspective, is going to really help. You know, to 2 your point, about the after-hour move and potentially 3 the assignment risk, so that's going to help 4 tremendously for managing this risk for this product. 5 So I think those two go hand in hand. 6 MR. KENNEDY: And maybe that's what you were 7 saying. But also I think that OCC window, like we 8 should really talk and think about how we can narrow 9 that. 10 I understand there's trade adjustments and 11 things like that, especially until we modernize the 12 floors. But -- even better. But I do think there's 13 opportunity to work with OCC. 14 MS. CRIGHTON: And maybe I'll just add to 15 that. I think that's one of the places where the 16 ecosystem can come together. Because I think there's a 17 variety of perspectives where, you know, continuing to 18 move forward with the listings, the additional 19 expirations, while it moves the market forward, we have 20 to make sure that we have the appropriate guard rails in 21 place. Because ultimately, it's the clearing firms and 22 the OCC that are wearing the risk of these processes as 23 well as the individual investors. And so we need to 24 make sure that we have the right guard rails. 25 I think exercise and assignment processes are

Page 218 1 not seamless. They have come a long way. But there is 2 a lot of room for improvement. And so these types of 3 events, I think, highlight the fragility in some of 4 those processes. And so guard rails and actually 5 sitting down and talking through what are we trying to 6 achieve and how do we do that safely with all -- with 7 all parties around the table I think could really go a 8 long way. 9 MR. BOLKOVIC: I think in terms of things that 10 keep you up at night, I guess with the majority of firms 11 is like, you know, operational risk or production, 12 exercise assignments are the most concerning. They are 13 still complex, which I think to a certain extent also, 14 you know, we'll speak later maybe about, you know, 15 tokenization and those things. That's where I guess the 16 option market differs from the equity markets. And we 17 need to keep that in mind as we -- as we develop 18 further. 19 MR. BROWN: One thing we didn't talk about, 20 there's ideas about how to mitigate the exercise risk, 21 extend trading hours, move the window into a smaller 22 time frame for exercise. Another way of looking at this 23 that we need to talk about is possible change at Options 24 Clearing Corporation, and how you determine automatic 25 exercise. Should it be done at the 4:00 closing price?	Page 220 1 rulemaking process always starts kind of like you get a 2 lot of noise about something, you're hearing noise. 3 Then you have a roundtable. You know. Usually, the 4 next step would be good if there was some publicly 5 available data on the frequency and how often it occurs. 6 That would kind of be helpful in determining whether the 7 solution needs to be small, medium, or large. 8 MR. HOLLEY: Thanks. 9 So continuing on this theme with a little 10 difference is cash-settled single stock options. So 11 what impact could single stock cash-settled options 12 have? 13 Historically, physically settled options have 14 helped mitigate the risk of manipulation by imposing an 15 economic cost when extracting profits from a trade. 16 Cash settlement would remove that friction. 17 What are panelists' thoughts on the potential 18 for single stock cash-settled options? 19 Start with Kevin. 20 MR. KENNEDY: Wasn't expecting that. But I'm 21 good because I think about it a lot. And it does remove 22 some of the friction. 23 I do think we all know you have to design the 24 right kind of settlement, though. Because much easier 25 to manipulate and hurt investors than an index. So I
Page 219 1 That's really the trigger of this whole problem. 2 MR. HOLLEY: You've got a growing to-do list. 3 But at the risk of putting you too much on the spot, if 4 something -- changes to the exercise window, is that 5 something that's feasible or interesting? 6 MR. BOLKOVIC: I so I think that's the 7 importance that we have as an industry. The sequencing 8 is going to be important in, you know, the overall 9 evolution of whether it's extending trading hours or 10 these things as well, because we have to find alignment 11 on, you know, what is global trading hours, what is 12 extended trading hours. When, you know, is the market 13 closed across equity and the OCC. But it also requires 14 on the clearing member firm side that same evolution to 15 happen. So we obviously also observe and we do get 16 requests in the evening where, you know, operational 17 work still needs to complete at our clearing firms. 18 Sometimes there is operational issues where they request 19 extensions. Those things, you know, still exist and 20 haven't gone away and we need to keep those in mind as 21 we try and solve these as much as we can. 22 MR. HOLLEY: Thank you. 23 Jim, did you have -- 24 MR. TOES: No, I just wanted to add, I mean, 25 on the contra exercise instructions, you know, the	Page 221 1 think it's something we have to give a lot of thought 2 to. 3 That one, clearly, out of all the things we're 4 going to speak about today, about where I'm concerned 5 that we're you know, ready, go, set, instead of ready, 6 set, go. Cash-settled options would be at the top of 7 that list. 8 It's appealing, because it just sounds so 9 attractive. Like, wow, just settle for cash. You don't 10 have any of these problems we just spent the last 15 11 minutes on. But I think we would need to tread very 12 cautiously and really get a lot of input from everybody 13 on all three of these panels. 14 MR. HOLLEY: Matt. 15 MR. MacKENZIE: Yeah, thanks. This question 16 prompted a lot of discussion and a diverse array of 17 views with in Optiver when I asked. I think on the one 18 hand, it certainly is an attractive idea, especially for 19 someone who is interested in trading volatility or 20 hedging volatility. It removes that friction. 21 On the other, you know, there's a concern 22 about drawing liquidity away from the physically settled 23 market and what does that mean more broadly? I have to 24 give a shout out to Jerry Swarbrick, who identified 25 FINRA Rule 2360. I think I got that right, Jerry. That

Page 222 1 would probably need to be rewritten if we were to do 2 this. So a lot of operational issues may be involved. 3 But, yeah, definitely some interest. 4 And I think, you know, the overall theme was 5 potential for a rising tide to sort of lift all boats. 6 So more options -- that was not a pun, I promise -- 7 would incentivize greater participation. 8 MR. HOLLEY: Faris. 9 MR. MATAKA: I don't have too much on this 10 topic. I mean, we don't see a lot of demand from our 11 clients in terms of cash-settled single stocks. I do 12 recall when the Monday Wednesdays were proposed, there 13 was an industry discussion about can we make these cash 14 settled because of this exercise of assignment, the -- 15 risk that we talked about. And I think the consensus at 16 the time, and I know it takes a lot of the friction out, 17 but it's harder to implement. 18 You know, these are, from a pairing 19 perspective, in terms of the calculating margin, you 20 would treat these as a separate class versus the 21 physically settled. Can you spread those together 22 between the cash and, you know, how do you treat that? 23 So there is a little complexity at least from our 24 perspective. 25 I do think just maybe not related to this, I	Page 224 1 MR. TOES: I mean our interest on this one is 2 fairly narrow to just flex on -- flex settlement -- cash 3 settled for flex on ETFs. And so we understand, 4 obviously, on the industry side, you know, the capital 5 efficiency, sale in cash versus physical settlement. 6 And that's being balanced against, obviously, the 7 Commission's interest around avoiding potential 8 manipulation on pricing on the close. So we appreciate 9 that. 10 But the issue that we have is on these flex -- 11 cash-settled flex on ETFs, you know, they have certain 12 liquidity and trading volume thresholds that they have 13 to hit. Which is fine. They're pretty high and that's 14 good. You know, that kind of solves the problem of 15 marking the close on these products. However, you also 16 have this like 50 ETF cap that is causing some angst. 17 In the last six-month valuation that went 18 through with these ETFs, over 60 met the trading and 19 liquidity thresholds but because they were 51, 52, to 20 60, they weren't eligible for it. So some type of 21 expansion on that 50 ETF cap would be helpful. 22 MR. HOLLEY: I'll turn to the next topic, 23 which is stock tokenization. 24 So if stocks tokenize, including outside of 25 the NMS system, what effect could that have on options?
Page 223 1 think what we're seeing the demand is in flex options, 2 and what Cboe is -- coming from the Cboe for our 3 registered RIA business, where they want a European 4 style single stock to hedge some of their concentrated 5 position and not worry about the assignment of risk. I 6 think that is getting a lot of traction from that side. 7 Maybe back to the cash settled, maybe a good 8 use case for a cash settled is potentially a binary 9 option. And that, you know, I think JJ mentioned the 10 predictive market. You can really, you know, put that 11 as -- I mean, a cash-settled option is a speculative 12 instrument, versus the physical, which the use case is 13 to hedge. This potentially could be, you know, wrapped 14 in a predictive market kind of front end to the client 15 and can really be under the purview of the SEC since 16 it's a security and it's easier to implement as well. 17 MR. HOLLEY: Mike. 18 MR. TREACY: Yes. If you think about why 19 options exist, what are they used for? They're 20 primarily used for either speculation, hedging, or yield 21 generation. And if you were to drill down into current 22 zero DTE volumes, and identify how much of that is pure 23 speculation, then my question is simply why not go cash 24 settled? 25 MR. HOLLEY: Jim.	Page 225 1 for example, would it make hard-to-borrow securities 2 less accessible to borrow and therefore raise lending 3 rates? 4 We'll start with Andrej. 5 MR. BOLKOVIC: Thank you. I was at an 6 industry conference in March, and I'm not sure if I'm 7 allowed to name the industry. But I think most of us 8 were there as well. But I think that was proof that the 9 digital market infrastructure and traditional market 10 infrastructure are converging at an accelerated pace. 11 Because I think half of the panels and half of the 12 topics were related to that. 13 We also know that both, you know, exchanges 14 and CSDs are all investing in tokenization capabilities 15 or have done so. The SEC obtained no-action relief for 16 a tokenization pilot covering U.S. equities, ETFs and 17 treasuries. And Nasdaq has filed with the SEC to 18 facilitate trading of tokenized securities. 19 So if the underlying equity exists in both 20 traditional and tokenized form, so too the options 21 clearing system needs to accommodate both. And this 22 probably has implications for delivery obligations, 23 margin, collateral, and corporate actions. 24 To answer your question, I think if tokenized 25 shares trade outside the NMS framework, it probably

Page 226 1 means that the link between the options market and the 2 underlying becomes more complex and most likely borrow 3 costs, settlement timing, and price discovery could be 4 affected. And these would also affect directly into 5 options pricing and risk management. 6 I've heard a couple of panelists also mention 7 slow and methodical being who we are and what we do, and 8 I'm proud of this industry and how stable and resilient 9 we are, and I'm proud of the OCC team in doing what they 10 do day in and day out. So we are also taking a slow and 11 methodical approach as it relates to tokenization. 12 We are near term exploring the acceptance of 13 tokenized assets as margin collateral to improve 14 efficiency and also look at, you know, potential 15 expansions into 24/7 trading. We are then for a longer 16 term evaluating what does on-chain clearing mean and how 17 would OCC operate in such a digitally native market 18 structure. Thank you. 19 MR. HOLLEY: Mike. 20 MR. TREACY: So Apex as a platform company, it 21 is our job to provide access to whatever comes to 22 market. And agnostic of what we think about the product 23 itself, and when I think about tokenization, I view it 24 as just another form of synthetic risk on another asset. 25 And again, I think we need to walk before we	Page 228 1 financing. 2 And so the question over tokenization, who has 3 title to those assets, what do you have the ability to 4 do with those, I think is one that needs to be answered 5 from a variety of different perspectives. And what does 6 that mean? From execution all the way through to 7 clearing, how does it mean how a clearing firm interacts 8 with a clearinghouse? How do you think about the assets 9 that you have recourse to? 10 And then to that point, I also think it 11 changes the risk composition potentially of the 12 clearinghouses that are accepting these types of 13 instruments as collateral. Does it change the way we 14 think about non-default losses and how you capitalize 15 for some of the incremental risks that the ecosystem may 16 be taking on? 17 So I think in that kind of, you know, crawl, 18 walk, run, those are some of the things that we really 19 need to think about as an ecosystem. 20 MR. BOLKOVIC: And I think I want to highlight 21 like the purpose, obviously, at OCC for any of those 22 assets are mostly important for an event such as 23 default, and default management. Which means that there 24 can't be a question about ownership or title. There 25 can't be a question about convertibility and the value
Page 227 1 run. I think at the OCC, if I own 100 shares of Nvidia 2 tokenized and I go and I sell an upside call, I think to 3 start out, that position should be considered holding a 4 naked call, or some pro rata share of risk. 5 I think we need to consider what's happened in 6 the past when we've had synthetic risk in the market. 7 And when prices detach from parity. And what happens is 8 we typically see liquidity events. 9 I'm not saying that's going to happen with 10 tokenization. I just think it's something we need to 11 watch. I also think that we need to watch the leverage 12 that we're extending. Right? 13 In the crypto industry, you read about 10x 14 leverage on various crypto assets. I think in the 15 equity space, as we tokenize, I don't believe the 16 intention is to allow leverage to start. But I think 17 that we should all, you know, maximum 2x, 3x. 18 MS. CRIGHTON: If I can just add just on that? 19 I think, Matt, you raised a valid point earlier -- among 20 many, of course -- about how do we think about the 21 ownership of that asset. Right? So much of what 22 happens across the industry is done on a net basis. 23 Right? There's a significant amount of financing that's 24 provided that's not done by kind of moving things in 25 sequence. It's done based on, you know, providing	Page 229 1 of it. 2 So that's why I also mentioned that, you know, 3 while we look at innovation and see how this could 4 potentially help the market in terms of efficiency, it 5 will have to be the crawl, walk, run approach. 6 MR. HOLLEY: Thank you. Now we'll park the 7 clouds of gloom and doom and talk about something more 8 fun, which is opportunities for growth. 9 So earlier, I asked you what keeps you up at 10 night. Now I'll ask you what gets you out of bed in the 11 morning as a promising new prospect. We can start with 12 Alicia. 13 MS. CRIGHTON: Great. Thank you. 14 Yeah, it's nice to switch from the kind of 15 like dark clouds. 16 Look, I think the ability to innovate, even 17 having the opportunity to have a conversation like this 18 where we're talking about the ecosystem as a whole and 19 we're raising concerns about what does it mean to be a 20 clearing broker, what does it mean to be a clearinghouse 21 and how do all these pieces come together, the ability 22 to innovate and figure out solutions as a group, I feel 23 like the opportunity to do that here and hopefully going 24 forward is exciting. And that is a good reason to think 25 about wanting to continue and kind of, you know, be a

Page 230 1 part of this ecosystem. 2 Certainly capital tailwinds, I think that goes 3 a long way in terms of helping us think about 4 innovating, providing more capacity and more resources 5 to help facilitate client growth. And certainly market 6 structure reform, you know, with some of the items that 7 we've talked about as it relates to maybe changes in the 8 60/40 rules. Those types of things, allowing us to 9 service our clients in the way that they want to be 10 serviced, allowing us to innovate and do more, that's 11 all really exciting. So those are some of the reasons. 12 And it's an equally long list, is what worries me. 13 MR. HOLLEY: Thank you. Kevin. 14 MR. KENNEDY: Good. Because at heart, I'm an 15 optimist. But we're also paid to worry, so I worry. 16 But always on, to us at Nasdaq, extremely 17 exciting. Like we want to trade 24 hours a day. 18 Starting in equities with 23/5, we'll be ready in 19 December. We are just so excited. And I'm as excited 20 if not more excited to do it in options as well. 21 However, I just think it needs to be measured and 22 deliberate. And not forever. 23 I would just love to have the Commission step 24 in and say, guys, get this done by X. Understand when 25 day orders are ending, understand when there's an	Page 232 1 move this market forward. 2 And I think an area that's been touched upon 3 is extended hours. Clearly there is a lot of 4 coordination going on on the equity side. And as we 5 look at options, it is really a natural evolution of our 6 broader market for this to move forward. 7 But when we do look at the equity markets, I 8 think they are doing it in a really mature way, in that 9 they are coordinating the readiness of the SIP, the TRF, 10 and clearing. And all of those requirements need to be 11 in place before we can move forward. Options is going 12 to follow. But I think as folks know, they're 13 fundamentally different. 14 We've talked about role of market makers 15 today. Very competitive. Quoting millions of listed 16 series. Liquidity fragmented across exchanges, across 17 strikes, expiries. So extending hours means scaling 18 pricing, risk management, and liquidity provision across 19 that entire surface. 20 From a market quality perspective, extended 21 hours can introduce different trading conditions, 22 particularly in thinner underlying markets. That can 23 lead to wider spreads, less stable pricing, and 24 differences in execution quality, even as quoting 25 obligations remain the same.
Page 231 1 opening cross, understanding the playbook if something 2 goes wrong, understanding OBSR and what those rules are. 3 Are they different? Does that change the timeline of 4 catastrophic, which catastrophic, as we all know, means 5 the different time notification. 6 So super excited about -- thrilled about 7 always on. I just want to do that in the right way. 8 More zero DTE, even with all the comments that 9 we had, I -- make sure we continue to do that. 10 And just an interesting fact, because I look 11 at this all the time. So the top 55 days in history of 12 U.S. options, equity options trading have all occurred 13 in the last 15 months. Like that's an incredible 14 number. Fifty-five. Like as of the end of Q1. I 15 actually think it's now 56, because I think yesterday 16 was one of those top 55. 17 But with zero DTE, with extended hours, with 18 everything else we talked about, there is so much to 19 look forward to. 20 MR. HOLLEY: Ellen. 21 MS. GREENE: Yeah, I would concur. I mean, 22 there definitely is -- we have a very vibrant ecosystem 23 in the options market. Clearly, just demonstrated by 24 today's event, we have so many interested parties 25 regardless where you're sitting here. We all want to	Page 233 1 There are also practical considerations. For 2 example, the opening rotation still needs to occur 3 within a very tight window, one minute. But at 7:30 in 4 the morning, that's going to be very, very different 5 liquidity conditions. 6 Separately, the suitability of extended hours 7 will vary across products. Broad-based products are 8 more naturally suited, while single names introduce 9 additional challenges, particularly around news events 10 and event risk. As hours expand, they may also broaden 11 participation across time zones, including international 12 investors, as we touched on today. 13 So the question isn't really whether to expand 14 hours. It's really how to do so. And again, taking a 15 lesson from the equity markets, that coordination, 16 linkage, harmonization across the ecosystem will be 17 important. So we build on the current market structure 18 rather than fragment it, I think another topic we've 19 heard today. 20 We've seen this work most recently in zero day 21 to expiration. We started that in broad-based ETFs 22 where liquidity and price formation are most robust, and 23 then expanding to a limited number of single name equity 24 options over time, as we've been discussing. And 25 clearly, there's a lot of caution about moving forward

Page 234 1 with that. 2 We think a similar sequencing should occur in 3 equities, where extended night trading was eventually 4 first introduced in a limited set of highly liquid ETFs 5 before expanding more broadly to individual stocks. 6 That sequencing provided a stable environment to observe 7 how these products function over time and different 8 conditions. 9 Today, we already have a limited number of 10 ETFs that trade in extended hours until 4:15. This 11 seems to present a very natural starting point. 12 Expanding first within these products before moving to 13 single name supports more robust liquidity formation, 14 price formation, and a consistent customer experience as 15 trading hours evolve. 16 MR. HOLLEY: Thank you. 17 Faris. 18 MR. MATALKA: So I kind of lost track of the 19 question. I think it was -- 20 MR. HOLLEY: What gets you up? 21 MR. MATALKA: What gets me up? So I think I 22 look at the growth, the bullish growth from a retail 23 perspective. It's fascinating to see new accounts 24 adopting options. We track, you know, the time from an 25 account open to putting on a first option trade, that --	Page 236 1 getting a consensus from the exchange. But I don't 2 think we can rely on Katie's charm for another two 3 years. I think there has to be a framework that really 4 ensures that if Cboe deems a GTH or a 4:00 to 4:14 a 5 regular trading session versus another exchange as a 6 curb session, for example, that creates a lot of 7 complexity for the order types that we provide to our 8 clients. Because everything is predicated on the day, 9 time enforced. I think the definition of day would need 10 to be evolved. But I'm very bullish on options trading 11 for years to come. And it's an exciting time. 12 MR. HOLLEY: Thank you. 13 Andrej. 14 MR. BOLKOVIC: My job is obviously to worry 15 about things, so I might not be as excited as everyone 16 else. I am excited about innovation, and some of the 17 problems that we will be able to solve. If I think 18 about even the more simple things, you know, we kind of 19 sometimes talk about things that are going to happen in 20 the next couple of years. We're excited about, you 21 know, the potential of tokenization. Yet we also still 22 have limitations today where on exchange trading days we 23 have banking holidays, and then we collect margin up 24 front to prefund that gap. 25 So we're kind of like, you know, talking still
Page 235 1 those are now in days. It used to be weeks or months. 2 You could see and you can feel from the 3 education interaction that a lot of interest is in 4 options. And like I mentioned in the -- in my opening 5 statement, we are seeing younger investors trading 6 options, utilizing options, and not just speculative 7 onshore dated options, but using it to hedge portfolio 8 and use it for yield, with all the education that we 9 provide. 10 So I think naturally with this growth and the 11 innovation of new products that are coming to market, I 12 think it's going to be -- it's a natural evolution to be 13 always on. And I think that's something that we're 14 already offering equities overnight. I think it's a 15 matter of time where options and equities will intersect 16 overnight. I think it's more complex, obviously, to 17 price options overnight and all the corporate action and 18 the complexity. But I think we will get there. 19 And I think the starting point with the Cboe 20 announcing the GTH expansion, I think that's going to be 21 meaningful and very useful, even just from a trading 22 perspective, but from a risk management perspective. 23 I do think, to Ellen's point, I think a 24 coordination between the exchanges is really crucial 25 here. And I think SIFMA does a great job, you know,	Page 237 1 in two different worlds that we will hopefully be 2 resolving. So I do get excited about those future 3 possibilities. 4 So our view, and we've heard from a couple of 5 panelists as well, and we work closely with the 6 exchanges and our members, but that the -- you know, the 7 direction of continuous trading is inevitable. But the 8 sequencing matters enormously. 9 Options present unique structural 10 considerations that equities do not. Options pricing 11 depends on continuous reliable reference price for the 12 underlying. And when the underlying markets are open 13 and liquid, pricing models function as intended. And 14 when equity trading trades thin overnight, the 15 reliability of that underlying reference degrades and 16 with it the integrity of option pricing. The ability of 17 market makers to manage their books depends on a 18 functioning underlying market and not just one that's 19 technically open. 20 Expiration mechanics, margin calls, and end- 21 of-day settlement processes are all built around defined 22 market close times. And extending or eliminating those 23 windows requires rethinking of the entire infrastructure 24 at the clearinghouse level, at the clearing broker's 25 level, and at the exchanges.

Page 238 1 So this is not an argument against change. It 2 is an argument about what we heard before about doing 3 the work carefully before committing to a timeline as 4 was suggested. The right approach is a deliberate and 5 phased one. And I think the approach to start off with 6 limited extended trading hours around known high-demand 7 windows with clear metrics will enable us to do so. 8 I think beyond just going -- the internal 9 coordination, we would welcome the Commission's 10 engagement in building that roadmap with the industry. 11 But not just in isolation form, as an options industry, 12 but actually in coordination with the equity industry. 13 Because the decisions that we make on either side 14 influence one another. 15 MR. HOLLEY: Thank you. 16 Dmitriy. 17 MR. MURAVYEV: Well, I'm very excited for the 18 option market. I think the future is very bright. I 19 never expected the option market to be so big. For 20 example, if we take the notional equity option volume 21 and divide it by the stock volume, it's between 30 and 22 40 percent. So this is just huge. And I expect to see 23 more growth, especially from shorter maturity. 24 I think the weekly option on individual names 25 will be introduced, and then eventually the zero DTE	Page 240 1 for some ETF representation. You know, a lot of the 2 growth is occurring in those outcome ETFs. They require 3 options to deliver the investment desire of the 4 investor. So things to be bullish about. 5 MR. HOLLEY: Shelly. 6 MR. BROWN: Thank you. A few things to 7 consider. 8 As an exchange, we're in a unique situation 9 that we facilitate trading. And we facilitate trading 10 by allowing the market makers to be more aggressive in 11 posting their quotes. It's not for the exchanges or the 12 clearinghouses to impose new risk on the market makers 13 or the market in general. 14 I think we need to think long and hard about 15 extended trading hours. There's probably very few 16 people in this room aside from myself and a couple of 17 people who remember we used to trade equity options 18 until 4:10 every afternoon, and we backed off at some 19 point, 4:00. That was a long time ago. 20 But as we talk about extended trading hours, I 21 think there's a significant flaw in the Cboe proposal. 22 The majority of obvious errors occur around the opening 23 rotation. The Cboe proposal has two opening rotations. 24 You're going to open at 7:00 and you're going to close 25 at 8:25 Central Time, reopen at 8:30. So now we're
Page 239 1 options on individual names. And to me, it seems like 2 the European version is actually very attractive, 3 because it solves the problem with the reference price 4 and the underlying stock. We have a closing option 5 which accounts for more than 10 percent of the 6 underlying equity volume, and it solves so many problems 7 in the market. So I expect the option market to grow. 8 And hopefully, we as academics, with get a little bit 9 more data to work with. 10 MR. HOLLEY: Jim. 11 MR. TOES: Yeah. I think, I mean, ETFs, 12 outcome ETFs, it's a very growing -- it's large now, 13 it's growing now. There are some -- obviously -- I 14 think it's pretty easy kind of like to connect trading 15 venues. But when you start getting into the clearing of 16 some of these products, obviously it is -- there's some 17 complexities around that. You know, ETFs clearing at 18 MSCC and the options that are being held within them. 19 Listen, this is a great product. You know? 20 What it provides as far as liquidity and pricing 21 efficiency to equities, equity markets. If they start 22 doing well, the options market should be doing well on 23 top. 24 But I just would suggest, you know, if you're 25 going to take this conversation further, that you look	Page 241 1 imposing upon the market makers two opening rotations 2 that these specialists have a requirement -- maybe 3 that's another significant reason why they should have 4 carveouts, but we can talk about that -- but two opening 5 rotations, two changes at the opening for obvious 6 errors. So it's imposing risk on the industry. 7 As exchanges, we should be facilitating 8 trading and reducing risk. Things like new risk 9 protections, better technology, better throughput. But 10 let's also talk about quotes. And we talked earlier 11 about quote mitigation and strike mitigation. 12 If we extend trading hours two hours a day, 13 we're six and a half hours now. If it's similar 14 quoting, you're going to see an instantaneous 20 percent 15 increase in those quote graphs. 16 So there's a lot of things to think about. So 17 we really should take our time and think through all the 18 unintended consequences. 19 MR. HOLLEY: Mike. 20 MR. TREACY: I'm excited about the 21 international growth that we're seeing converging with 22 the new products that we're introducing. We're seeing 23 large growth in South America, Asia, and Europe. And 24 the ability for them to access the U.S. market during 25 their normal day, their market hours, providing that

Page 242 1 supply to meet their demand, I think it's great. I 2 think everyone in this room should be proud that we have 3 such large demand for U.S. equities, U.S. stocks, U.S. 4 options from international clients. And that's only 5 going to grow. 6 MR. MacKENZIE: I feel like I should say 7 something, so you don't get the impression that I get up 8 depressed every day. 9 I would just say as the policy person, I'm 10 very encouraged by the dialogue and all the work and 11 engagement that has come from the SEC's direction to the 12 industry on these issues. I mean, the first public 13 roundtable in more than 20 years is a great sign. And 14 the issues or problems or, you know, idiosyncrasies that 15 we've identified today are probably not, you know, the 16 end of the story. There will continue to be those 17 problems or issues. 18 And to quote, you know, an iconic member of 19 another dream team, just substitute Angola for problems 20 when you hear, "I don't know anything about Angola, but 21 they're in trouble." That's Charles Barkley, by the 22 way. 23 MR. HOLLEY: All right, before we move to our 24 final question of the day, I want to quickly acknowledge 25 the contributions of Arissa Ketty (phonetic), Joanne	Page 244 1 use to improve options market structure. So that 2 options market structure depends very much on your frame 3 of reference. 4 So I am going to take off my MIAX hat and put 5 on my market maker hat. I'd like to see a trading 6 floor. I'd like to know what I know today. Single 7 listed equities trades in eighths and quarters. And my 8 acronym is BRN. 9 (Laughter.) 10 MR. HOLLEY: That's an old-school genie. 11 Alicia. 12 MS. CRIGHTON: Thanks. I would like to say 13 let's follow the risk, follow the funding, and make sure 14 when you go through that whole chain we have the right 15 guard rails and protections built in for each of these 16 components. That way, the system can continue to grow 17 in a healthy, resilient, and sustained way. 18 MR. HOLLEY: Ellen. 19 MS. GREENE: So as we've discussed, we've 20 created a market structure that incentivizes 21 competition, lowers barriers to entry, and delivers an 22 unparalleled experience for retail investors. In many 23 respects, that model is working. Many would say we've 24 already captured that genie. But there is always room 25 for improvement.
Page 243 1 Kim, other TM staff, Facilities and Security, the 2 security group to help make today possible. 3 So our last question, we will do kind of a 4 lightning round, go through everybody in the last couple 5 minutes we have left. And this one is inspired by the 6 poeticism of the LOMSWG acronym. So I give you CAMSG, 7 which is the congressionally appointed market structure 8 genie. 9 If the omnipotent CAMSG granted you one wish 10 that you could only use to improve options market 11 structure, what would you change and, very briefly, what 12 effect would your change have on investors. 13 So let's start closest to me, Andrej. 14 MR. BOLKOVIC: If I were granted a wish by the 15 genie, I would like to see a framework that continues 16 and further evolves the support obviously of central 17 clearing, because it will truly recognize the benefit 18 that it brings. And the way that it helps support our 19 industry and growth of the industry as we heard today 20 over the last 53 years, and then in my view also for the 21 growth that we have projected and the exciting things 22 that we've heard today. 23 MR. HOLLEY: Shelly. 24 MR. BROWN: So I looked at this question a 25 slightly different way, as I read it. You could only	Page 245 1 In a fragmented market with 18 exchanges, it's 2 important that we continue to promote clarity, 3 consistency of approach, and a level playing field so 4 all participants can compete fairly. 5 MR. KENNEDY: I'm a little disappointed in 6 Shelly, because I thought he was going to say, as a 7 former trader like he and I both are, that he was going 8 to wish for three more wishes. Which is what I would 9 have done, Richard, but you qualified it and said it had 10 to be for market structure. 11 So my wish, honestly, will come across a 12 little bit self-serving, but I need to explain it. So 13 there's something called QBTC, which is Q for Nasdaq, 14 BTC. It's going to be, hopefully, our Nasdaq index 15 listed options QBTC. 16 Your team has done incredible work trying to 17 get this approved, working with the CFTC. So if the 18 genie came out of the bottle, I'd say can we get that 19 done? 20 And not just because I want it for my index 21 suite. But because approval of QBTC would provide a 22 clean, regulated bridge between digital assets and 23 institutional market structure, sending a signal that 24 we're really moving together and we're working together 25 with both regulators. So that's really why I want it

Page 246 1 and that would be my wish. 2 MR. HOLLEY: It's a great wish. It may be 3 posed in the wrong building. 4 MR. KENNEDY: That's why I am very – I made a 5 point to say I am very appreciative of the team here. I 6 really am. 7 MR. MacKENZIE: Well, Kevin stepped on my 8 joke. So the correct answer, whenever a genie is 9 involved, is to wish for more wishes. So appreciate 10 that. 11 I think from our perspective, I'd like to 12 associate our firm with the comments that Steve 13 Crutchfield made this morning around lifetime 14 appointments for specialists. I think a competitive and 15 transparent process on specialist appointment would be 16 my wish from the genie. 17 MR. MATAKA: For me, I think the retail, the 18 market structure is serving the retail investor really 19 well. I mean, I think my wish is attainable. I think 20 maybe a framework to break fraudulent trade. That helps 21 the whole environment and cleanses the system from 22 account takeover. 23 MR. MURAVYEV: Well, Form 605 for options 24 would be great, because it will provide the objective 25 measures with execution quality and keep us academics	Page 248 1 Thank you all and the previous two panels for 2 helping us. Granted, that's important. We mentioned 3 performance measures, I think the division will stand 4 well in her regards. 5 Thank you all for this panel, for the prior 6 two. Thanks to the Commissioners, thanks to the 7 Chairman for his remarks. As Richard said, thanks to 8 the dedicated team at the Division that helped put this 9 together. 10 As the Chairman said, this is an incredibly 11 informative day. I think there are potentially lots of 12 things to do which we will take away. 13 Most importantly though, it's an opportunity 14 for us to see and hear where we might come in and 15 support and help standardize and build on the progress, 16 you know, ORF and other things, where we can help you 17 take the next steps to improve the marketplace. 18 Once again, feel free to comment. Please 19 comment. Comments are already rolling in. Kroeper had 20 the precise file number. I'll just ask you to search on 21 the website for Options Market Structure Roundtable and 22 find it there. 23 So with that, thanks again. This concludes 24 the roundtable. 25 (The roundtable was concluded at 3:21 p.m.)
Page 247 1 busy. 2 MR. TOES: So I had two and they both were 3 covered. Kevin and Alicia. 4 So I guess my wish would be, you know those 5 like fold-up tables that usually come with those chairs? 6 That would be very helpful next time. It's hard to take 7 notes – 8 MR. KENNEDY: Kind of like at a swim meet or 9 something? 10 MR. TOES: Yeah, yeah. 11 MR. TREACY: I don't have a wish for anything 12 today. I have a wish for something that I think could 13 happen in the future and how we as an industry react to 14 it. 15 In the future, if we have some type of 16 volatility event as a result of artificial intelligence 17 or a large language model that causes some havoc on the 18 market, I would ask that we not immediately turn to 19 overregulate and turn something off. I would ask that 20 we examine what went wrong and not pull the rug on this 21 transformative technology that's helping all of us. 22 MR. HOLLEY: Jamie. 23 MR. SELWAY: Those are all wonderful wishes. 24 Back to where we started today, Commissioner Peirce 25 mentioned her wish.	Page 249 1 PROOFREADER'S CERTIFICATE 2 3 In The Matter of: ROUNDTABLE ON OPTIONS MARKET 4 STRUCTURE 5 File Number: OS-0001 6 Date: Thursday, April 16, 2026 7 Location: Washington, D.C. 8 9 This is to certify that I, _____, 10 (the undersigned), do hereby swear and affirm that the 11 attached proceedings before the U.S. Securities and 12 Exchange Commission were held according to the record 13 and that this is the original, complete, true and 14 accurate transcript that has been compared to the 15 reporting or recording accomplished at the hearing. 16 17 _____ 18 (Proofreader's Name) (Date) 19 20 21 22 23 24 25

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I, NATE RIVENESS, reporter, hereby certify that the foregoing transcript of 248 pages is a complete, true and accurate transcript of the testimony indicated, held on April 16, 2026, at Washington, D.C. in the matter of: ROUNDTABLE ON OPTIONS MARKET STRUCTURE.

I further certify that this proceeding was recorded by me, and that the foregoing transcript has been prepared under my direction.

Date: 4/23/26

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