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COMMODITY FUTURES TRADING COMMISSION

TECHNOLOGY
ADVISORY COMMITTEE
(TAC)

10:00 a.m.

Thursday, July 16, 2020

TELECONFERENCE

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CFTC COMMISSIONERS

Chairman Heath Tarbert
Commissioner Brian D. Quintenz (TAC Sponsor)
Commissioner Rostin Behnam
Commissioner Dan Berkovitz

TAC CHAIRMAN

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Eventus Systems, Inc.,

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ICE
Derek Josef Kleinbauer, Vice President, Bloomberg
SEF LLC, and Global Head of Rates and Equities
Electronic Trading, Bloomberg L.P., Bloomberg
Lee Olesky, Cofounder and Chief Executive Officer,
Tradeweb

1 COMMITTEE MEMBERS [Continued]

2 Thomas Chippas, Chief Executive Officer,

3 ErisX

4

5 Jennifer Peve, Managing Director, Head of Solutions

6 Business Development and FinTech Strategy,

7 DTCC

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9 Erik Barry, Head of Client Platform for Prime

10 Derivative Services,

11 Credit Suisse

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13 Christopher Chattaway, Managing Director,

14 Goldman Sachs

15

16 Christopher Hehmeyer, Managing Member,

17 Hehmeyer Trading and Investments

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19 Supurna VedBrat, Global Head of Trading,

20 BlackRock

21

22

1 COMMITTEE MEMBERS [Continued]

2 Jeffrey A. Trahan, Vice President,
3 Pension Fund and Investments,
4 Deere & Company

5

6 Charley Cooper, Managing Director,
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8

9 Timothy McHenry, Vice President,
10 Information Systems, NFA

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12 Haimera Workie, Senior Director for Emerging
13 Regulatory Issues,
14 FINRA

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16 Gary DeWaal, Special Counsel,
17 Katten Muchin Rosenman LLP

18

19 John Lothian, Executive Chairman and CEO,
20 John J. Lothian Co. Inc.

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COMMITTEE MEMBERS [Continued]

Yesha Yadav, Professor of Law,
Vanderbilt University, Special Government Employee
(SGE) for CFTC

Eddie Wen, Global Head of Digital Markets,
JP Morgan Chase

Julie Holzrichter, Chief Operating Officer,
CME

Aaron Wright, Associate Clinical Professor of Law,
Cardoza Law School

Daniel Carrigan, President,
Nasdaq Futures

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1 PROCEEDINGS

2 (10:02 a.m.)

3 MS. TENTE: Good morning, everyone. Welcome to
4 the July TAC meeting. This is Meghan Tente, and as
5 the TAC Designated Federal Officer I would like to
6 call the meeting to order. We are very much looking
7 forward to today's presentation. Before we begin
8 there is some logistical notes related to this meeting
9 being held by teleconference.

10 For TAC members and presenters, as well as
11 Commission participants, please keep your phones muted
12 when you are not speaking. If you would like to be
13 recognized during a discussion message myself or TAC
14 Chair Richard Gorelick via the Webex app and we can
15 connect you to get your questions. Chairman of the
16 TAC, Richard Gorelick, will lead the meeting today.
17 But first TAC Sponsor Commissioner Quintenz will give
18 his opening remarks.

19 COMMISSIONER QUINTENZ: Thank you, Meghan and
20 good morning everybody, welcome to our sixth meeting
21 of the Technology Advisory Committee, or the TAC.

22 Before we begin, as always, I would just like to

1 express my, my deep gratitude to all of the committee
2 and subcommittee members for so generously giving
3 their time and energy and thought, over the last,
4 certainly number of months, but the last number of
5 years in general, but also in preparation for today.
6 And also, especially in light of the challenges
7 presented by preparing and holding this meeting
8 remotely.

9 I'm hopeful that everyone's able to connect and
10 if we have any issues, I think we'll try to work
11 around them as best we can. But as usual we have a
12 lot of ground to cover at the TAC. The TAC
13 subcommittees have prepared very timely presentations
14 for today addressing issues that are really top of
15 mind for the Commission.

16 And for U.S. derivatives market participants,
17 including cybersecurity lessons learned from the
18 COVID-19 pandemic and the remote work environment, a
19 discussion of the Commission's recently proposed rule
20 on electronic trading risk principles, an update on
21 the resiliency and scalability of DLT systems and
22 potential use cases, an overview of central bank

1 digital currencies and their place in the derivatives
2 regulatory landscape, and an analysis of volatility in
3 Bitcoin compared to other asset classes.

4 Our first panel is going to focus on
5 presentations from our Cybersecurity subcommittee.
6 COVID-19 pandemic and the ensuing social distancing
7 efforts, forced the transition of massive complex
8 businesses to 100 percent work-from-home environments.
9 Yet firms, still face the same daunting challenges
10 associated with protecting their confidential, and in
11 some cases highly proprietary, data from cyber theft.
12 To hear more about the important cybersecurity lessons
13 learned from this unprecedented situation, Nina Neer,
14 Director of Technology Operational Risk Management at
15 Credit Suisse, and Jason Harrell, Head of Business and
16 Government Cybersecurity Partnerships at the DTCC,
17 will highlight some of the key differences between the
18 operational challenges presented by COVID-19 and past
19 cyber incidents.

20 Relatedly from a cyber perspective, and not
21 necessarily from a COVID-19 pandemic perspective,
22 we're then going to hear from Jerry Perullo, a Chief

1 Information Security Officer at ICE and Hunter
2 Landrum, Senior Counsel at Two Sigma Investments,
3 about some of the significant risks raised by the
4 collection, concentration, and storage of highly
5 sensitive intellectual property during regulatory
6 examinations, including policies and practices that
7 Commission could adopt to mitigate these risks.

8 I am hopeful that their discussion will dovetail
9 well with the enormously productive and thorough work
10 of my colleague Commissioner Stump, and her Data
11 Protection Initiative. I look forward to continuing
12 to use the TAC expertise to supplement her great
13 efforts.

14 At our prior TAC meeting, the full committee
15 voted in favor of recommending that the CFTC adopt a
16 statement of support for the Financial Services Sector
17 Coordinating Council's cybersecurity profile. I am
18 very pleased to announce that through a unanimous vote
19 of the Commission, the CFTC has adopted language,
20 reflecting the TAC's cybersecurity recommendation.

21 Today, the Commission is officially expressing
22 its support for the use of standardized approaches to

1 assessing cybersecurity preparedness, including the
2 FSSCC Cybersecurity Profile. The statement should be
3 released publicly momentarily.

4 During our second panel, Adam Nunes, Head of
5 Business Development at Hudson River Trading, will
6 lead a discussion on the CFTC's recently proposed rule
7 on electronic trading risk principles. Mr. Nunes will
8 discuss the subcommittee's assessment of the
9 rulemaking's scope, including what constitutes the
10 type of "market disruption" that the proposed rule is
11 designed to prevent, detect, and mitigate. I look
12 forward to hearing the views of TAC members on this
13 rulemaking as well, and I appreciate that the diverse
14 membership of the subcommittee reached a large degree
15 of consensus.

16 During our third panel, we will hear from Shawanna
17 Hoffman, Global Cognitive Legal Leader at IBM, Marc
18 Pryor, the Chief Executive Officer of The Seam, and
19 Yesha Yadav, Professor of Law at Vanderbilt Law
20 School, regarding the use of DLT systems in the
21 derivatives markets. In particular, the panel will
22 examine the challenges associated with developing and

1 implementing DLT systems that are both resilient and
2 scalable, including regulatory considerations
3 involving permissioned versus non-permissioned systems
4 and interoperability. The panel will also highlight
5 the use of asset tokenization to track agricultural
6 commodities and promote sustainable farming.

7 Finally, we will hear two presentations from our
8 Virtual Currencies subcommittee. First, my good
9 friend Dr. Chris Brummer, Georgetown Law Professor and
10 Faculty Director of the Institute of International
11 Economic Law, will present on the design and evolution
12 of central bank digital currency concepts, CBDCs. The
13 various proposals and development of CBDCs has been an
14 area of particular interest to me, given the unique
15 regulatory questions they present under the Commodity
16 Exchange Act as potential fiat currencies or swaps.

17 Dr. Brummer will also describe how widespread
18 adoption of CBDCs could have an impact on the nature
19 of financial intermediation in the derivatives
20 markets. Regardless of the potential for, or lack of,
21 official U.S. government action on its own CBDC, I
22 believe it is important that the CFTC, given its role

1 as a regulator of global derivative products traded on
2 U.S. DCMs or by U.S. customers, stays abreast of legal
3 and regulatory questions in this space.

4 Second, and finally Tom Chippas, Chief Executive
5 Officer of ErisX, has prepared a fascinating
6 presentation comparing the volatility of bitcoin
7 against other assets, such as stocks, both
8 historically, but especially during the recent period
9 of market volatility triggered by Covid-19. Mr.
10 Chippas will also discuss the impact of Covid-19 on
11 asset price correlations.

12 Before I conclude, I just always like to
13 recognize the hard work of Meghan Tente, Jorge
14 Herrada, John Coughlan, Scott Sloan, and Phil Raimondi
15 for their tireless efforts to make this meeting a
16 success. And I would like to express my deep
17 appreciation for Richard Gorelick, the TAC Chair, for
18 his leadership and expertise.

19 Thank you very much and Meghan I'll turn it back
20 to you.

21 MS. TENTE: Thank you Commissioner Quintenz.
22 Chairman Tarbert, do you have opening remarks?

1 CHAIRMAN TARBERT: Yes. Good morning, very
2 brief. And I want to thank you all first for
3 attending the Technology Advisory Committee or TAC
4 meeting via teleconference. I'd especially like to
5 thank Commissioner Quintenz for his leadership and his
6 staff for convening the meeting. I am also grateful
7 to Meghan Tente, the Designated Federal Officer for
8 the TAC, for organizing the meeting. And of course, I
9 must also thank Richard Gorelick for serving as the
10 TAC Chair, and all the TAC members for taking the time
11 to share your valuable perspectives.

12 The mission of the CFTC is to promote the
13 integrity, resilience, and vibrancy of U.S.
14 derivatives markets through sound regulation. But as
15 I have said before, we cannot achieve this mission if
16 we rest on our laurels—particularly in relation to the
17 ever evolving technology that makes our derivatives
18 markets the envy of the world.

19 What is sound regulation today may not be sound
20 regulation tomorrow. So that's why it's so important
21 to have these gatherings of experts and innovators to
22 advise the CFTC on the many technological issues under

1 our purview.

2 So in that vein, I see that we have a packed
3 agenda for today's meeting. As Commissioner Quintenz
4 mentioned from cybersecurity to automated trading to
5 DLT and digital assets. We seem to be covering the
6 waterfront.

7 I'll be particularly interested to hear the
8 feedback from the panel on our proposed rule on
9 electronic trading principles. My view on this is
10 that the current proposal that was voted out last
11 month, provides the flexibility needed to allow
12 electronic trading practices to evolve, while
13 maintaining sound regulation. That's the ultimate
14 goal. So I look forward to hearing this panel's view
15 on the subject, and thank you very much.

16 MS. TENTE: Thank you Chairman Tarbert.
17 Commissioner Behnam.

18 COMMISSIONER BEHNAM: Thanks Meghan. Good
19 morning to everyone, especially TAC members and, as
20 has been said I'd just like to restate our thanks from
21 the Commission, specifically for your participation,
22 volunteering your time and your commitment to this

1 effort. Specifically during these trying times in the
2 past few months we've all been occupied with many new
3 challenges in our life, both at home and in the
4 workplace. So, your continued work and commitment to
5 the advisory committees, and of course, TAC in the
6 context of today's discussion is tremendously valuable
7 and a great help to the Commission.

8 Of course, recognize Commissioner Quintenz and
9 his leadership on the TAC for many years now and
10 bringing up these important issues for the Commission
11 to learn from I do want to recognize Meghan Tente, and
12 of course, Richard Gorelick the Committee Chair.

13 And I certainly look forward to today's
14 discussion as Commissioner Quintenz mentioned, proud
15 personally for the adoption of the cybersecurity
16 recommendations from the Commission and I want to
17 thank the TAC generally, and the subcommittee, itself,
18 for making that recommendation to the Commission, and
19 also think it's important as we continue to discuss
20 all of these important issues from digital currencies,
21 automated trading, and of course, cybersecurity we're
22 seeing the effects of technology in the workplace and

1 at home, growing at an ever growing speed, and the
2 challenges that they bring with them.

3 And even as late as last night, I'm sure we've
4 all seen that the cyber hack that occurred with
5 Twitter and conversations like this, although not
6 directly related or certainly in my view very helpful
7 to sort of broadening the scope of what we need to do
8 I think as policymakers and as market participants to
9 build more resilient systems and to adopt technology
10 because of its efficiencies, and because it really is
11 the future of how we're going to operate from an
12 economic perspective and a business perspective.

13 So very I'm pleased to be a part of today's
14 discussion again thanks everyone for your
15 participation and your time. Thanks for the
16 leadership of all the committees and the
17 subcommittee's and, of course, thanks again to
18 Commissioner Quintenz for his leadership. Thanks
19 Meghan.

20 MS. TENTE: Thanks Commissioner Behnam.
21 Commissioner Berkovitz.

22 COMMISSIONER BERKOVITZ: Thank you Meghan. Thank

1 you, Commissioner Quintenz. Thanks. Rich, Richard
2 Gorelick, and thank you all, TAC members for meeting
3 with us today and updating us on a number of very
4 timely issues.

5 It's absolutely critical in this time, where we
6 are basically sequestered away from the agency, and
7 the normal agency meetings and communications have
8 been significantly altered by the pandemic and the
9 need for social distancing. So meetings like this
10 where we're updated on emerging issues, and trends and
11 market conditions are absolutely critical for us at
12 the Commission to be able to perform our functions
13 properly and ensure that our markets are working
14 properly.

15 So I just want to thank all the TAC members for
16 taking the time to participate today and I also know
17 that a meeting like this requires a lot of time
18 beforehand to make presentations, to get up to speed
19 on all the issues, and to distill it into useful
20 packages of information for us to digest.

21 So I just want to thank everybody involved for
22 the time and effort and these meetings and our

1 advisory committee meetings and the TAC and the others
2 are just absolutely critical for our business. So I
3 want to thank you and I look forward to today's topics
4 and discussions.

5 MS. TENTE: Thank you Commissioner Berkovitz.

6 Now I'll turn the meeting over to Richard
7 Gorelick who will introduce the first panel.

8 CHAIRMAN GORELICK: Thank you Meghan and thank
9 you Commissioner Quintenz, Mr. Chairman,
10 Commissioners, TAC members, subcommittee members, and
11 everyone participating today. I hope that you were
12 all staying healthy and well during these difficult
13 times. I'd like to get the meeting started so we can
14 get to the interesting presentations that we've
15 scheduled. We're going to start with the
16 Cybersecurity Subcommittee where we will have two
17 presentations.

18 The first is about preliminary cybersecurity
19 lessons learned from the COVID-19 pandemic. Nina
20 Neer, the Director of Technology Operational Risk
21 Management at Credit Suisse and Jason Harrell, the
22 Head of Business and Government Cybersecurity

1 Partnerships at the DTCC, will be presenting on
2 preliminary cybersecurity lessons learned from the
3 COVID-19 pandemic.

4 Then we will have a second presentation from
5 Jerry Perullo, the Chief Information Security Officer
6 at ICE and Hunter Landrum, the Government Affairs
7 Litigation and Enforcement Head at Two Sigma
8 Investments. They will be presenting on CFTC
9 collection, concentration, storage, and securing of
10 sensitive information.

11 I think we will go through both presentations
12 first, and then open up for questions and answers for
13 both groups of presenters and with that, I will hand
14 it over to Nina and Jason.

15 MR. HARRELL: Thank you very much. Before I get
16 started I first I want to thank, Commissioner Quintenz
17 for his leadership as a CFTC Commissioner, and for all
18 the work that he's done to support the Technology
19 Advisory Committee.

20 Second, I want to thank Richard Gorelick, and the
21 TAC members, and the supporting staff were able to
22 pull this virtual event together during these

1 difficult times. I understand that this level of
2 effort is way more than just setting up a conference
3 call. And your dedication to making this happen, is
4 commended, and I thank you all for what you've done
5 here.

6 I find it highly appropriate that a COVID lessons
7 learned discussion is the first on today's agenda.
8 The COVID pandemic has placed enormous stress on the
9 families and individuals that we depend on to run our
10 business, drive our economy, support our past times --
11 like sports and entertainment, and to provide a sense
12 of normalcy. These have truly been unusual times.

13 Today, Nina Neer and I are here representing the
14 Cybersecurity Subcommittee to provide you with
15 preliminary lessons learned from the financial
16 services sector, in response to the COVID-19 pandemic.
17 This has been a popular topic for many global
18 supervisors regulators standard setting bodies, just
19 looking to understand the operational resilience of
20 financial institution.

21 I can say based on conversations, both
22 domestically and internationally, that financial

1 institutions have responded well to the pandemic. And
2 that supervisors and financial institutions have been
3 able to sustain operations critical to the financial
4 services sector.

5 In a moment I'll share some of the impacts that
6 financial institutions have observed. My fellow
7 subcommittee member will share actions taken by these
8 institutions to mitigate these impacts and lessons
9 learned by the financial services sector, that will
10 carry forward into the new normal.

11 Before this, we cannot stress enough that while
12 this event did test financial institutions operational
13 resilience, it did not test the entirety of financial
14 institutions cyber resilience. We would be remiss if
15 we did not point out that pandemic scenarios, while
16 certainly impactful, do offer financial institutions
17 with some advantages, when compared to cyber-based
18 incidents for this scenario.

19 Next slide. There we go.

20 So, first we could see the pandemic coming.
21 Response times could be measured in days or weeks, as
22 opposed to a cyber event, which provides response

1 times measured in minutes or hours. This extra time
2 allows for institutions to better plan, and consult
3 prior to deciding a course of action.

4 Secondly, financial institutions were affected in
5 a manner that was symmetrical, and in some ways equal.
6 The pandemic has had a galvanizing effect for the
7 sector, as we are all facing the same set of
8 circumstances. In the event of a material cyber
9 incident, the compromised institutions would be
10 asymmetrically impacted when compared to other
11 financial institutions in the sector.

12 Third, third parties were also affected in a
13 manner that was symmetrical. Financial institutions
14 were not looking to establish relationships with
15 alternate providers or executing exit strategy with
16 third parties, as may occur if that vendor suffered a
17 material cyber event. Given that backdrop, we can
18 move to the impact that financial institutions, large
19 and small, observed during this pandemic.

20 Next slide.

21 For brevity I'll cover only a few points on this
22 slide.

1 First, while financial institution had previously
2 implemented robust and secure remote working
3 environments, they were not designed to support the
4 entire workforce, the need to rapidly move to a new
5 working model drove some institutions to quickly
6 modify existing technology. This move also put
7 pressure on the telecommunications sector, which
8 needed to support financial institutions, by way of
9 bandwidth increases for their networks, and additional
10 network traffic coming from home networks.

11 Second, while the number of phishing attacks was
12 raised slightly. The predominant backdrop of these
13 attacks used COVID as the lure for employees to click
14 on links. For example, we saw, you know, COVID heat
15 maps, donation sites, First Responder support, and
16 health and safety information being some of the key
17 lures for employees to click.

18 The change in the working environment and
19 work/life balance left some employees overstretched
20 and more susceptible to the attacks.

21 Third, the dependence on supply chains outside of
22 national borders. Countries approached the management

1 of the pandemic in different manners. Financial
2 Institutions had to review their remote working
3 policies and their ability to have continuity of
4 service in the face of decisions that were made by
5 numerous countries, which takes careful coordination
6 and understanding of the pandemic impact in these
7 countries.

8 Fourth, and the last thing I'll cover is more of
9 a human element. And that is work/life balance,
10 especially for families with children. Trying to
11 teach and conduct childcare on top of a rigorous work
12 schedule impacts productivity and the mental well-
13 being of the workforce. At this time, I will pass the
14 floor to Nina who will talk to the actions financial
15 institutions have taken in the face of this pandemic.

16 MS. NEER: Thank you Jason. And thank you, Mr.
17 Chairman, all of the Commissioners, and the Technology
18 Advisory Committee for hosting us here today. If we
19 could move to the next slide please.

20 The next several slides will focus on firms'
21 responses to the amplified risks that Jason described.
22 And as in all things cybersecurity, we really need to

1 think about best practices, encompassing technology,
2 people and process.

3 So if we consider first the technology front, in
4 terms of elevated risk, many firms increased their
5 threat monitoring and/or performed more frequent
6 scanning for vulnerabilities, especially on their
7 internet facing applications. Attackers will be
8 looking for new devices, new applications that may
9 have been adopted quickly in response to this wide
10 scale work-from-home were improperly configured.

11 From a people perspective, firms must continue to
12 remind staff to remain vigilant against increased
13 topical COVID-related phishing attempts that that
14 Jason talked about. Employees are naturally going to
15 be looking for information on this topic. So, in
16 addition to reminding employees about being vigilant,
17 providing accurate information on COVID is another
18 important way that a firm can combat the temptation
19 for employees to click on malicious links.

20 We can also combine that with information on
21 supporting employees' well-being, again, Jason touched
22 on that the very human and real aspect here, and a

1 stressed employee is not at their best, either from a
2 productivity perspective or from a susceptibility
3 perspective to some sort of malicious attempt. If we
4 combined the technology and personal aspect, we also
5 should be providing guidance on secure homeworking
6 setup to employees.

7 Finance in many ways is considered to be a
8 digital business. However, individuals may not all be
9 digitally secure in their home environment.

10 Everyone's setup is going to be unique in their home.
11 But, providing tips on firewall setup, turning off IoT
12 devices, or even just maintaining a clean desk, help
13 prevent inadvertent data leakage.

14 Consider process. Remote working raised the
15 demand in many firms for new processes. Think about
16 the use of new collaboration tools like Zoom,
17 Microsoft Teams, others that you may have encountered.
18 Firms need staffed, but robust framework and process
19 for approving or not, as the case may be, use of these
20 new tools, new use cases on existing tools, and
21 exception to previous prohibitions. For example,
22 printing at home requests.

1 Not only is it important to monitor usage of
2 these tools or other exceptional items, such as
3 printing, but it's really important to take a step
4 back and review those approvals and exceptions, as the
5 new working arrangements settle into a routine. What
6 may have seemed imperative, at a given point in time,
7 may be different when taken holistically.

8 Overall exposure, may not be within a risk -- a
9 firm's risk appetite moving forward, when you put all
10 of that together.

11 Next slide please.

12 Also consider a few other areas of risk and how
13 we responded. Starting with infrastructure and
14 application availability, especially during these
15 times where we saw peaks of high volume and high
16 volatility. Shift to remote working happened very
17 quickly, and at a scale -- as many people before me
18 this morning have mentioned, at a scale never seen
19 before. For many of our firms, most if not all,
20 employees are working remotely.

21 So first and foremost, ensuring capacity for
22 remote working is in place is critical. That's not

1 enough. Firms also needed to consider resiliency,
2 plans for failover. Resilience can be maintained
3 within a region, for example through different data
4 centers or different internet providers. Firms may
5 also build out resilience across regions. There's no
6 single right answer for all firms. But everyone's
7 been thinking about this and responding to it.

8 Don't be afraid to slow down to speed up, it's to
9 the immediate priority around technology change is
10 expanding capacity or resilience, or just general
11 system stability. It's okay to limit non-essential
12 changes during these periods. Change freezes,
13 heightened monitoring of critical applications, all
14 proved to be useful approaches for many firms.

15 And of course, our third parties, your supply
16 chain. They're dealing with much the same risks as
17 all of the financial services firms. Proactive
18 engagement with critical suppliers, is called for to
19 assess their readiness and response, particularly in
20 these uncharted times.

21 Next slide please.

22 And so, response to the elevated risks brought on

1 by the pandemic are very wide ranging, as you can see,
2 these highlight both firm's strengths and
3 opportunities for the long-term. Firms need to
4 consider how to carry these lessons into the future.
5 For example, the COVID pandemic is a very timely
6 reminder of tail-end risk, whether it's cybersecurity,
7 pandemic-related, or combination of both, but this
8 must be considered when assessing risk exposure.

9 Scenarios, hypothetical scenarios are a really
10 useful tool in a firm's toolkit. Many firms have
11 responded really well in these very unique times, but
12 COVID provides ample opportunity to ask yourself,
13 "What if?" This allows firms to consider different
14 aspects of their risk exposure that perhaps they
15 hadn't considered through other types of assessment
16 approaches.

17 Understand what your crown jewels are. Your
18 critical assets systems, third-party data, effective
19 crisis response, it's quite difficult if you don't
20 know what you're protecting. And we touched on
21 process earlier. Think cross functionally about risk
22 decisions, new requirements such as collaboration

1 tools impact technology, cybersecurity, legal, data
2 protection, digital growth, a wide range of angles and
3 a wide range of perspectives is needed in risk
4 decision making to get to the best outcome.

5 And finally, never waste a good crisis. Firms
6 can use this opportunity to assess what it means for
7 their operating model, no firm moves forward without
8 commitment of staff. Firms are thinking about what
9 they've learned during the crisis about this new
10 model, agility in this trying time, and how to manage
11 risk. The world has changed, and these lessons which
12 may be unique in some ways to each firm, can and
13 should be carried forward into the future.

14 Thank you very much for the Committee's attention. We
15 look forward to questions in a few minutes.

16 But first, I will hand over to my colleagues on
17 the Cybersecurity subcommittee, Jerry Perullo and
18 Hunter Landrum for their presentation.

19 MR. PERULLO: Thanks so much. This is Jerry and
20 I'll jump right in, in the interest of time here. So,
21 thank you much to the entire audience for paying
22 attention to this. I think it is a pretty important

1 topic and I know I personally have taken a few
2 opportunities to speak with several of you directly
3 when we had the chance on this very topic. And I
4 think it's great that the TAC saw it worthwhile to get
5 it in front of the agenda.

6 So jumping right into slide two here. Let's just
7 frame the issue a little bit. What this is really
8 about is during the examination process, and I should
9 note that we run seven different entities that are
10 under CFTC system safeguards for example, and they
11 span, or uniquely fit in the exchange vertical, and
12 the clearinghouse vertical.

13 And I've been here at ICE for almost 20 years
14 now, and during that entire period we've been
15 operating under the CFTC. So, and then we have a
16 number of clearinghouses and exchanges under foreign
17 jurisdictions, as well, of course. And I just note
18 that because describing the vantage point, you know, a
19 lot of comparison and seeing the way different
20 regulatory bodies are handling these topics. And what
21 this is really about is during the examination
22 process, you know obviously to properly assess our

1 cybersecurity posture. There's a lot of extremely
2 sensitive data that really should be viewed. So we'll
3 never question the reasons for viewing the data. It
4 almost always makes sense to support the examination
5 process. The real question, the real point that we're
6 bringing up here is that it can be -- can provide
7 quite a bit of jeopardy to take a lot of this
8 documentation and hypersensitive data, if you will,
9 off-site and to burden the Commission, burden the CFTC
10 to protect that data for a number of reasons.

11 And you know in this slide we mentioned critical
12 national economic infrastructure, but obviously any
13 regulated entity is germane here. And so, it's really
14 about, again, not the viewing of the data, or the
15 opining on it, but rather the collection of it with
16 the concentration what we're really focusing on there
17 is that we're having so many regulated entities having
18 their data, all in one place, just makes it a very
19 attractive target for a number of threat actors
20 ranging from financially motivated cyber criminals to
21 nation states.

22 And then the storage and security of it. We all

1 know, protecting our own data. You know, data has
2 legs, it gets copied, it gets neglected. It's very
3 hard, especially when things are retained for a long
4 time on backup tapes in the multiple systems. It's
5 quite a challenge. And we all struggle with resources
6 and the best solution any of these problems is usually
7 to avoid it out right. So, you know, that really
8 brings up the general challenge that we've had and you
9 know when we assess risk, whether it's internally in
10 our own applications or with third parties or anything
11 else.

12 You know, we look for these types of patterns.
13 When it comes to data securing in particular, what is
14 the sensitive data, we immediately come up with things
15 like our penetration test results, right? That can be
16 a roadmap to the vulnerabilities that we have. When
17 we simulate an attack on ourselves, we spend a lot of
18 money and in many cases relaxed defenses, and give
19 extra advantages to the ethical hackers we pay so we
20 can do "what if" scenarios.

21 And when we take all of that, and you know,
22 potentially put it -- expose it to adversaries, it

1 could be catastrophic without a doubt.

2 And then in addition, sometimes requests --
3 supervisor requests go so far as to individual names
4 of user accounts that have access to that can be
5 targeted as well and even email addresses for phishing
6 attacks and that sort of thing. We take all that
7 data, collectively, and that's the type of stuff that
8 we -- I can tell you the Commission, in particular
9 among all of the regulators, has been extremely
10 reasonable and the actual supervisory staff has been
11 very collaborative at least with our organization.
12 And they've been very sympathetic to this, and they
13 have been willing to work with us. Other regulatory
14 bodies, other commissions, not so much.

15 And it's not a geographic thing, I can't tell you
16 that you know one region of the world is going to
17 address the other it really just changes regulator-by-
18 regulator and supervisor-by-supervisor and things
19 change over time. So what we're really after today
20 is, let's really memorialize this healthy practice
21 that we've seen at the Commission and get some
22 guidance in here so we're not just living by the

1 goodwill of a few individuals.

2 So Hunter I'll turn it over to you as we get into
3 slide three.

4 MR. LANDRUM: Yeah, thank you. Thanks Jerry and
5 thank you very much to the Commission for having us
6 today.

7 Jerry, reproduced the issue very well and I think
8 in short the concern is that much of the data being
9 collected including electronic information from
10 entities like Jerry's involving an infrastructure such
11 as system diagrams, vulnerability reports, and
12 penetration tests result, as well as sensitive
13 information related to trading, from CPOs and CPAs,
14 information such as source code on investments,
15 descriptions, and market tactics, would be extremely
16 useful for an adversary planning of cyber attack
17 against the CFTC, the markets that it regulates, its
18 registrants, or someone attempting to profit from the
19 misappropriation of sensitive market-related
20 information.

21 Now these concerns regarding the collection of
22 this sensitive information have been taken up by a

1 variety of United States government oversight groups
2 and the CFTC has dedicated itself. So looking at this
3 issue, as Commissioner Quintenz pointed out,
4 Commissioner Stump's great work on data protections
5 and very informative. Unfortunately, though this
6 concern continues to be buoyed by actual breaches at
7 national regulatory agencies including the SEC.

8 Now we understand this. Jerry says that this
9 information can be useful for regulatory examination
10 purposes. But we believe it can be viewed and
11 accessed on-site where it resides or in other ways
12 where it's not duplicated and removed from secure
13 institutional systems where it resides. Jerry also
14 noted that various national and international
15 regulators have taken different stances towards data
16 collection. Some regulators acknowledge the danger
17 and agree not to collect this information and instead
18 view it in more secure ways.

19 Others insist on collecting it under the cover of
20 regulation or record keeping requirements. But what
21 we've been working with in the U.S., is currently U.S.
22 regulators, such as the CFTC, have no clear policies

1 and procedures to aid them in determining when and how
2 sensitive information is reviewed.

3 So on to the next slide.

4 What rules could come forward to address this
5 concern? We think that to better align the CFTC
6 policies and procedures with its best in class
7 practices regarding the limiting of collection of
8 sensitive information. The CFTC should provide clear,
9 concise, and up-to-date guidance on how the CFTC
10 reviews highly sensitive cybersecurity artifacts and
11 intellectual property in a way that doesn't compound
12 risks. We think that is really what we're calling for
13 here. It's just clear policies and procedures on when
14 and how this information should be accessed, when it
15 should be collected, and how it should be stored when
16 it is collected by the CFTC.

17 So how should we inform that rule? Moving on to
18 the next slide, I'll throw it back to Jerry to start
19 talking about the risk analysis.

20 MR. PERULLO: Thanks Hunter. So I wanted to very
21 briefly introduce this threat objective model because
22 I know it's somewhat bespoke and something that we've

1 created at ICE over the years, but you know with all
2 the different ways to talk about cybersecurity risks
3 in particular. You know, we have threat actors and we
4 have threat vectors, and how somebody can do something
5 and what they might do if things like malware versus
6 nation states. They're not really parallel constructs
7 and we all struggle with that when we do things like
8 trying to present the issue to through governance and
9 really tie a lot of our investments and processes to
10 the big picture.

11 So we've come up with this threat objective model
12 which really focuses on the why, you know, what is the
13 objective of the adversary. And by using that we've
14 been able to really model a finite number of threat
15 objectives and we won't go through them all, but you
16 get the idea of things like that of material nonpublic
17 information that is a threat objectives, to steal it.
18 Extortion, that is a threat objective of things like
19 ransomware. And sabotage is one that we, as a
20 critical infrastructure provider, think about quite a
21 bit.

22 And it's really helpful because it allows us to

1 take something that comes in off the news, something
2 like a PII theft and an Equifax, and immediately slot
3 it into and that happens to be a threat objective, PII
4 theft versus sabotage that we're very concerned with,
5 and that will cause us to really focus on other types
6 of attacks, such as the Sony attack even or something
7 like that.

8 So using that, the way that we handle everything,
9 is we have an inherent risk for each those and then
10 residual risk. And the inherent risk we really use
11 threat intelligence and that's where we start with is
12 this happening in the wild? What does it look like?
13 And that way we can gameplay how would that look, how
14 would that materialize in our own environment.

15 And then the residual risk of course, is after
16 we've taken actions and installed measures and
17 compensating controls and where we land this year, so
18 that we can announce that risk internally and track it
19 and choose if we need to invest more to mitigate it
20 further.

21 So the inherent likelihood and impact of
22 something like the threat objectives that we're really

1 intimating here with this issue. The concentration
2 risk of having this sensitive data in a single spot.
3 You know, the objectives of that can range from a
4 nation state taking it to perform sabotage against a
5 critical infrastructure to extortion even against the
6 entities that are regulated, to even financial fraud
7 because a lot of these types of things would allow
8 someone to get into an organization internally and
9 then all kinds of things can happen.

10 So when we look at the inherent likelihood of
11 those, it's extremely high. And that go straight to
12 the threat intelligence and really the news cycle
13 tells everyone that, you know, nearly every day we
14 hear about everything I just mentioned, just different
15 threat actors that are trying that all the time. So
16 we know there are interested parties, we know they're
17 willing to try really hard even against a single
18 institution to get this type of data. So we can only
19 surmise that if they could go to one institution and
20 get data on many regulated entities, it will be
21 extremely attractive.

22 The inherent impact, I think we get quick

1 agreement on that, that it would be pretty
2 catastrophic if that type of thing was able to occur
3 and that adversary was able to use that to actually
4 shut down critical Infrastructure, no less steal data,
5 or anything like that. That's the inherent side.

6 Now on the residual side, that's where you know
7 internally we look at our controls. So when we look
8 at the residual impact, that's where internally we
9 look at things like segmentation. All right, we can
10 lower its residual impact if we can keep data in
11 separate pockets or something like that so if somebody
12 were to get in and access one bit, they wouldn't have
13 access to others. So things like our subsidiaries and
14 our different clearinghouses and how we divide those,
15 we do that to lower residual impact.

16 So, concentration risk and getting it all into
17 one entity and into the Commission, it clearly, you
18 know, goes against that. So we don't see a strong way
19 to really, you know, update that impact, but on the
20 likelihood that's where really, we get into the weeds
21 on our how do we protect this data and whether it's
22 encrypted and access controlled, and on and on. And

1 that's where I harken back to the, noting that we see
2 the challenges even in our relatively well-resourced
3 groups. And I know, you know, having spoken to your
4 staff many times that you, that's a constant struggle,
5 of course, and it only makes sense.

6 And again, it's a problem better avoided, full
7 stop, if possible. So I'd rather -- I mentioned this,
8 that we see with some regulatory bodies we run into
9 the idea of "Well, we'll get more attestations" or
10 "We'll make more of an investment and then that'll
11 solve this problem." And I really like to focus on
12 the concept of avoiding the problem outright because
13 it is extremely difficult, even for a well-resourced
14 organization, and even more so for the Commission.

15 MR. LANDRUM: Thanks Jerry. And I think I would
16 note that, you know, against the backdrop of limited
17 budgets available to protect resources and the high
18 level of targeting attracted by the concentration of
19 data at a regulatory agency, we think it's important
20 that the CFTC, both reduce the amount of information
21 it collects, and also shifts the burden of retention
22 on to market participants. Like I said that divide

1 the information into more places that reduces budget
2 demands on the CFTC and we think it provides a safer
3 environment, you know, for market participants and
4 infrastructure providers.

5 That moves us on to the next slide.

6 MR. PERULLO: So that brings us to the conclusion
7 slide here, and we're really -- what we're really
8 asking for and prevailing upon you for is policy and
9 procedure to, you know, allow regulated institutions
10 to rely on the CFTC to pursue less invasive tactics
11 for certain data -- and we have some wording but, you
12 know, we're open to feedback on that of course to
13 really define and ring fence that specific type of
14 data -- where an on-site review is a reasonable
15 substitute.

16 For example, in our case, you know, we were
17 willing and have made things available in DC and I
18 think that in major financial cities, that's
19 reasonable to expect in a regulated entity. I don't
20 think it would work well for an entity to say you have
21 to fly to Kansas City to do everything, every time.
22 But of all the, and we've run a number of groups where

1 we speak with all of the major clearinghouses and
2 exchanges in the US and abroad, and I've never seen
3 any pushback on that. You know, we've always had
4 government affairs offices in DC at a minimum.

5 And then, you know, what this can run into and
6 what can really cause a problem from the goodwill that
7 we have today would be a different interpretation on
8 things like record keeping and work paper retention
9 requirements. So to get ahead of that we're
10 specifically asking for relief from those to be
11 spelled out. In other words, yes you should normally
12 take all the notes, I mean all the work papers that
13 you have and everything that underpins all your
14 conclusions.

15 But where information is in this category that we
16 are spelling out, it is reasonable to have redacted
17 note taking, to really show the calculus and the
18 thought process from the supervisory staff, without
19 lifting out all of the vulnerabilities and potential,
20 you know, jeopardizing information in detail.

21 So that brings us to the end of our conclusion,
22 and I'll hand it back because I know we have a pretty

1 broad swath of Q and A.

2 CHAIRMAN GORELICK: Thank you very much. Thanks
3 Jerry, Hunter, Jason, and Nina. I now ask the
4 Committee, the Commissioners, if there are any
5 questions related to these panels -- to these
6 presentations. If you have questions feel free to
7 message me by the WebEx and I will call on you. In
8 the meantime, I'll start off with one question from
9 the first presentation.

10 Nina and Jason I saw that one of your
11 recommendations was to disable IoT devices. I was
12 wondering if you could talk a little bit more about
13 that and what some of the risks might be in a home
14 setting from IoT devices that are not usually found in
15 offices.

16 MS. NEER: Sure.

17 CHAIRMAN GORELICK: So if that's the risk that
18 you're trying to address with that recommendation.

19 MS. NEER: That's exactly right and, you know, in
20 some cases firms are starting to use IoT devices
21 within their firm, but let's talk about it in the home
22 setting. These are tools that can provide great

1 convenience in a home, but they listen. You know they
2 listen to what's being said.

3 Individuals are now regularly on conference calls
4 for their firms. They may be talking about sensitive
5 information, intellectual property, material
6 nonpublic, and other types of confidential sensitive
7 information and, you know, it's very difficult to know
8 as a lay person, how to deal with your IoT device,
9 what they're listening to. Who may be hacking into --
10 and we hope not, but hacking into that device stream,
11 you know, from your home from the internet through
12 your own personal Wi-Fi.

13 And so, it's an avenue that just doesn't exist in
14 the same way as within the firm. So it's all about
15 data leakage, external data leakage, and Jason I
16 welcome you to add any comment on that.

17 MR. HARRELL: I think that you pretty much
18 covered it I don't see anything additional to add.

19 CHAIRMAN GORELICK: Thank you. And then I've got
20 another question here. What are the practices that
21 financial institutions have in place today that
22 assisted them in responding to the pandemic?

1 MR. HARRELL: So, I'll take that one. I think
2 there's a few things that firms actually have as part
3 of their response that really played a role in helping
4 them during the pandemic. I would say the first one
5 is, you know, tabletop exercises and that is, you
6 know, working through your decision making tree,
7 whether it's with senior and executive management, or
8 whether it's with some of the operational areas and
9 kind of playing out the scenario, during different
10 injects that would take twists and turns as you learn
11 more information, so it simulates a real event.

12 Forced absenteeism, which is the practice of
13 having individuals who may play a key role in the
14 response, not being able to participate in the
15 tabletop, which forces secondary and tertiary
16 employees to step in and be able to fill those shoes,
17 and that decreases some of the operational friction
18 that may occur during an event because it closely
19 simulates that individuals may not be available when
20 you need them to be in these types of events.

21 And then I'll just touch on one more, you know,
22 more from a business side is, you know, some of the

1 things we do around liquidity modeling and making sure
2 that the markets continue to function in an orderly
3 manner, you know, by going through some of those risk
4 models and as seeing how different impacts to
5 liquidity could materialize that also prepares us to
6 as CFTC to be able to respond and keep a fair and
7 orderly market place.

8 CHAIRMAN GORELICK: Okay, thank you, Jason. Are
9 there any more questions for these panelists?

10 (No response.)

11 CHAIRMAN GORELICK: Okay, with that I propose we
12 go into a ten-minute break and we'll resume at 11:05
13 Eastern time with the Automated and Modern Trading
14 Markets subcommittee presentations. Thank you,
15 everybody. Thanks very much to our panelists today
16 and talk to you soon.

17 (Break.)

18 CHAIRMAN GORELICK: (hold music plays) -- Hudson
19 River Trading. Adam will be presenting on behalf of
20 the Automated and Modern Trading Market Subcommittee,
21 an analysis of the CFTC's proposed rules on electronic
22 trading risk principles. And with that, I will hand

1 it over to Adam.

2 MR. NUNES: All right. Thank you Richard, and
3 thanks to the Chairman, Commissioners, and Commission
4 staff for their work on the rulemaking. As many -- or
5 hopefully most of you know, the rulemaking seeks to
6 enhance and ensure the resilience of the futures
7 markets, the U.S. futures markets. So, briefly, the
8 proposed regulations consists of three principles that
9 will be applicable to DCMs.

10 The first is the implementation of exchange rules
11 applicable to market participants to prevent, detect,
12 and mitigate market disruptions and system anomalies
13 associated with electronic trading. The second
14 principle is the implementation of exchange-based pre-
15 trade risk controls for all electronic orders. And
16 the third principle requires the prompt notification
17 of the Commission by DCMs of any significant
18 disruptions of their electronic trading platforms.

19 The rulemaking rightfully notes that many of
20 these protections are already in place, and I think
21 it's important to recognize that, you know, we are
22 coming at this from a position of strength. But they

1 do provide a framework for oversight and to ensure
2 that these protections are enhanced and continue to
3 evolve as the markets and market participants continue
4 to innovate into the future.

5 The subcommittee broadly supports the rulemaking,
6 and since we didn't have any, you know, particular
7 points on the principles. We decided that it would be
8 best for us to focus on some of the questions that
9 were posed in the rulemaking.

10 You can go to the next slide.

11 So, the first relates to the definition of
12 electronic trading. And we will note that the
13 definition is pretty broad in the proposal. But we
14 believe that for the purposes of the rulemaking, which
15 aims to address the potential risk to a DCM's trading
16 platform of disruption that the differences between a
17 manual order entered into an automated trading system,
18 and a fully automated order as part of an automated
19 trading system pose many of the same risks.

20 So, because these risks, you know, can be, you
21 know, exhibited on the exchange in the same manner.
22 And to be fair, some of the risks associated with them

1 might not even be order entry or cancellation of
2 orders, it could be, you know, just the more nuts and
3 bolts of connecting to the exchange system, and so on
4 and so forth. We believe that the definition, being
5 broad, including manual orders entered into electronic
6 trading systems is appropriate.

7 We did note that the risks of those two can be
8 different. And I think that our view was that the
9 risk-based approach that the principles provided to
10 the DCMs was appropriate and if they viewed it to be
11 the right thing to do, that they could make
12 distinctions within that, but that, you know the broad
13 principles and the broad definition, were, you know,
14 appropriate for the rulemaking.

15 All right, you can go to the next slide.

16 So, this has to do with the use of the term
17 market disruption and kind of see if that was the
18 appropriate term or if there are other terms, you know
19 trading disruptions, trading operations disruption
20 would be more appropriate or more appropriately
21 capture what we were seeking. So, the rulemaking
22 notes of market disruption as an event originating

1 with a market participant that significantly disrupts
2 the operation of the DCM on which the participant is
3 trading or the ability of other market participants to
4 trade on the DCM on which the market participant is
5 trading.

6 So, the first portion of this is pretty clear and
7 is pretty easy to define and perhaps would warrant a
8 different, you know, definition that is more specific.
9 But the latter portion is a bit more amorphous as to
10 how to define it. And given that, we believe that the
11 term market disruption was the appropriate term,
12 because it is a more broad definition. It should
13 sufficiently capture the more broad array of the types
14 of events but the rulemaking notes. So, again we tend
15 to agree with the definition that was used in the
16 rulemaking.

17 The next slide.

18 So this gets to what types of events constitute a
19 market disruption, what type of trading halts. This
20 one we view to be -- it kind of harkens back to the
21 two part definition, one being, you know, a DCM system
22 outage. And then, the other being you know impeding

1 other market participants' ability to trade and
2 discover price. So, I think on the DCM trading system
3 side that should be reasonably clear, I think that
4 there are questions as to what type of scope this
5 issue would fall in. The rulemaking does use the term
6 significant.

7 But, you know, when I think about this, think
8 about, you know, impairing the exchanges matching
9 engine. Impairing, you know, other critical pieces of
10 infrastructure, which are going to depend on the
11 architecture of the exchange but it could be a switch
12 that's used by many market participants, a gateway
13 that's used by many market participants, a load
14 balancer, a sequencer -- just different pieces of the
15 exchange infrastructure that are critical for its
16 function. And most of these I would do as being
17 things that would, you know, generally be
18 characterized as an outage to a meaningful portion of
19 the market participants or the entire exchange.

20 The second type, I think is more difficult to
21 clearly define. The rulemaking does note that this is
22 additive to existing regulations that focus on market

1 disruptions more generally and there are also rules in
2 place for disruptive trading practices. So, to me
3 that raises the question of the scope of the
4 rulemaking and which types of events it is -- that is
5 focused on.

6 So one question is really comes down to, when
7 trading is not halted, but during which participants
8 either can't trade or can't effectively manage risk or
9 engage in price discovery. And, unfortunately, these
10 are somewhat difficult to define ahead of time. I
11 think that it is worth noting that I view that as a
12 positive part of the principles-based approach,
13 because it allows you know it allows the DCMs and the
14 Commission to capture those types of events, based on
15 the principle as opposed to having a list and then
16 there's a market disruption that isn't on the list
17 and, you know, somehow isn't captured.

18 So there are a couple of things that were noted
19 that were viewed as out of scope because they are
20 separately covered. So one thing that was noted, is a
21 limit up or limit down event, you know, may not be a
22 market disruption, you know, to the extent that that

1 is the result of price discovery. It should not be.

2 The rulemaking also notes excessive messaging and
3 this is an example where excessive messaging can be
4 disruptive to other market participants, but it is not
5 necessarily disruptive to other market participants,
6 and certainly as it's currently defined by the DCMs
7 when they are messaging policies.

8 So I think that is, you know, kind of highlights
9 some of the nuance of what is in scope versus out of
10 scope and how it's difficult to put a number on that.

11 So, another area to note is that market
12 participants could have a technical issue, and even
13 submit erroneous orders that could not affect the
14 exchanges trading system or other market participants'
15 ability to trade and manage risk. And there were a
16 couple of events noted in the rulemaking that I can't
17 judge but, you know, perhaps fit into that category
18 where there was an issue with a with a member and that
19 member was fined for the issue, but that might not
20 have reached the level of affecting the exchange's
21 system or affecting other market participants.

22 A couple of other things to note on that front.

1 Participants might submit bona fide orders that cause
2 sudden price movements. And they might, you know,
3 cancel orders, that you know, a market maker may
4 cancel orders that would reduce liquidity. But to the
5 extent that that doesn't cause a market disruption or
6 affect other market participants' ability to trade and
7 manage risk, that seems like something that should be
8 out of scope for the rulemaking.

9 And in fact, you know, on the cancellation of
10 orders that might be a prudent thing to do based on
11 risk controls or internal system issues at the firm.

12 Then, I think. Lastly, I would note that you
13 know the rulemaking, you know, as I said is additive
14 to existing rulemaking and I believe a number of the
15 topics that I raised here are subject to some of the
16 other areas so I don't think that they are going
17 uncovered. I think it really just comes down to
18 thinking about the scope of this rulemaking and where
19 you know where there's overlap, which is the
20 appropriate regulation to apply on the activity.

21 All right, we can go to the next slide.

22 This gets to latency, as a measure of market

1 disruption. And the question is what amount of
2 latency to other market participants should be
3 considered a market disruption. And the
4 subcommittee's, you know, dialogue about this -- we
5 found it very difficult to try to come up with a
6 number that would be appropriate. And I think that
7 there are a few things that go into that.

8 One is latency is an actual property of these
9 trading systems, and when they're under more load, it
10 goes up is generally the case that load comes from,
11 you know, many market participants during a period of
12 high market activity. So in that instance a higher
13 latency number might be fully appropriate. If it were
14 during a period of lower market activity and was
15 caused by perhaps a single market participant, then
16 that might be sufficient to consider disruption.

17 I don't have a number that I would say it would
18 be appropriate there, but we found it very difficult
19 to pick a number there.

20 The other observation is whenever you pick a
21 number, the world moves on, and that number is going
22 to change. And, you know, I used to work at an

1 equities exchange and I remember when we got to 20
2 milliseconds, thinking we were done. And today, those
3 response times are measured in microseconds.

4 So, I think that we should be cautious of that,
5 and also be cautious of the fact that it's really
6 latency conditioned on market conditions and
7 conditioned on, you know, at what point, that's just
8 higher latency and at what point that disrupts other
9 market participants ability to trade and manage risk
10 or, you know, disrupts the exchanges ability to
11 operate.

12 All right. Next slide.

13 This question came down to what extent the DCMs
14 should be permitted to differ in what rules that
15 establish to prevent, detect, and mitigate market
16 disruptions and system anomalies. So, the
17 subcommittee's view was generally that we anticipate
18 that a number of the procedures and rules adopted by
19 the DCMs will be similar or the same. However,
20 permitting and providing for that flexibility, we
21 think is important for a couple of reasons.

22 First, we want the DCMs to establish the

1 appropriate rules that are relevant for their trading
2 system and their trading architecture, and we
3 recognize that those could be different enough to call
4 for different rules, and it should allow them to have
5 rules that are more effective for their trading
6 systems. And then the second part is that permitting
7 that innovation will over time, you know, improve best
8 practices as we see exchanges innovate and come up
9 with, you know, new ways to ensure resilience. That's
10 something that, you know, the market will see and
11 other exchanges could adopt in the future.

12 So we view that as being, you know, the
13 rulemaking does provide for that. We view that as
14 being a critical aspect of the rulemaking that that
15 will allow evolution.

16 So those were the questions that the subcommittee
17 determined to address. So, at this point, I think we
18 can take questions we have a few other members of the
19 subcommittee, that are part of the full TAC who I hope
20 are going to join me and answering questions.

21 CHAIRMAN GORELICK: Thank you, Adam. If there
22 are any members or Commissioners on the call who would

1 like to ask questions at this point, please direct
2 them to me. And I will be happy to relay them off to
3 the group and would address people to ask those
4 questions.

5 Okay, so let me, maybe I'll start off with a
6 question here. You know, one thing that struck me as
7 I was reading the rule proposal and was listening to
8 your presentation here is how do you determine if
9 something is unusual enough to be labeled disruption.
10 I know the subcommittee talked about it and thought
11 that latency measures were not the appropriate way to
12 do it.

13 Do you have any thoughts for the Commission and
14 for the exchanges will be coming in their own rules
15 here, how to identify what the market condition or
16 behavior unusual enough to be considered disruption?

17 MR. NUNES: Yeah, I think the thing that I would
18 start with is that, I believe most nearly all of the
19 issues that would meet this threshold will actually be
20 in the first part of the definition that effectively
21 refers to an exchange system outage of significant
22 scale.

1 So, from my experience. And in fact, a couple,
2 at least one of these was referenced in the
3 rulemaking. There aren't that many things that
4 happen, you know, in the market, from a single
5 participant that you know really inhibits other market
6 participants ability to trade effectively and manage
7 risk. And I don't have the answer, but you know, one
8 of the things that was referenced in the rulemaking
9 was the just, you know, high degree of messaging in
10 the Eurodollar futures complex. It was about a year
11 ago, a little bit less. And that led to a much higher
12 degree of messaging. I don't believe that really
13 affected the system latency in a way that was
14 meaningful.

15 You know, and I feel like that kind of gives an
16 example where I don't know which way the world should
17 fall on that. I think some market participants found
18 it disruptive, because it was a lot of messaging and
19 it was a very different behavior than they had seen
20 before. I believe the activity was at least bona fide
21 and like those were orders that were willing to trade
22 and they had a purpose.

1 I feel like that you know they noted a few things
2 in the rulemaking that borderline, and I think they're
3 useful to examine to say, "Well, which side of the
4 equation does this fall on?" So, I can imagine a
5 circumstance where a single market participant is just
6 sending so much traffic that, you know, like, it's
7 very difficult to get orders acknowledged and you
8 know, trades executed. But I think that's a very
9 extreme example, and I don't know that I've seen that
10 example happen.

11 Now it could be something like if the normal
12 limit order book has, you know, 20,000 open orders and
13 somebody sends a million open orders, even if they do
14 it slowly that might be disruptive to participants or
15 the exchange. But they're, you know, kind of events
16 that we generally don't see. And I think part of the
17 reason we don't really don't see many of those is
18 because, as I referenced we do have pre-trade risk
19 controls. So many of those things that could happen,
20 are already likely prevented.

21 So that was a non-answer, but it's a non-answer
22 because it's rare and, you know, drawing that line is

1 going to be very difficult.

2 CHAIRMAN GORELICK: Okay. Thank you.

3 Commissioner Berkovitz, I understand you have a
4 question.

5 COMMISSIONER BERKOVITZ: Yes, thank you Richard.

6 And thank you for the helpful presentation and my
7 question goes along the lines of exactly what you've
8 just been talking about and this is something that was
9 discussed at the Commission meeting on the proposal.
10 And that's the concept of preventing market
11 disruptions versus preventing significant market
12 disruptions.

13 And if you notice the difficulty in sort of
14 finding what a disruption is and where do you draw the
15 line, what's a significant market disruption, but I'm
16 wondering, why do we need or what is the value of
17 having that qualifier, because if you have the
18 qualifier that says, "Thou shalt prevent significant
19 market disruptions," that almost seems to be
20 permission, that once that it's okay for one trader
21 system or tool or certain trading methodologies or one
22 market participant's behavior -- you can affect other

1 market participants a little bit but don't do it too
2 much.

3 Where is the material -- what's the material
4 disruption versus a non-material disruption, we are
5 going to tolerate some interference but not really too
6 much affects price discovery, I'm wondering if that
7 opens the door to why to we have one market
8 participant being able to affect another market
9 participant the ability to trade or discover prices?

10 Now, it says the standard as proposed -- a
11 proposed rule would say, basically, thou shalt have
12 tools to prevent market disruptions. But then the
13 guidance along that says you have to do put on
14 appropriate controls, that are reasonably designed.

15 So it's not a zero tolerance standard but it says
16 reasonably designed to prevent, it doesn't require 100
17 percent effectiveness, it doesn't require 100 percent
18 zero tolerance, it says reasonably designed is in it.
19 So if you have a standard that says "shall be
20 reasonably designed to prevent," one market
21 participant from interfering with another in any other
22 way, is that workable?

1 I was just wondering why we need this concept of
2 significant versus not significant market disruptions
3 at all and if it's ultimately a reasonably designed
4 standard that's going to govern it?

5 MR. NUNES: That's a great question, and I'll
6 give a response but I would welcome other subcommittee
7 members to chime in if they have anything to add.

8 So, as I thought through that question, many of
9 the things that I came up with that, you know, would
10 be one market participant accepting another, I think,
11 should generally be covered by other provisions. So,
12 you know I've noted that thinking through the scope of
13 what types of things we want to cover here is
14 important.

15 So if one market participant knowingly attempts
16 to impact another market participant, that should
17 generally be covered under anti-fraud provisions, so
18 that you know isn't just a technical blip, that is,
19 you know, like a purposeful activity to affect another
20 market participant.

21 I think that, you know, similarly, there is a
22 disruptive trading practices rule that has to do with,

1 you know, kind of certain trading practices that might
2 disrupt price discovery or you know, induce market
3 participants to trade when they otherwise wouldn't.

4 So, as I thought through the scope of what we
5 were discussing here I think you need to understand
6 when you submit an order or a cancel, you know, or,
7 you know, make any orders and cancels that will affect
8 the performance of the DCM trading system. And, you
9 know, the trading systems are built to manage that
10 order flow. But if you're sending bona fide orders,
11 and, you know, trading, in a fashion that doesn't
12 disrupt other market participants.

13 It just gets to what is disrupt, you know, what
14 does it mean to disrupt? So we could see some
15 behavior that we find to disrupt our approach to
16 trading at my firm, but other market participants
17 might be totally fine with it. And, you know, at that
18 point, we need to adapt and move on because if
19 somebody came up with a new strategy and it fit within
20 the principles, and the rules that were laid out by
21 the by the exchange. So, I think that is, I don't
22 know that I directly answered the question, but I

1 think that, you know, there's some degree to which
2 there should be some threshold because what's
3 disruptive to one firm might be completely legitimate
4 activity and might not disrupt many other firms.

5 So I don't know if I don't know if that --

6 MS. HOLZRICHTER: Yeah, this is Julie
7 Holzrichter. I think generally Adam really gave kind
8 of the broad overview of some of the complexities with
9 scope, but I think he really outlined very clearly
10 that it was really based on the fact that we felt like
11 a lot of the issues that we might encounter are
12 already covered, as he said, under different
13 regulations and different rules.

14 I think when we're talking about the messaging,
15 for example, since that was something that was raised,
16 you know, just from experience that we have with that
17 specific situation. It was interesting because there
18 were certain number of our market participants who
19 maybe were annoyed by it but have very different
20 strategies that they deployed and so didn't
21 necessarily feel impacted by it, their strategies
22 continued to operate as they normally would.

1 So it was more of a, I think, just an annoyance.
2 You know, to paraphrase some of the market
3 participants words, others just found it a little bit
4 more of an issue because of the, you know, consuming
5 the market data, but not necessarily that it didn't
6 allow them to enter orders or manage risk.

7 So I think what we did and what we continue to do
8 and why I think the principle-based approach is so
9 important is that you know we are continuously
10 innovating on our risk mitigation functionality for
11 that we can look at you know behaviors or trading
12 strategies that are developing or evolving. And
13 really, again, put in what I would agree with the
14 Commissioner on, reasonably designed to controls. A
15 reasonable rule to mitigate some types of situations
16 like this.

17 So, with respect to where do you draw the line I
18 do think that's a good conversation and one that we're
19 all having, obviously, as these rules came out. I
20 think we're all doing a little bit of our own
21 analysis, having conversations really trying to
22 understand how we would view.

1 In the messaging policy specifically and the
2 issue that occurred, I just would share with the
3 Commission and with all of the participants on the
4 phone, that there were several different conversations
5 with different market participants with very different
6 views on that. And so, I don't think there's a black
7 and white with some of these and so I do think that
8 further dialogue is appropriate.

9 CHAIRMAN TARBERT: This is Chairman Tarbert. I
10 just wanted to make a quick point. Just a
11 clarification on the proposed risk principles. The
12 proposed principles, do make a distinction between
13 market disruptions and significant market disruptions.
14 But that deals with the reporting. So in other words,
15 the requirement would be if finalized in its current
16 form, that DCMs have systems designed to reasonably
17 prevent and detect, et cetera, market disruptions and
18 system anomalies. Full stop.

19 Now, there's a question as to what's the market
20 disruption as opposed to some kind of smaller
21 disruption. But the significant disruption deals with
22 what is required to be reported to the Commission. So

1 I just wanted to make sure that there's a
2 clarification and distinction, about, you know, the
3 duties that would be required if these rules
4 principles went into effect.

5 CHAIRMAN GORELICK: Thank you very much. And if
6 we have more questions or comments from the TAC
7 members happy to continue with those.

8 In the meantime, I'll take the Chair's
9 prerogative here and ask another question. It's all
10 on the sort of same topic of line drawing. How do you
11 Adam and any other committee members you'd like to
12 chime in, think about the difference between sort of
13 normal -- sometimes messy price discovery and market
14 disruption and sort of who should be making those
15 decisions and distinctions?

16 MR. NUNES: That is a difficult question to
17 answer. So I think that the principles cover that.
18 And that, you know, they're basically putting it on
19 the DCMs to come up with the rulemaking around that.

20 So, I think it, you know, comes down to how broad
21 the issue is, you know the rulemaking noted the call
22 limit up/limit down situation may not be a market

1 disruption. But I think when it says may not be at
2 means but it also could be. So, you know, to the
3 extent that that was the result of, you know, a system
4 anomaly occurring at a single market participant, then
5 that would you know cause a cause a halt. And, you
6 know, cause at least, like a pause in trading and that
7 would limit the other market participants' ability to
8 trade and manage risk.

9 So, you know, from my perspective, that's exactly
10 what the second principle that deals with, you know,
11 risk controls is designed to ensure or to kind of
12 mitigate the potential for that. But I don't have a
13 good -- I don't have a great answer for how you draw
14 some of these lines. And I think that perhaps how
15 these lines are drawn changes over time. As you know,
16 as risk controls improve and things like that. So,
17 sorry, Richard. Maybe somebody else has better
18 thoughts on that.

19 MS. HOLZRICHTER: Hi, Julie again. Yeah,
20 Richard, I think, you know when we look at price
21 movement and price discovery in general, we always
22 look at the balance that we need to make sure we have

1 to allow legitimate price discovery, but also have,
2 you know, various risk tools in place, that really
3 allows market participants to take a breather if they
4 need to take a breather. Because maybe the market is
5 moving, you know, very quickly within a very short
6 duration of time.

7 We have put in place, things like velocity logic
8 and dynamic circuit breakers and price banding and all
9 of those all of those types of functionalities, in
10 order to really, you know, signal to the market that,
11 that there is, you know, activity that's happening,
12 and in all of those controls, they are very
13 transparent so that the market participants really do
14 understand exactly what's happening at each moment of
15 time.

16 What we generally see though is, you know, there
17 are multiple participants that really are in the
18 market during those periods for the most part. If we
19 do see a situation where it appears that a market
20 moved a significant amount in a very short period of
21 time, and it was really as a result of a single market
22 participant and the activity from that single market

1 participant is something that we are curious about, I
2 think those are the types of things that for us, you
3 know, really do cause us to kind of talk about it a
4 little differently look into it a little differently.
5 And I think those are going to be on a case-by-case
6 basis, but the market moving and price discovery
7 happening and those control, you know, being put in
8 place to me that's all part of, you know, price
9 discovery that happens during a normal market event.

10 Unless there's something occurs that would cause
11 us to think about it differently, and again I would
12 just reiterate that that really is on a case-by-case
13 basis.

14 MR. NUNES: And I would just add to that like
15 even my example of a single market participant, you
16 know, being the one that caused the price move that
17 might bona fide. So I think Julie's response to it,
18 you know, that's something that should be looked into,
19 and not just defined is right, you know that could be
20 bona fide orders because they needed a hedge a
21 position or there was news or you know whatever it
22 was.

1 MS. HOLZRICHTER: Absolutely. And Adam, honestly
2 that that is the case, you know, many times when we do
3 look into it further and as they are bona fide,
4 they're looking to exit positions and they're doing it
5 in a very -- what would appear to be a very rigid
6 legitimate way it's just happened to move the market.
7 The market wasn't as liquid at the time. So there was
8 nothing nefarious about it, per se.

9 And again, I think the controls that we have in
10 place, are really there so that other market
11 participants understand what's happening. That's why
12 they're so transparent and people can really, you
13 know, take a second to pause if they need to et
14 cetera.

15 CHAIRMAN GORELICK: Julie, if it's okay I'll
16 direct this question to you. For many years in this
17 committee we've heard various presentations often from
18 your predecessor on the committee, Bryan Durkin, about
19 the various risk controls and processes to avoid
20 market disruption at the CME. Do you see this rule of
21 changing anything significant for the CME?

22 MS. HOLZRICHTER: I think the Commission and the

1 industry have spent so much time really thinking
2 through the different types of controls and measures
3 that we might want to have. I think it's very
4 responsible and prudent that we do it, so I do want to
5 commend the staff and the Commission. We're all
6 incentivized to have the right types of controls in
7 place to have healthy markets, et cetera.

8 So, having said that, I think it allows us to
9 really take a deeper look at what we have in place, to
10 take a deeper look at whether or not we may want to
11 add additional risk mitigation functionality or we may
12 want to tweak some of the functionality we have. And
13 I think that's something that we're looking at, but I
14 will say, for the most part, I'm very, very pleased
15 because I do think a lot of what we were able to
16 achieve with this rulemaking is an acknowledgment of
17 all the work that the industry has done through all of
18 the, you know, best practices that we've discussed in
19 the past.

20 So I think this is additive but I don't think
21 it's going to necessarily require to change how we're
22 doing things drastically. I do think though, it's

1 important for us to focus a little bit more on what we
2 may want to do to further enhance what we have.

3 CHAIRMAN GORELICK: Okay, thank you Julie. Are
4 there anymore questions on this particular topic?

5 (No response.)

6 CHAIRMAN GORELICK: If not, we will take a break
7 now. A lunch break we'll be back at -- let me check
8 here quickly. It looks like Noon Eastern time is when
9 we'll be back so it's a brief lunch break. And we'll
10 be back shortly to hear the next presentation from the
11 Distributed Ledger Technology and Market
12 Infrastructure Subcommittee. Thank you everyone. And
13 we'll be back shortly.

14 (Whereupon, at 11:44 a.m., the Technical Advisory
15 Committee took a luncheon break.)

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A F T E R N O O N S E S S I O N

(12:01 p.m.)

OPERATOR: Thank you for standing by. I'm pleased to announce that Richard Gorelick will now be your host. Thank you.

CHAIRMAN GORELICK: Thank you very much. So, welcome back everyone.

We are now going to have a presentation from the Distributed Ledger Technology and Market Infrastructure Subcommittee. The presentation will be from Shawna Hoffman, the Global Cognitive Legal Leader at IBM. Mark Pryor the CEO of The Seam, LLC, and Yesha Yadav, Professor of Law at Vanderbilt Law School.

And the presentation will be an introduction to resiliency and scalability of DLT systems use cases and regulatory picture. Thank you very much.

MS. HOFFMAN: Thank you so much.

CHAIRMAN GORELICK: Take it away.

MS. HOFFMAN: Wonderful. This is Shawna Hoffman, and we're really excited to have the opportunity to share with you today a little more

1 about scalability and resiliency within the
2 distributed ledger technology.

3 So next slide.

4 Since the outbreak of COVID-19, distribute,
5 distributed ledger technologies are exponentially
6 increasing in popularity and gaining public awareness
7 and corporate engagement.

8 Let's go to the next slide.

9 DLT or shared distributed Ledger's that can
10 securely store digital transactions, without using a
11 central authority. Instead of managing the ledger by
12 a central authority, each individual member holds a
13 copy of the chain and reaches consensus on the ledger.
14 New transactions are linked to prior transactions
15 through cryptography, which makes the DLT networks
16 resilient and secure.

17 Now any changes in a single block would require a
18 computational effort and proof of work for all
19 succeeding blocks. So as a result, a computational
20 minority is outperformed with the computational power
21 of all the other truthful miners, which makes DLT very
22 resilient to malicious attacks.

1 As you can see here resiliency and scalability
2 are critical to the functioning of any DLT system in
3 derivatives. Both values are connected. The more
4 scalable a system, the greater the need for
5 resiliency. Scalability can implicate considerations
6 of system-wide risk and stability, making resiliency a
7 priority in market design.

8 In the early days of their development, the most
9 well known names in the industry: Bitcoin and
10 Ethereum, had a maximum size of their blocks, which
11 was limited in Bitcoin's case to just one megabyte.
12 Now although this mechanism was designed to make
13 Bitcoin more secure. With each transaction comes
14 data, and with a maximum size of one megabyte per
15 block, there's only so many payments that can be
16 processed at once due to the size.

17 Now in order to improve scalability and
18 resiliency, many companies and research teams have
19 proposed differing solutions for example off-chain
20 scaling solutions, ensure that certain transactions
21 are completed, only essential information would be on
22 the DLT.

1 Next slide.

2 So DLT is a digital system of data verification
3 per transaction assets and users. DLT achieves
4 unforgeable and decentralized ledger by applying P2P
5 network cryptography, and consensus mechanism over a
6 distributed network. That is a decentralized network
7 and is automated network. Nodes automatically apply
8 preset verification protocols to ensure that the data
9 is authentic.

10 Potential reason for decentralization use of DLT
11 is improved resilience to faults in a traditional
12 system with respect to cyber attacks Bitcoin, the
13 oldest DLT implementation, has proven to be relatively
14 resilient, when compared to traditional systems.
15 Network nodes rely on consensus to verify data
16 accuracy and authenticity.

17 Now reaching consensus on which blocks to accept
18 as valid in DLT is challenging, consensus algorithms
19 must be resilient to failure of nodes, delayed and
20 corrupt messages, and be able to detect unreliable, or
21 malicious nodes. Now once verified data is
22 cryptographically recorded on the ledger. Data is

1 immutable and impervious to tampering.

2 DLT can clearly benefit system operations,
3 markets, and consumers. DLT is a fast moving area of
4 research and development, continued review though of
5 this emerging technology is required to improve
6 understanding, increase the body of knowledge, and
7 realize potential.

8 So I'd like to take this opportunity to hand off
9 to Mark Pryor to share his insights on market
10 applications within DLT. So Mark. Next one.

11 MR. PRYOR: Thank you Shawna. If you could go
12 to the next slide please.

13 Okay, thank you to the Commissioners and to the
14 TAC and guests. I'm delighted to participate today on
15 asset tokenization in agricultural commodities. So
16 there are many exciting developments underway in
17 agriculture, as well as sustainability and
18 digitization in general.

19 You may have seen just in the past 24 hours some
20 major announcements from big tech aligning and
21 collaborating with agriculture sustainability. All
22 these things have hit the press, so agriculture is

1 certainly in the sights of many and for good reason.

2 Next slide.

3 So the topic of the slides here is asset
4 tokenization, so let's define what a token actually
5 is.

6 So there are several definitions out there but
7 the best one I found is an abstract digital
8 representation of some fact, some claim, or some
9 physical object. So that's the best type of
10 definition that I've seen. It's a visual
11 representation of some value.

12 Next slide please.

13 The tokens can represent physical assets like a
14 bale of cotton, for example, but they can also
15 represent nonphysical assets like a carbon credit. A
16 carbon removal asset as they call them, which
17 typically represent one ton of carbon dioxide removed
18 from the atmosphere. Additionally, another type of
19 nonphysical asset could be a token that represents a
20 certain claim of verifiable, sustainably produced
21 cotton.

22 Next slide.

1 Concept of tokenization is not new. In the
2 agriculture space, we've had bearer bond paper
3 warehouse receipts, that represent ownership of a
4 specific bale of cotton. The owner or the holder of
5 this paper receipt is entitled or was entitled to
6 receive that actual bale of cotton from the warehouse
7 upon presenting the receipt or the token of ownership.

8 In the mid-90s these ownership receipts became
9 much more abstract. Instead of having the paper
10 receipt, you then had an electronic record that
11 determined the ownership and the rights to the
12 underlying commodity. So in cotton in the United
13 States, 15 to 20 million of these records or tokens of
14 ownership are managed in proprietary systems today,
15 the proprietary part is what's changing now, and
16 advancing.

17 Next slide.

18 So there's two primary types of tokens. There
19 are fungible tokens and there are non-fungible tokens.
20 Fungible tokens, as you can imagine, are
21 interchangeable. One token represents -- representing
22 carbon removal for example is the same as any other.

1 one dollar bill can be interchanged with any other
2 physical dollar bill, it's okay. They're fungible.

3 Both commodities fall into this line where
4 fungible tokens work well with that side.

5 Non-fungible tokens are not interchangeable they
6 represent something specific like a unique piece of
7 art, or an identity preserved commodity, like a
8 specific bale of cotton. Now, for those that aren't
9 familiar with cotton, although two bales may be side-
10 by-side and look just alike on the outside, the actual
11 qualities are specific to that bale so you may have
12 one bale with the raw material that is suited for a
13 fine quality dress shirt, whereas the other bale may
14 be the type of quality that works well better with
15 blue jeans. So different qualities, different
16 standards behind it, and therefore different value.

17 Next slide please.

18 There's been much focus on the journey or the
19 provenance of physical commodities for traceability
20 and transparency for some time now. You know, you get
21 it from the farm to the retailer and in the case of
22 cotton we call it from dirt-to-shirt. But now it's

1 getting more important, in fact it's extremely
2 important to the brands and the retailers and the
3 consumers, that the practices used in the production
4 of those raw materials are also part of that
5 provenance story. So there's this need, this desire,
6 this demand in many cases to link the sustainable
7 farming practices to the actual goods along the supply
8 chain. The story is what's important.

9 Next slide please.

10 The Seam has designed and released a new
11 agricultural sustainability platform that science
12 based. It's got online self assessment field-level,
13 field-print analysis for the environmental footprint
14 and more. There's a mass balance chain of custody
15 model built into this as well as identity preservation
16 tracking and management. So the first crop to use the
17 platform is cotton and the National Cotton Council,
18 who represents all U.S. cotton industry segments that
19 includes producers to ginners to warehouseers to
20 merchants, cottonseed cooperatives and manufacturers
21 has recently released the U.S. Cotton Trust Protocol.

22 This is a new voluntary farm-level program to

1 engage U.S. cotton farmers in continuous improvement
2 towards sustainable cotton production. Now the
3 platform manages two types of tokens today. It
4 manages both a fungible token, where you have a token
5 that represents one kilogram of raw cotton, that was
6 verified produced sustainably through the protocol.
7 And then you have non-fungible tokens where you have
8 specific-identity preserved bales that are in the
9 platform and managed as such.

10 Next slide please.

11 We're now developing towards carbon removal
12 assets, carbon credits. We're seeing a lot of news
13 out there as well as you are on various initiatives,
14 like Amazon Climate Pledge Fund, they have a \$2
15 billion fund for advancing initiatives that can
16 address the carbon issue. Microsoft, as well.
17 There's lots of other announcements from big tech and
18 big companies that are committing to carbon
19 neutrality, are committing to being carbon negative.

20 You may have seen some recent bipartisan bills
21 from U.S. senators to tackle climate change through
22 agriculture they have an initiative called the Growing

1 Climate Solutions act. And this is meant to establish
2 U.S.-certified protocols to make it simple for farmers
3 to participate in carbon markets. So there's lots of
4 focus here in carbon credit tokens, and the
5 advancement therein. I think there's a real need for
6 standards as we'll talk about shortly.

7 Next slide please.

8 So in looking at standards in the Ethereum
9 ecosystem. There are several standards for tokens.
10 You had the base ERC-20 standard that has been defined
11 for some time, it's useful for fungible tokens. It
12 would be useful for bulk commodities, but it's for
13 interchangeable representation of those assets.
14 Volume-based claims and certificates.

15 There's the 721-ERC, that is for non-fungible
16 tokens, this would be for representing one-of-a-kind
17 products commodities, identity preserved commodities
18 like a bale of cotton. They have other standards such
19 as the ERC-998, which is a composable token it's kind
20 of interesting in that you have a digital asset that
21 actually owns other assets and the composition makes
22 it more valuable.

1 And then lastly, a fairly new standard for the
2 Ethereum ecosystem is the ERC-1155. This is a multi-
3 token standard. It allows a single deployed contract
4 can include a combination of both fungible and non-
5 fungible tokens, or many other configurations.

6 So these standards are critical and this is
7 specific to the Ethereum ecosystem, but there's other
8 initiatives going on as well. Next slide.

9 And looking at the multi-token standards that are
10 that are out with Ethereum, and if you look at it from
11 a cotton perspective. You have these individual bales
12 that have their own unique identities, and they can be
13 represented by a non-fungible token that we've been
14 talking about. But you put those into a container
15 typically there's about 90 of those. And what you
16 would prefer to do from a technological standpoint is
17 to reference all 90 with one token.

18 So compartmentalize or containerizing the
19 transaction is something that's exciting and I think
20 will provide some efficiencies to the trade, so you
21 can represent all 90 of those with one token, which
22 also allows some batch operations, some efficiencies,

1 and some cost savings in the transaction piece of that
2 so that's an exciting development in a standard that
3 is at answering some real problems.

4 When you think about it, I like to use the
5 analogy. When you go to the grocery store, you've got
6 a basket full of goods in there, you know you've got
7 you go to the dairy aisle, you've gone to the meat
8 department, you've get all kinds of stuff in your
9 basket. And the way it was before and the parallel to
10 the token world is you'd have to transact individual
11 items out of your basket with the cashier. So okay
12 here's a loaf of bread. Okay, let's transact that.
13 Okay, and go through all that process. Now, what,
14 else do you have in your basket?

15 Instead of doing it that way, you can treat the
16 transaction as one, so you have a collection of things
17 a collection of assets in this case that you can work
18 with as a whole. And it's pretty exciting.

19 Next slide please.

20 On to other standard initiatives, it's not just
21 Ethereum. We know that there's multiple platforms
22 there's multiple ecosystems that are out there.

1 There's an exciting new development from IWA, the
2 InterWork Alliance. They're a nonprofit member-led
3 organization, several large companies are part of that
4 so Accenture, Microsoft, DTCC, IBM, R3 are several, to
5 come together to define some standards upon which the
6 token economy can work. Interoperability is critical,
7 and you know that there's going to be several
8 succeeding platforms and ecosystems and they need to
9 be able to work together.

10 So this is a relatively new alliance that allows
11 the standards and collaboration around how those
12 standards can be created.

13 Next slide.

14 So, as you can see there's a lot of advancement
15 in agriculture from the token digital ledger
16 technology perspective, and these things are happening
17 very quickly. You've read the recent press around big
18 tech working in collaboration with agriculture
19 initiatives. It's advancing more rapidly now than
20 ever, and we're excited about where it's headed.

21 Thank you.

22 I'd like to hand it over now to Yesha.

1 PROFESSOR YADAV: Wonderful. Thank you so much.
2 First off, thank you Chair Tarbert, Commissioner
3 Quintenz, Commissioners, Meghan and Richard. Thank
4 you so very much for hosting this meeting at this
5 significant and extremely difficult time, we know how
6 difficult it is, the amount of work and attention to
7 detail that's involved in organizing a normal TAC
8 meeting. To do it at this time at-home and locked
9 down, remotely, is just remarkable so thank you so
10 much.

11 In particular, very much I think the incredible
12 staff at the CFTC, John Hoffman, Jorge Herrada, and of
13 course Meghan, for all the dedication, the
14 organization, and the pandemic-proof, terrific humor
15 that they've brought to our conversations and
16 discussions over these past few months. So it really
17 has been a pleasure to work with this team. So thank
18 you very much.

19 So as my co-panelists have been highlighting.
20 There are a number of regulations for us to consider
21 as we think about resiliency and scaling in the
22 context of DLT. As Shawna mentioned, these values

1 are essentially linked, the more scalable a system
2 becomes, the higher the network effect.

3 The more international the system becomes, the
4 greater interoperability and the functionality that it
5 brings to the table, the more we have to worry about
6 resiliency. The more we have to worry about systemic
7 impact in the market, in making sure that any new
8 technology that is developing in this space is able to
9 is able to maintain a continuing function, and that
10 the damage that any losses could cause do not
11 reverberate into the system as a whole.

12 So obviously this sets up the classic buy-in when
13 we're dealing with regulating financial innovations in
14 this space which is how to get the innovations to be
15 scalable, resilient, but at the same time, not to make
16 the compliance costs so high that we exclude
17 potentially innovators, smaller companies, newer
18 companies that are building in this space.

19 And so, that really puts a challenge for us
20 working in these markets to balance these two values
21 to make sure that we're having scalable and resilient
22 systems, but at the same time encouraging innovation

1 so that we can get this nascent technology in the
2 context of DLT off the ground and working and
3 exploring the different use cases that we can have.

4 Next slide please Meghan. Thank you so much.

5 So looking at looking at DLT, I just want to
6 mention there a number of core features here to DLT
7 we're looking at a distributed ledger. That is
8 decentralized consensus-free validation encryption
9 throughout the ledger, but how the system is designed,
10 the different functionalities that can be brought to
11 the system will be assessed the regulatory treatment
12 that the system will get.

13 Now the most important value that we have to
14 consider, the most important design choice really
15 isn't the difference between permissions and non-
16 permission systems. In the context of non-permission
17 systems. That is essentially what is being used in
18 the Bitcoin blockchain, non-permission systems are
19 arguably, much more scalable. It certainly implies a
20 greater amount of risk.

21 Now in the context of markets, permission systems
22 are a great deal more desirable. They allow for the

1 DLT operators essentially control who gets to join,
2 the conditions of joining the system the conditions of
3 joining the network, making sure that those who are
4 participating within the network have the strong
5 technology, cryptography, they have the ability to
6 maintain resiliency in difficult periods as well as,
7 of course, the capital, should they need it in order
8 to pay for losses.

9 And most importantly, from the practices of the
10 regulator, permission systems allow for a locus of
11 liability to be established, so that we can control
12 and maintain a degree of accountability within the DLT
13 system as a whole, and that is obviously, desirable
14 from the perspective of thinking about thinking about
15 the interoperability.

16 Next slide please. Thank you.

17 So looking at the context of permission systems.
18 Permission systems can allow us to build greater
19 functionality into any DLT system. When we have a
20 permission system, and we trusts the users that are in
21 the system. We can arguably enhance the use cases
22 that the DLT system can apply to, and specifically we

1 can have a use of smart contracts, for example,
2 automated code that can trigger the transfer of value,
3 whether that be in the form of dollars, in the form of
4 tokens, in the form of securities throughout.

5 And then, it's arguably easier within a closed
6 and commissioned system where the users are able to
7 trust each other.

8 Next slide, please.

9 Now in the context of building a permission
10 system, where we do have sophisticated use
11 functionality attached to it, we're using smart
12 contracts to transfer value. And with the need for
13 resiliency is growing, and that obviously raises
14 questions about who gets to participate in the system.

15 Now, the more -- the greater the use, the greater
16 the potential for scalability, the greater
17 sophistication of the DLT system, we run the risk that
18 we potentially create high compliance costs and high
19 barriers to entry, such that newer companies --
20 smaller companies that are just getting off the ground
21 are potentially excluded from participating.

22 Now what this can mean, in the context of network

1 effects, is the risk that we don't essentially get the
2 network effects that we desire, essentially that
3 companies are unable to join because they cannot
4 afford to do so. And that can potentially limit their
5 economic skin-in-the-game to invest in this
6 technology, to invest in migration, to think about how
7 best to reconfigure their systems, to incorporate DLT
8 within their back office.

9 And so, there is the danger of a potential
10 negative feedback loop that we are focusing on
11 resiliency, we're focusing on scalability, we're
12 focusing on network effects, we're increasing the
13 sophistication of the system. At the same time,
14 obviously, that does create costs for those who need
15 to join. And so, that is a very difficult value to
16 balance and we have to think about how best to do so
17 without, of course, in carrying or creating any risk
18 for the market as a whole.

19 When we do get to scaling. Next slide, please.
20 Thank you.

21 And when we do get to scaling, one of the issues
22 that we have been thinking about, you know, to me, is

1 the regulatory challenges that we face from a system
2 that is much more sophisticated that is seeing a great
3 deal more activity, and how to make that system
4 resilient in all cases where the, where the use of
5 that system is increasing. In particular, what we are
6 concerned about is that as the DLT system scales up,
7 as its use value increases as the activity on that
8 system, increases that any system can withstand the
9 heat, that will be involved in that contest.

10 In particular, we're worried about latency
11 increases. As Adam mentioned in his presentation for
12 the other Committee earlier on, the increased activity
13 within the system will lead to greater latencies
14 caused by the heightened activities and we do worry in
15 the quantitative assessment risk. Where greater
16 latencies can potentially develop risks within the
17 system as a whole.

18 Now when we think about the scaling of a DLT
19 system we can imagine that for the derivatives markets
20 that will involve international scaling, where ledgers
21 will be distributed internationally. And that
22 obviously raises a number of regulatory concerns that

1 the CFTC is extremely familiar with in relation to how
2 we regulate and think about data that is distributed
3 across borders.

4 Now as we saw, just from a European decision
5 today. There are a number of divergences in data
6 standards with respect to data privacy, data
7 portability, data transfer, and cyber security that
8 rebalancing in this context.

9 And as we'll discuss later, this is really ripe
10 ground for standard settings in the context of DLT
11 where we're essentially looking at international
12 distributed ledger's, a new form of holding
13 information, and we have to think about ways in which
14 that information can be secured, as well as be
15 compatible with multiple different international laws
16 that don't necessarily see that as debt are not
17 necessarily comparable, and obviously the CFTC has
18 gone through 10 years worth of rulemaking in the
19 context of Title VII where these issues have been
20 discussed we're hopeful that when it comes to
21 standards testing, it can be a useful material to draw
22 upon as we go forward.

1 Next slide please.

2 So, the other issue that we have been looking at
3 in the context of scaling as the DLT system gets
4 bigger and more prominence and if you think about the
5 different uses to which we can apply that system. And
6 it's really the issue of system governance and then
7 it's a critical issue and it's one that needs to keep
8 obviously extremely familiar with, in the context of
9 clearinghouses and exchanges. And the question that
10 we have been sort of giving some thought to is what we
11 do about governance in the context of DLT.

12 Now this is extremely critical from the point of
13 view of the system as a whole, and who gets to be in
14 the system is the critical question. What are the
15 conditions of their entry? And importantly, from the
16 perspective of the regulator and from the perspective
17 of market participants; who bears the losses? How are
18 these losses shared within the system?

19 And when we think about who bears the losses, how
20 are the decisions taken when it comes to ensuring that
21 the system is up to the standards that we want it to
22 operate at?

1 And so, making sure that the decision-making, the
2 protocol changes that may be needed, what kind of
3 decision-making structure is applicable within the
4 network? These are all critical questions when it
5 comes to governance and that is obviously a critical
6 part of any DLT system as it as it grows and it
7 becomes more scalable, to make sure that the
8 governance structure that it has ensures that it can
9 be resilient, and that the members are able to pay for
10 and contain the losses within the DLT network itself.

11 Now, these are all extremely difficult and
12 challenging questions and I think they're particularly
13 challenging in the context of the technology that is
14 developing at this stage, you know Mark has outlined
15 some very exciting possibilities for the use of
16 tokenization.

17 And there are, as Shawna mentioned, a number of
18 use cases that have been explored within the
19 subcommittee itself, a lot of us have been conscious
20 of the fact that this is really a technology at the
21 early stage of its development, that given time and
22 given exploration and given investments that we're

1 likely to see, you know, a real potential for it to
2 grow and become more sophisticated.

3 And deeper, as time goes on, we really see this
4 as a kind of early version of the internet,
5 essentially, and the potential for it is really
6 growing. That one that we're excited to see happen
7 but journey is a process at this stage.

8 And so in the context of that process, in the
9 context of the technology that is growing we've even
10 given it some thought to what kind of regulatory
11 approaches might be useful in this context of making
12 sure that we're balancing the need for resiliency and
13 scaling with also ensuring that the innovation can
14 happen in this space.

15 Now one approach, essentially is the tried and
16 tested one, which is to use existing rulemaking,
17 existing oversight in the context of new technologies.
18 So obviously, CFTC has been sort of implementing Title
19 VII, that is a go-to framework for providing a set of
20 milestones in the context of a regulated market
21 infrastructure. And that is a possibility in terms of
22 using existing mechanisms to regulate new technologies

1 that are coming up in this space.

2 The principles of financial market infrastructure
3 again provides the guideposts, the CFTC is obviously
4 an expert in implementing those principles.

5 But, you know, some of us did, obviously,
6 consider it -- using existing approaches, having an
7 existing framework that is already in place, whether
8 that is appropriate for technology that is growing.
9 Is it fit for purpose? And so, in that context,
10 obviously because we've opened the possibility of
11 creating a new framework. Is there something
12 different about DLT at this stage that were it require
13 and give us cause to think about creating a new set of
14 guidelines, a new set of risk controls, a new approach
15 for the oversight of the system that is in its growth
16 stage.

17 And in the context of thinking about and
18 balancing the new versus old, what is new about DLT
19 what is similar about the DLT? We did wish to
20 emphasize the principle of proportionality. And
21 whether proportionality as a guiding value here could
22 be an important one, which is to say that we have, you

1 know that we recognize that innovation is happening
2 and that it's small scale. And that regulation
3 ratchets up, scales up essentially as the technology
4 scales up.

5 So, as a way to get innovations into the, into
6 the infinite space we have a system that is
7 essentially geared towards recognizing their
8 smallness, their newness, but obviously as technology
9 expands and becomes more important as a scalability
10 potential is recognized that the full -- that the
11 fuller force of regulation then is brought to bear
12 much more concretely. And proportionality is a
13 principle that is put to work, currently in the
14 European Union in the context of innovation space and
15 it may potentially be a version of it, something that
16 we might consider here, as we think about how to
17 regulate emerging DLT technologies.

18 Now, next slide please, I think I'm a bit lost in
19 the slide deck actually.

20 The next -- so the next to final slide.

21 So the, the question that we really had, the
22 questions for future work, essentially that we've had

1 with the CFTC is really thinking about the
2 international picture in the context of DLT and where
3 to go with respect to standard setting. And this just
4 recaps some of our discussions in past TACs, which is
5 really the need for international standards in the
6 context of DLT to create a sense off the benchmarks
7 that I expected, the technological standards that are
8 expected. And that will allow the DLT to be an
9 international technology for transactions in this
10 space to proceed cross-border in a safe and regulated
11 way.

12 Obviously standard testing is also important for
13 coordinating oversight, for making sure that
14 regulators are aware of who's paying for what, for
15 making sure that regulators know who's taking
16 responsibility for what and maintaining data integrity
17 throughout the distributed network. And, you know,
18 one question -- one pathway to the CFTC that we have
19 been thinking about is the leadership role the CFTC
20 committee played this market.

21 As Chair Tarbert mentioned earlier, you know we
22 are the envy of the world in terms of our markets and

1 our innovation, and the CFTC has been a leader in
2 regulatory innovation and regulatory implementation,
3 post-Dodd-Frank. So again we have this is a space
4 potentially where the CFTC can really bring this
5 leadership to bear globally and provide a blueprint
6 for standard setting, going forward.

7 So, we'd really look forward to your questions
8 and your input, and thank you so very much for your
9 time and for hosting the TAC today.

10 CHAIRMAN GORELICK: Thank you very much. I thank
11 the participants, they were all very good, strong
12 presentations I learned a few things. I understand
13 that I've got a couple questions coming in, I'd like
14 to start first by calling on Eddie Wen.

15 MR. WEN: Hi. Thank you for the presentations
16 and I found them to be quite, very interesting. The
17 benefits of distributed ledger technologies sounds
18 very compelling and it's been touted for several
19 years, but the implementation and adoption of the
20 technology has been slower than many have expected.
21 What do you think is the limiting factor, and is it
22 just more difficult than people think or the time to

1 the technology to mature and what can we do to
2 accelerate adoption and implementation?

3 MS. HOFFMAN: I can start, this is Shawna. We
4 have seen an exponential increase in interest in DLT
5 since COVID-19, and the crisis has really pushed many
6 IT departments forward to say okay what technologies
7 can we use, you know, to, for example, request an
8 identity from an individual, when they walk into their
9 building and confirm that that individual has been
10 tested for COVID-19 and either has the antibodies or
11 in the future, a vaccination.

12 So we're starting to see a huge uptick in
13 interest in DLT and also a lot of pilots that have
14 started within the past few months.

15 PROFESSOR YADAV: Eddie, this is Yesha. I think
16 that's a great question that Shawna has mentioned.
17 You know there is work happening here, but I think
18 there's a couple of limiting factors, which is the
19 need for a network, and the need for network effects,
20 and essentially I think there's a bit of a chicken/egg
21 problem in the sense that the technology does remain
22 new it is untested, we're talking about a lot of money

1 here, and the need to migrate systems is obviously
2 expensive.

3 There's an investment involved in moving to these
4 new technologies and a case has to be made that this
5 technology is worthwhile to bring in. I think there's
6 an increase -- there is an increase power to those
7 cases that are currently being made to exceed in-
8 house, a number of leading banks use DLT for
9 transferring value within their own organizational
10 systems throughout the globe, as a way to represent
11 value throughout their chain.

12 Now, these are small scale, in the context of
13 DLT, globally. These are testing initiatives, we're
14 seeing how well they're working, and as that
15 workability case improves that might convince folks to
16 give the technology a try.

17 And I think the regulatory picture here is also
18 important because, you know, when large amounts of
19 money, you know, is being moved -- when there's value
20 transfer that happens, obviously enormous amounts of
21 accuracy, in that context, the systems that have to be
22 used, have to really be bulletproof and existing

1 systems that proved their worth.

2 And so, the question becomes how do we move to
3 this new system that might have certain advantages,
4 but we don't know the regulation required, whether or
5 not it's -- according to the standards that are
6 currently in place.

7 So I think there's a number of issues here that
8 are potentially impeding uptake of work effects, a
9 lack of regulatory clarity, and also the enormous risk
10 involved. When we think about reducing the
11 (inaudible).

12 MR. PRYOR: And just to add on that, so there's
13 been a lot of -- speaking from an architecture kind of
14 mindset, there's been a lot of improvements recently
15 in encryption technologies there just wasn't there
16 even a year ago. There's also massive improvements in
17 decentralized file storage techniques and technologies
18 that that have to work in concert with distributed
19 ledger technology, that there's been just massive
20 improvements in that area.

21 And I've referenced in my presentation about
22 multi-token containerization of assets, I mean you

1 could have done transactions before, you know, a year
2 or two ago but it doesn't scale well when you have
3 millions of transactions under that ecosystem at that
4 point. Those changes have happened very, very
5 recently.

6 Now the last thing is usability. We all know
7 that there needs to be a certain level of abstraction
8 from a business user and from the person interfacing
9 with these technologies to make sure that it's simple.
10 They don't need to know how electricity works to flip
11 the light switch, for example, they just need to be
12 able to use it. And there's been some massive
13 improvements in usability that makes this The time is
14 now more than it was a year ago or even two years ago.

15 CHAIRMAN GORELICK: Okay thanks. Commissioner
16 Behnam, I understand you've got a question.

17 COMMISSIONER BEHNAM: Thanks, Richard. And this
18 kind of -- my question kind of dovetails off of Eddie
19 Wen's question and it's sort of more focused and
20 addressed to Mark if you don't mind, specifically the
21 Ag sector. I appreciate some of the comments you've
22 made and what The Seam is doing and has done it as

1 trying to accomplish. But I'm just curious to know
2 from your experience in the cotton market, and then
3 looking at agriculture more broadly. What do you
4 think are the biggest impediments to sort of broader
5 scale implementation within the Ag sector of this type
6 of technology?

7 I say that specifically because you know I think
8 a lot of people might not necessarily think
9 agriculture and agricultural producers are not
10 necessarily technologically innovative or creative,
11 but in fact in my experience and I think history tells
12 the story that agriculture has some of the most as
13 some of the most innovative sort of participants, you
14 know, in the world. Anything from seed technology to
15 input technology to logistics and transportation.

16 You know, technology is the backbone of a well-
17 functioning agricultural ecosystem. And I have been
18 very interested, I think the interrelationship -- and
19 this is why I think the CFTC is so unique because we
20 have so many different constituencies, obviously
21 having a conversation about these innovative
22 technologies within DLT and crypto and cyber issues,

1 but we also have farmers and ranchers and our ability
2 to sort of act as a convener and bring everyone
3 together and sort of have this intersection of
4 different parts of the economy.

5 I think makes both the agency unique, but then
6 these discussions unique and I'd appreciate your
7 thoughts on sort of how we get as a building block --
8 right? Larger sort of outreach to the agricultural
9 sector and then as the technology organically grows.
10 How do we get larger implementation because in the end
11 I think that means better production, lower costs, and
12 that's good for the economy and the country as a
13 whole.

14 MR. PRYOR: Yes. So sure, just to that point.
15 So agriculture is one of the least digitized industry
16 sectors as many of you know, I mean it's a lot of
17 paper-based processes that are still there there's
18 lots of wonderful innovation on the farm with
19 precision agriculture and things like that, but in the
20 business systems it's largely -- there's a lot of
21 paper-based processes, which means there's
22 opportunity.

1 Now there's some movements underway, some real
2 exciting movements towards standardizing those
3 practices in the middle. You may have read about the
4 Digital Container Shipping Association is basically a
5 nonprofit standard body that is represented by some of
6 the largest shippers in the world. And they're coming
7 together and collaborating to define the communication
8 protocols and the language that we all have to speak
9 in order to interoperate and to me that's the most
10 exciting and I think that has to be in place as a
11 foundational thing before innovation can occur on top
12 of it.

13 And so, the tools have been there, the software
14 has been there, the technology has been there for a
15 while, but unless you just embrace a single system or,
16 you know. a vendor lock-in, you can't participate a
17 lot in some of these this interoperability. The
18 exciting part, again, is the standards, that's being
19 created. And that will allow the industry to advance
20 more rapidly, so I'm excited about where that is.

21 COMMISSIONER BEHNAM: Thanks Mark. Thanks
22 Richard.

1 CHAIRMAN GORELICK: Thank you. I've got one
2 final question here for Haimera Workie.

3 MR. WORKIE: Hi, I guess my question relates to
4 maybe some of the earlier discussion and how it
5 dovetails to the latter part of the presentation, were
6 the earlier discussion focused on kind of use of ERC
7 tokens, which are primarily on a public
8 permissionless-based system, and the later discussion
9 about kind of some of the regulatory considerations
10 about the need for having accountability and
11 governance built into the system.

12 Is it possible to have those features within the
13 context of a permissionless system, or is the
14 regulatory needs such that, that you would need to
15 have suddenly some elements of a permission-based
16 system where somebody was controlling the network,
17 that the regulators (inaudible) to?

18 PROFESSOR YADAV: And thank you for that
19 question. It's a great question. In the context of a
20 permissionless system and financial markets. I find
21 it very hard to think of situations in which a
22 permissionless system could work in the context of

1 providing the sense of comfort and reassurance that
2 the system is working.

3 Now, as we've seen in the context of our markets.
4 You know, we could have outages we can have, you know,
5 we can have circuit breakers, we can have events. And
6 we feel comforted by the fact that there is an
7 operator behind it that will take care of the process.

8 And the in the context of a permissionless
9 system, we, you know, there's a worry that there is no
10 such operator, the system itself has to be automated
11 enough to recognize the problem and shift theories and
12 remedy it. If the technology robust enough that we
13 can build in or embed some kind of regulation within
14 the blockchain itself, and make the system
15 sufficiently automated that is capturing errors and is
16 potentially regulating itself in that context.

17 Perhaps there's a chance that we are able to get
18 to a world where the permissionless can work in the
19 context of a system that we have which requires some
20 accountability and resiliency. At the same time, I
21 think that seems a long way away, if it's available at
22 all. We know we do need liability -- we need any

1 system, we need a system that will be able to pay for
2 the damage that it causes, and it's just hard to see
3 how a permissionless system can work that way at this
4 present point in time.

5 MR. WORKIE: Thanks.

6 CHAIRMAN GORELICK: And with that I think we'll
7 move on to the next panel from the Virtual Currencies
8 Subcommittee. Chris Brummer will be giving a
9 presentation on an overview of central bank digital
10 currencies. And after that Tom Chippas, is the Chief
11 Executive Officer at ErisX will be giving a
12 presentation on Bitcoin volatility compared to other
13 asset classes and the impact of the COVID-19 pandemic
14 on asset price correlation.

15 So with that I'd like to hand it over to Chris
16 Brummer.

17 PROFESSOR BRUMMER: Hey, thanks to Jorge and
18 thanks to you for all the time, just to sort of echo
19 Yesha's comments earlier, you know the amount of time
20 that the staff has put into coordinating this event
21 has been enormous thank you to you. Thanks to
22 Chairman Tarbert for really making sure that the

1 agency stays out front and thinking about these
2 issues, and obviously a special shout out to
3 Commissioner Quintenz for his time and leadership in
4 making sure that TAC, as well is taking the lead on
5 virtual currencies and identifying issues like central
6 bank digital currencies.

7 That seems at first glance, it'd be a little bit
8 less of having implications for derivatives law and
9 derivatives infrastructure. However, there are some
10 considerations that I think are at least worth keeping
11 in mind. Maybe we can just go to the first slide.

12 So CBDCs have gained an enormous amount of
13 attention recently, like virtually every other form of
14 digital payment. Part of the attention has been
15 generated, because of the coronavirus pandemic and the
16 idea that the U.S. government's need for swifter
17 payment rails in order to move money to those kinds of
18 constituents and citizens who may need it, and that
19 the legacy infrastructure, whether governmental or in
20 some instances private, just haven't kept up to speed
21 with the needs of society as it has evolved.

22 Additionally, part of the interest is also driven

1 by a number of allied concerns such as competitiveness
2 concerns and concerns as to whether or not, economies,
3 in order to remain competitive and even whether or not
4 currencies in order to be competitive. You need to
5 upgrade, not only the payment rails but, as we'll get
6 to a little bit later, the very experience of money --
7 again, think about money as a kind of customer
8 experience and that the customer experience as it
9 currently this isn't as optimal as it possibly could
10 be.

11 And so, it should we change in effect, how we
12 think about money and how we use money in ways that
13 reflect more of a 21st Century orientation and all
14 this just led to an enormous amount of interest in
15 energy in the CBDC space. But for all of the talk
16 about CBDC, the term is by no means a standardized
17 term. So certainly not as a matter of national or for
18 that matter, international law.

19 And it's not just because many of these or the concept
20 of the CBDC has yet to be worked out.

21 I had a very interesting conversation two weeks
22 ago with Benoit Cœuré who is the FinTech lead and head

1 of the Bank for International Settlements' Innovation
2 Hub, who emphasized on a podcast that it would likely
3 stay unstandardized and that the regulation of central
4 bank digital currencies would likely not become a
5 matter of direct regulation from the international
6 regulatory community. But that said, there are a
7 number of widely recognized characteristics of the
8 CBDC.

9 First and foremost, they are a liability of a
10 central bank, thus backed by the government in the
11 same ways that current forms of fiat currency are
12 backed by the government, but they are distinct from
13 existing master accounts at the Federal Reserve.

14 As I mentioned, there are a number of drivers
15 that have accelerated interest into CBDC, but even
16 prior to the coronavirus, there were a number of
17 observed potential advantages. One that was relevant
18 for developed countries and developed economies, was
19 just a widespread recognition that the cost of
20 producing, distributing, and destroying physical
21 currencies is quite high. Another was this idea about
22 efficiency. It's something that's been highlighted in

1 the coronavirus pandemic, but has been of enormous
2 interest in developing countries who have been -- who
3 recognize the difficulties of physical currency to
4 transcend space and time, more or less, and the
5 difficulties that traditional currencies pose in the
6 midst of infrastructures and communities where people
7 were often unbanked and had but limited access to
8 financial services.

9 Now, because the starting points of central banks
10 around the world are very different, where they end up
11 will ultimately be very different. But there are a
12 number of key design considerations.

13 Next slide please.

14 And these key design considerations reflect both
15 where countries are and where they want to go. Now,
16 one can easily sort of identify six different vectors
17 of CBDC design. The first is whether or not a central
18 bank wants to engage or explore an account or token-
19 based model.

20 Now, interestingly enough, for those who have
21 spent enough time sort of thinking through the bowels
22 of the sort of payment infrastructure. This kind of

1 nomenclature is in itself, sometimes a bit obscured
2 when you think about, sort of, cryptocurrency.

3 But that ultimately, the question goes as to
4 whether or not access to the CBDC is tied to an
5 identity-based system, sort of with account-based
6 technology that can often rely on somewhat
7 reconciliation intensive, sort of message-based
8 approaches that, where you adjust interest in the
9 ledger or whether or not you're going to have a kind
10 of a tokenized system that operates via cryptographic
11 screens that don't require identification. The
12 question as to whether or not you're going to have a
13 more of a digital bearer asset or instrument.

14 Another important vector and question is whether
15 or not you want to design a central bank digital
16 currency, as being either a retail or wholesale-based
17 system. And that ultimately overlaps at least in part
18 with the account-based or tokenized system. Generally
19 the question of a retail or wholesale CBDC reflects
20 whether or not the person who is supporting the
21 infrastructure can or specifically, whether or not
22 access to CBDC is being reserved for the retail public

1 or whether or not it's going to be reserved as a
2 utility for the commercial banks.

3 But I did want to make a quick observation that a
4 wholesale banking day generally reflects the state of
5 affairs, where you have a computerized record of
6 assets and liabilities and receivables and payments
7 maintained at the bank level, but they are not really
8 settled, at least not settled effectively, until
9 they're settled at a settlement account at a central
10 bank. Right?

11 So with digital fiat currency has -- there's an
12 overlap between this account-based and token-based
13 distinction and the retail and wholesale-based
14 distinction, insofar as a tokenized system could
15 permit a system whereby the commercial banks
16 themselves are enabled or permitted to settle amongst
17 themselves using a fiat settlement instrument
18 synonymous to what you know carrying a briefcase full
19 of cash.

20 So you have a decentralized settlement system,
21 between commercial banks, without necessarily having
22 to settle at a central bank.

1 Another key aspect or design consideration is
2 privacy versus non anonymity. The question as to
3 whether or not, again, central banks or other
4 intermediaries should be involved and that has to do
5 with the degree of direct control that that's being
6 exercised by a central bank. In our case, the Fed.

7 And then whether or not CBDC should have any
8 kinds of deviations when it comes to interest bearing
9 features and characteristics and whether or not they
10 should be programmed or programmable. And that's the
11 concept that we'll return to briefly.

12 Though it's not on the slide. I guess I'm
13 inspired a bit by Professor Yadav's comments and
14 remarks. Another kind of key design consideration
15 with CBDCs that can be relevant for the people
16 listening in on this call, is whether or not a CBDC
17 should also enable cross-border payments.

18 Next slide please.

19 So CBDCs can be viewed at least a part as a
20 solution to this cross-border transaction challenge
21 that has certain kinds of competitive advantages in
22 some ways to Stablecoin. Now, Stablecoins, as many of

1 you know are privately issued instruments typically
2 used as a store of value or meeting of exchange. It's
3 designed to have a market value that tracks or is
4 pegged to a set amount of fiat currency. And that's a
5 distinction that we'll get to as well very shortly
6 that's very important in order to understand both the
7 relative strengths and weaknesses of Stablecoins and
8 what some CBDCs are trying to do.

9 Stablecoins are generally token-based. They're
10 not backed by a central bank, but they could be
11 supported by commercial bank deposit security and
12 other assets, and including other -- including crypto
13 currencies and virtual currencies. They can be
14 synthetic or they can be that can be imported
15 algorithmically.

16 Now, it's interesting to sort of understand that
17 Stablecoins, even though they are designed to help
18 facilitate cross-border transactions, among other
19 things, they have important limitations.

20 Next slide please.

21 So, in short Stablecoins, don't always solve some
22 of the problems that they are designed to solve. It

1 just depends on the design of a Stablecoin.
2 Stablecoins, just like central bank digital currencies
3 are underpinned by varying degrees of trust. And the
4 issuer, since they are being issued privately, and
5 certain kinds of or a certain degree of trust that an
6 issuer will uphold varying degrees of obligation.

7 And those obligations don't necessarily have to
8 involve the redeem-ability of the asset that it is
9 ultimately referencing. But the fact that there is
10 some kind of commitment being made by the issuer of a
11 Stablecoin means that in a Stablecoin that there is
12 ultimately an underlying legal claim this one will and
13 not a cryptographic one.

14 And it's a point that I've been hearing a lot
15 from lately from lots of DeFi experts, and this
16 distinguishes and differentiates Stablecoins from even
17 some privately issued cryptocurrency, public block
18 chains like Bitcoin. Because that redeem-ability
19 factor can depend on facts and circumstances as to the
20 design of a Stablecoin. Central bank currencies can
21 be seen as trying to provide a more certainty and
22 safely if one will, behind the sort of utility that a

1 traditional Stablecoin aspires to achieve.

2 So what are these kinds of problems that CBDCs
3 are trying to solve? Well, like the other
4 Stablecoins, they're trying to solve this issue of how
5 do you create a 24/7 movement of fiat currencies. How
6 can you facilitate contactless payments? As I
7 mentioned at the outset of my remarks. And then,
8 they're trying to figure out the question of riskless
9 settlement.

10 Although, with -- again many stable coins, there
11 are some interesting solutions. CBDCs are trying to
12 sort of drive the risk premium even further down and
13 CBDCs are extending fiat incrementally into the
14 possibility of introducing programmable money. So
15 that would comprise an upgrade over the traditional
16 paper-based fiat currencies.

17 Now this generates a number of important
18 questions like, whether it's a proper government
19 response, not just to Stablecoins but also a response
20 in terms of how they should or can roll out their own
21 CBDCs and whether or not governments should offer
22 something simpler. Something that Stablecoin

1 providers can themselves, add varying kinds of layers
2 and services on top of alongside other financial
3 services professionals.

4 Now, see CBDCs -- next slide please.

5 So I guess I'll run through a couple of more
6 obvious issues for those of us thinking about
7 derivatives law. The regulatory treatment of the CBDC
8 is rather straightforward, a CBDC would be a digital
9 fiat currency, and therefore it should at least -- I
10 think the members of the Committee agree, be treated
11 the same as any other fiat currency.

12 Although you can always ask and these are
13 probably questions for the Federal Reserve and others,
14 whether or not certain kinds of special policies
15 should be enacted for U.S. dollar issuances currencies
16 are commodities under the Commodity Exchange Act.
17 However, U.S. dollars are typically not themselves
18 from a market perspective, the subject of derivatives
19 contracts although it's interesting to see whether or
20 not if the Federal Reserve was to introduce a CBDC
21 whether or not this would change.

22 Next slide please.

1 So as to the derivatives markets considerations,
2 the upsides I think have been well-articulated, at
3 least, potentially CBDCs could facilitate faster
4 exchange of payment and collateral for cleared and
5 uncleared contracts, and through the use of smart
6 contracts CBDCs can be utilized effectually real-time
7 or closer to real-time settlement of margin or
8 collateral obligation.

9 But there are changes that this would likely
10 introduce, namely the existing role of commercial
11 banks could change, and also clearinghouses, FCMs,
12 swap dealers and the like, would need to build
13 messaging and settlement systems for the secure
14 transfer of CBDC.

15 When built out, at least presumably programmable
16 CBDCs could also further facilitate the automation of
17 those functions.

18 Next slide please.

19 So, some of the more interesting issues involve a
20 little bit of thought experiments that we on the
21 subcommittee had to sort of undertake and discuss with
22 one another, particularly since there has been no

1 announcement by the Federal Reserve, just to introduce
2 or to embrace, or to pursue central bank digital
3 currency per se. So, we have to think through what
4 are the kinds of ways in which derivatives law in the
5 CEA, could be introduced and brought into or become
6 more salient.

7 And it's an important question because not all
8 CBDCs are the same, a central bank can issue a CBDC in
9 a myriad of ways or it could just sanction the
10 issuance of some currency instrument that might
11 include a number of different kinds of elements
12 including swap or some kind of secured product.

13 So, on my slides for those of you who don't have
14 it, I have a kind of a hypothetical. Where, let's say
15 a central bank decides against issuing the CBDC
16 directly, but instead goes to all the commercial banks
17 or just to primary dealers and says, you create a
18 digital dollar in whatever form you want. We will
19 guarantee, we the central bank, will guarantee those
20 digital dollars or say a central bank says, we will
21 secure those digital dollars with mortgage backed
22 securities or corporate bonds that we bought over the

1 years.

2 Well, this raises a number of very interesting
3 questions among them. Is this a swap or does the
4 transaction end up being operationalized in a way that
5 looks like a swap. Is this a security or security-
6 based swap? In addition to other structures, these
7 kinds of products could very well be CFTC or SEC-
8 regulated products.

9 Next slide please.

10 Now, of course if it is a swap or -- not traded
11 on CFTC or an SEC-regulated exchange. You would need
12 to be an eligible contract participant in order to
13 engage in that transaction. So, these alternative
14 currency structures depending again on decisions by
15 the Federal Reserve, could end up in outcomes that
16 directly impact the availability of that product to
17 retail persons, because obviously it's the swap or the
18 forward not being traded on a SEC-regulated exchange.
19 The access to that particular product could be a limit
20 and limited and limit the usability of the CBDC in
21 smart contracts. Again, depending on their structure.

22 Next slide.

1 So for the sort of balance of this conversation
2 and for my presentation I'll just go through a couple
3 of interesting questions.

4 Number one, what if any new custodial challenges
5 would CBDC pose for clearinghouses? As folks on the
6 call know clearinghouses are largely built for real-
7 time processing on a limited basis for part of the
8 day, they rely on partial real-time for other
9 functions during the day and can go full-on batch mode
10 after the market closes. Whereas crypto-trading takes
11 place 24/7, and those of us on the committee, were
12 wondering whether or not, you know, if you introduce a
13 CBDC, whether or not market pressures can induce
14 dramatic changes in the operations shift into a
15 24/7model, really to prevent new competitors or
16 existing competitors from listing the same products
17 and taking market share.

18 Next slide.

19 Another interesting question and very important
20 question, is whether or not a CBDC would introduce new
21 cybersecurity risks for those infrastructure. Among
22 those kinds of questions would CBDC-related services

1 and infrastructures create larger honeypot risks?
2 Given the likely scale of a CBDC, would responses and
3 backups to be sufficient given likely higher volume of
4 CBDC-related transactions, and what kinds of interests
5 with other regulators including the Fed, take steps
6 taken here by largely CFTC regulated entities?

7 Now, as to the sort of cybersecurity risks that
8 could arise, certainly there's the possibility that
9 that a CBDC has certain favorable characteristics, at
10 least as compared to a Stablecoin. In the context of
11 Stablecoins, theft is possible and this is very hard
12 to reverse. Something that we've -- was hinted at in
13 our earlier conversations today. Someone has private
14 keys. So unless you do a hard fork of the network
15 there's no way really to undo what has been done.

16 On the other hand, you can always freeze
17 accounts. Like we see with the pack of Stablecoins.
18 But you don't have any kind of other mechanisms
19 available. By contrast if you have the CBDC, the CBDC
20 represented represents a claim, usually on a
21 centralized database. At least, that's the general
22 assumption. So you would be able to reverse the

1 transaction, almost like reversing an ACH transaction.

2 Next slide.

3 On one of the earlier slides we talked about the
4 changing roles of commercial banks, if you were to
5 introduce a CBDC. Here, this takes that observation a
6 step forward of what would a rapid shift to CBDC, or
7 would a rapid shift to CBDC impact the financial
8 health of FCMs. Here, the movement of accounts to a
9 central bank could at least in theory impact the
10 liquidity of FCMs. FCM customers will likely keep
11 their CBDC wherever they are safest and most
12 accessible. And, again, depending on the degree of
13 intervention by the Fed, and the kind of design of
14 CBDC, the float of FCMs or whatever float that they
15 use to find themselves, could be compromised and so
16 some kinds of additional precautions, or surveillance
17 could be useful or at least might be necessary to keep
18 in mind.

19 Next slide please.

20 Again, it's useful to sort of think ahead,
21 because CBDCs are evolving quickly, and the models for
22 CBDCs can vary dramatically. And one of the questions

1 is would a platform-based CBDC require new forms of
2 intermediaries for derivatives infrastructure and this
3 is -- a question because some countries including
4 China are toying with this idea of a platform-based
5 model of money. Right? Where it's not just a payment
6 rail that is being taken into consideration, but
7 really the creation of entire an ecosystem of
8 financial services providers, and this ecosystem could
9 be in effect built on top of the payment rails for
10 money. And this gives me a very important
11 observation, at the very definition of money may
12 quickly be subject to change. And, you know, whether
13 and how this impacts how you think about our
14 derivatives law.

15 But at any rate, an ecosystem built on top of a
16 platform-based model of money could involve, at least
17 in principle, financial service providers that operate
18 in the derivative sector. And additionally derivative
19 services could at least be provided on top of that
20 platform, creating interesting issues of conflict of
21 laws or overlapping supervision and supervisory
22 responsibilities, as between the Federal Reserve and

1 the CFTC.

2 Next slide please. Hello? Can we please move to
3 the slide of "Would the introduction of a CBDC provide
4 --? Ah, there it is. I'm unsure as to whether or not
5 the WebEx is actually moving, it's frozen on my
6 screen, but I'll just keep talking since we're almost
7 done.

8 Again, you know, there are base questions as to
9 would the introduction of the CBDC provide a means for
10 easing the costs of regulatory compliance? And the
11 sense was among the subcommittee, that the compliance
12 costs themselves should remain relatively stable. But
13 firms could have much bigger opportunities to
14 distinguish themselves. In other words, CBDC
15 themselves, could introduce a considerable degree of
16 disruption and leading to or availing certain firms
17 that are running on more modern highly efficient
18 platforms, varying opportunities. So some firms may
19 keep segregated accounts then by event in real
20 processing time and not pulse-based batch services and
21 a few times day.

22 And so, what CBDC could do is create a new round

1 of winners or/and losers, or at least introduce a new
2 kind of competitiveness when it comes to the
3 introduction of new digital infrastructure that that
4 can be, frankly, introduce changes that are even more
5 drastic or at least rapidly evolving in the kinds of
6 changes that we've been witnessing over the last half
7 decade or so.

8 With that, that is the end of my presentation.
9 So I guess I'll just pass the baton now to Tom
10 Chippas.

11 MR. CHIPPAS: Thanks Chris. Okay, I'll wait to
12 see when the first light comes up here. And
13 recognizing a real lag here and what everyone's seen,
14 I'll just keep the train running here. If we flip to
15 slide number two, I'll start off by saying thank you
16 to the Commissioners and the Chairman for their
17 participation today. I know there's certainly been
18 some great presentations I found very helpful.
19 Hopefully, I can do the same with this one.

20 And really the purpose of this presentation is to
21 provide information regarding the volatility of
22 Bitcoin versus other well-known commodities and

1 securities. Such that we may have some context, and
2 perhaps dispel any pre-existing thoughts or myths
3 around the volatility of Bitcoin and we'll talk about
4 Ether as well, generally here. So with that said, if
5 we could advance the slide three, please.

6 So, I'm the last presenter and I presentation
7 full of charts and numbers, so recognizing that that
8 is not any place, most people want to be at the end of
9 a couple hours of presentations. I'm going to give
10 you the answers to the test now in the hopes that it
11 stokes your interest as to what follows.

12 So we'll talk a little bit here about what we
13 discovered after examining the volatility of Bitcoin
14 and some of the other commodities and securities. So
15 first up, what we did is observed how Bitcoin is on
16 average is more volatile than some of the other
17 securities and commodities noted, but there are
18 certainly some stocks that have similar and sometimes
19 even greater volatility. And although we didn't do an
20 entire comparison of all stocks, say, versus Bitcoin,
21 definitely there were some small cap U.S. stocks that
22 had even greater volatility than Bitcoin.

1 Currently, Bitcoin's volatility and its
2 underlying market structure when combined with some of
3 the non-U.S. venues that offer very high leverage in
4 their derivative products, create some conditions for
5 very short price movements and we'll examine what that
6 is and an example where that happened and what that
7 means from a market structure induced volatility.

8 And we will talk about, perhaps, where in the
9 mature market, just as the market matures and we get
10 more oversight and more seasoned participants, will we
11 see some of the benefits that other mature markets
12 have observed with respect to means and methods for
13 reducing sort of market structure induced volatility?

14 So, you know, in the last one here is simply that
15 this is still an evolving asset class and evolving
16 commodity in that regards, you know, secure and sound
17 operations are going to help market structure be
18 better, and perhaps we can think about how we can
19 strengthen what we do here in the U.S. to provide
20 alternatives to venues that may be perceived as
21 riskier or be at different levels of maturity.

22 So that's really what we've found and what we're

1 going to talk about. So why don't we advance to slide
2 four please?

3 And just to set the context for you, we looked at
4 the period of January of '19 through June of 2020.

5 And not surprisingly, Bitcoin and Ether are on
6 average, are more volatile than some of the
7 traditional stocks that were analyzed in this study.
8 But with that said, some of those stocks did have, as
9 noted here, substantially higher volatility than
10 Bitcoin or Ether during the same period.

11 So, you can't talk about volatility in stocks
12 nowadays without mentioning Tesla and close to one
13 third of the time in this study, Tesla was actually
14 more volatile than Bitcoin, so that's obviously a U.S.
15 listed security trading on the U.S. equity markets
16 which have substantive criteria, and controls to try
17 and address volatility. Gold and Bitcoin are
18 oftentimes contrasted.

19 And in this analyzed period, gold fell and is
20 much lower than Bitcoin, and certainly for those that
21 are cryptocurrency aficionados, the adage that Bitcoin
22 is digital gold and what have you, is often discussed

1 and there's more than a fair share of active Twitter
2 battles between Bitcoin aficionados and gold bugs.

3 So, we thought it was important to include gold
4 here. And in this period gold was lower but there'll
5 be some anomalies that I'll point out a little bit
6 later.

7 And lastly, you know, given sort of the unique
8 circumstances surrounding crude earlier this year. No
9 one should be surprised that crude volatility was
10 substantially higher than Bitcoin and we'll show some
11 of the correlations as well a little bit later on.
12 So, opening observations here, if we move to slide
13 five.

14 What about COVID-19? Certainly we've had the
15 response to the pandemic. So we do have a bit of a
16 unique opportunity here to look at some historical
17 data, and then both very recent but very narrow time
18 period of data, where generally we've observed market
19 shocks across geographies and asset classes and what
20 has it meant in crypto.

21 So during this time period, the first row is the
22 January '19-to-February 2020 period is on the bottom

1 row being what I've roughly refer to here is the
2 period of the outbreak March-through-June. What you
3 can see is -- you know, you can't see it clearly here
4 but we noted it in the text, the analyzed stock
5 volatility went up 265 percent, as compared to
6 Bitcoin's which was up 178, Ether 180 percent.

7 So the socks analyzed here were more volatile,
8 substantially larger increase in volatility. GE,
9 Tesla, and crude are represented there with USO.
10 Also, increases during this period on par are greater
11 than that of Bitcoin or Ether, so what do we take away
12 from that?

13 So, even during what was a highly volatile time
14 in the markets, the change the in volatility of
15 Bitcoin and Ether, are not outliers. There's
16 definitely not outliers. And you can see that by
17 comparisons here. So they may have high volatility as
18 compared to the absolute measures on some of the other
19 issues here. However, the amount of change of
20 volatility in many cases is actually on par or lower.
21 And again crude oil has been a bit of an outlier here
22 for the reasons specified earlier.

1 Okay, if we move on to slide six. I want to talk
2 about a specific event that took place in March of
3 2020, and I refer to it here just for sake of
4 convenience as the BitMax liquidations. Now for those
5 of you not familiar with BitMax, BitMax is a crypto-
6 only derivatives market that operates outside of the
7 U.S. and in March of 2020 there is a period where
8 there are about \$1.1 billion worth of contracts
9 liquidated. Contracts that trade on BitMax are
10 perpetual futures, so that's a long conversation in
11 and of itself, and actually BitMax provides some great
12 explanatory information about their products on their
13 site, which I'd encourage you to read if you want to
14 learn more about them.

15 But in short, liquidations of the perpetual
16 futures contracts take place do something called auto-
17 deleveraging. And this auto-deleveraging happens when
18 the value periods, and there's multiple value periods
19 a day, to the extent that holders of these contracts,
20 either owe more than they can pay in terms of the
21 collateral they posted -- their collateral is
22 liquidated and there's a payout made to the other

1 side. I'm grossly over summarizing for brevity. But,
2 in short, these auto liquidation events add selling
3 pressure to the Bitcoin spot market. So this is one
4 of those market structure induced volatility events
5 that I referred to in my introduction.

6 Now making matters worse, back on March 12th to
7 13th. When this all began, we note here Bitcoin's
8 price dropped from \$7,300 to \$3,900, and that occurred
9 9 AM in UTC so that's 5 AM Eastern, I believe.

10 And while all this was going on, a bit further
11 into the event BitMax suffered a distributed denial of
12 service attack. So that, of course, made matters
13 worse. And what this did, is it precluded the
14 liquidation engine from actually liquidating the
15 collateral so it stopped liquidating for a period of
16 time and that temporarily relieved the selling
17 pressure.

18 The highlighted section of the graph you see on
19 this particular slide is during that time, as we know
20 Bitcoin prices did go up 23 percent. So I want to
21 emphasize, I'm not trying to call out any, you know,
22 right or wrong here with respect to the BitMax

1 product. I think they've been exceedingly transparent
2 there's a link actually on this presentation to their
3 full explanation of what occurred that day so I'm not
4 making a statement of good, bad, or otherwise. I'm
5 simply using this to highlight that there are
6 structural events that when certain activities within
7 that structure that's being created take place, can
8 induce volatility in other spot markets.

9 So there's a there's a cyclical to all of this
10 when you take into account the timing of these
11 leveraged liquidations. And it stands in contrast, of
12 course, to the way markets operate in the U.S.,
13 whether it's a margin product or similar to what we
14 have in ErisX, a fully funded product. So there's
15 different structures and that structure can impact and
16 have an impact on volatility in the underlying spot
17 market.

18 Okay, why don't we advance to slide seven please.

19 And we'll shift from talking about volatility to
20 talking about correlation. So correlation. Always
21 with the proviso that it doesn't necessarily mean
22 causation, we're just focusing on correlation here.

1 And what's interesting here is in this period Jan
2 '19-t-June 2020. The correlation of both Bitcoin and
3 Ether is consistently high, and particularly high
4 during the outbreak approaching and getting to
5 complete correlation for a couple of brief periods.

6 With that said, Bitcoin and Ether versus dollars
7 compared to both stocks and gold. Those correlations
8 are not consistent over the measurement period, as
9 evidenced by the movement on this chart with
10 correlation being depicted vertically on the left-hand
11 side.

12 I will note there's a short period of negative
13 correlation, meaning moving opposite to one another,
14 rather than with each other, of Bitcoin versus gold
15 during March of this year. We just talked about that
16 event in March, you can see that in that March period
17 -- what is the color is that -- turquoise-ish line,
18 depicting Bitcoin versus gold, and there is a
19 reversion back to positive correlation, and it would
20 be a longer study to dig into some of the details
21 there, but it's just pointing out that when the spot
22 market moves it does impact the correlation here as

1 well.

2 So, these are one month correlations. If we move
3 ahead a slide.

4 And I'll give you credit, it's the last slide of
5 my presentation, so you made it. You had the answers
6 and hung on to the end.

7 So during the COVID-19 period, what was the
8 impact on correlation between all of these? So we
9 just have a couple of simple matrices set up here.
10 And as one would expect the correlation during the
11 pandemic period increased really across all the pairs.
12 The biggest change was that of Ether and Bitcoin
13 versus gold, where in the previous period, it really
14 was statistically zero and then rising to 60 percent
15 correlation during the COVID outbreak.

16 Now, the data shows that generally Bitcoin and
17 Ether are not correlated with the stock market nor
18 gold, but I think what we can take away from the data
19 presented here is that when you have these extreme
20 conditions; these market-wide movements across a wide
21 dispersion of asset classes, correlation rises, along
22 with those sorts of events.

1 So I think it's really important to note that the
2 period of time analyze here, and of course, the stocks
3 and indices and other commodities analyzed here,
4 yielded these results. If you use different
5 commodities or securities or indices for comparison
6 we, of course, would get another result and it also
7 observes that as Bitcoin and Ether.

8 In cryptocurrency -- is generally mature. We're
9 going to see a broader field of market participants
10 trade these as we see now, and as a trade these
11 commodities, we should expect these measures both
12 volatility and correlation to change again. So this
13 is definitely my caveat emptor. This data is accurate
14 now, but there are many, many, many factors and
15 conditions that can change that would render these
16 observations interesting at a point in time but at
17 another point time they should be substantively
18 different.

19 So hopefully, as I indicated at the beginning,
20 you take away that Bitcoin and Ether is certainly more
21 volatile than some U.S. stocks and other commodities,
22 but many times, there are other assets that are more

1 volatile and you know there is a market structure
2 component to consider when looking at Bitcoin
3 specifically that can create cyclical volatility. But
4 ultimately, as we bring more people into the markets
5 and they operate on exchanges with controls around
6 them, it will have the potential to reduce some of
7 that, although the unique 24/7 global nature of the
8 commodity means it may not be something that can be as
9 tightly controlled, as you may find in markets more
10 familiar with here in the U.S.

11 So that's the end of my prepared comments and
12 I'll turn it back over to Richard.

13 CHAIRMAN GORELICK: Thank you very much, Tom and
14 Chris. I appreciate your presentations, and they were
15 both very informative I do have a handful of questions
16 that have already come in.

17 I want to start with a question that Gary DeWaal
18 asked me to relay. And his question is for Chris
19 Brummer. Other than possible security concerns Chris,
20 are there any other potential concerns regarding the
21 introduction or use of CBDCs.

22 PROFESSOR BRUMMER: Right. Well, there are a

1 number of concerns. I mean, on the practical level,
2 privacy is going to be enormously important issue. It
3 sounds like obviously you know something that would
4 not be or fall on the radar of derivatives markets
5 professionals. But it is of enormous importance
6 because how the design of the CBDC is ultimately
7 effectuated can impact all kinds of reporting
8 requirements that you can imagine getting upstream by
9 varying financial market participants.

10 In other words, there's a -- that's usually
11 considered to be a kind of a social layer of CBDC,
12 where people are concerned about the degree of
13 anonymity and if you're going to create some kind of
14 digital bearer instrument. How or whether or not, you
15 know, will the federal government, be able to track
16 specifically on an individual basis, the spending
17 habits of individuals. That particular conversation
18 on privacy, as you could imagine could ultimately have
19 some real implications for transactions that are
20 effectuated, even for instruments that may reference
21 them.

22 But, CBDCs, by definition, are going to have a

1 number of implications, not just for securities
2 markets but potentially for derivatives markets. And
3 even when you get into the social layer of question,
4 they may end up trickling through the backdoor into
5 the province of the CFTC and other derivatives market
6 participants, not just in terms of how they comply
7 with those rules but how they could have been having
8 residual impact on some of their compliance
9 obligations under the CEA and I think they're just a
10 matter of time, we'll sort of be seeing how that would
11 specifically play out.

12 CHAIRMAN GORELICK: Thank you, Chris. We've got
13 another question now from Yesha Yadav. Yesha, do you
14 want to ask that question?

15 PROFESSOR YADAV: Sure. Thank you so much to
16 Chris and to Tom for their awesome presentations, I
17 really learned a great deal.

18 So, Chris, I had a question. The dollar is
19 obviously the reserve currency across the globe and
20 it's used, you know, throughout the world to settle
21 transactions. And in the context of the CBDC and
22 transition to CBDC, how do you see that playing out in

1 terms of some of the complications you mentioned? You
2 noted the lack of standardization that is anticipated
3 here in terms of payment systems across the globe. In
4 terms of the access to these payment systems for users
5 across the globe, when we see -- when we have the
6 dollar as dominant today, do you foresee any issues,
7 going forward, particularly given your work and
8 scholarship in this area? To that, given this
9 transition to CBDC.

10 And for Tom I just had a quick question.
11 Excellent. Obviously, terrific. So, did. Did you
12 see any issues with clearinghouses and the risk
13 mitigation mechanisms put in place with the Bitcoin
14 volatility and the Ether volatility in the
15 correlations as well? Did you feel that the risk
16 mitigation mechanisms emerging, et cetera, that are
17 currently put in place were sufficient to deal with
18 the risks and do you see the current measures will be
19 robust enough to withstand any possible sort of any
20 future disasters that may lie in wait in 2020?

21 So those are my questions. Thank you.

22 PROFESSOR BRUMMER: This is Chris, I think I'll

1 answer it but also I'll piggyback for Tom if he --
2 just, you know your charts were so interesting and I,
3 the correlation was so stark. And you know we were
4 talking about the rise of Stablecoins and part of the
5 bloom in Stablecoins has to do with potential hedging
6 done by individuals, looking to basically hedge
7 against crypto, but yet you're seeing in gold and in
8 other instances. Interesting correlation.

9 I don't know if you happen to have an observation
10 just on that general phenomenon and how that plays
11 into the Stablecoin conversation.

12 But Yesha, in response to your question, which I
13 think goes more to the international competition
14 question, if I understand it correctly. It's really
15 pretty basic.

16 The former CFTC Chairman Giancarlo, as many of
17 you know, has been really thinking through, along with
18 Dan Gorfine, sort of the place of what a digital
19 dollar would look like from the standpoint of the
20 provision of different kinds of financial services,
21 and I've worked with the Digital Dollar Foundation
22 trying to think through how that would work, but the

1 financial inclusion aspect to that is pretty big.
2 It's driven, for sure, innovation or at least attempt
3 to innovate in developing countries who are not
4 necessarily looking to transplant the U.S. dollar on a
5 global scale but maybe looking to increase their
6 market share, as money or as currencies at a regional
7 level.

8 And if you know enough countries or regions or
9 countries in regions are successful at doing that and
10 then I guess collectively, it could start to impact
11 the global aggregate. Some dominance of one will, of
12 the dollar. One interesting person Barry Eichengreen,
13 one of the world's leading economists talked
14 specifically about this and also observed that, you
15 know, if there's really going to be, however, a real
16 threat to the dollars usage. It would have to come
17 from one of the major currencies, major upgrades
18 either by China or by the ECB.

19 Although, again, he also had recognized that
20 innovations at the micro level could end up,
21 ultimately, in the aggregate impacting sort of the
22 market share of the U.S. dollar, so even relatively

1 small actors together if successful could have a
2 noticeable impact.

3 And with that, I'll pass it over to Tom.

4 MR. CHIPPAS: Thanks Chris. With respect to the
5 question regarding the sufficiency of clearing in some
6 of these more volatile periods that we've observed.
7 I'm not aware of any issues on settlement. I
8 certainly can tell you, there have been done on ErisX
9 but speaking more broadly, with respect to even non-
10 U.S. markets I'm not aware of any taking place.

11 Certainly, the BitMax example I gave you here is
12 one where the collateral posted drives, sort of, the
13 worst loss outcome. And again, it's a longer
14 conversation to explain how that particular product
15 works but in short, I'm not aware of any issues I
16 haven't seen any issues. I think I would not be the
17 only one to say that for the second part of your
18 question. Am I comfortable that all future disasters
19 could be averted? We're playing 2020 on expert mode,
20 so I'm not sure what's coming next. But I'm
21 comfortable that what's in place is definitely
22 sufficient for what we've seen today and what we can

1 expect today and through the volatility we've
2 experienced to-date so far. I'm not aware of any
3 issues so hopefully that answers your question but if
4 not happy to clarify anything.

5 PROFESSOR YADAV: Thank you Chris and Tom.

6 CHAIRMAN GORELICK: I've got another question
7 that Eddie Wen asked me to relay. It is directed for
8 Chris Brummer. And the question is that he sees in
9 the CBDC slides that you noted the possibility of
10 disintermediation. If CBDC is issued, and what impact
11 would this have on financial stability and economic
12 growth?

13 PROFESSOR BRUMMER: So that --

14 CHAIRMAN GORELICK: One quick add-on to that, in
15 particular, what would the implications be on FCMS and
16 do you think the benefits are worth the potential
17 trade offs?

18 PROFESSOR BRUMMER: Well, that is a -- I don't
19 even know how I want to say the one billion dollar
20 question, I don't know if it's a one trillion dollar
21 question, but it is a great question. Ultimately, if
22 you create, you know, again, depending on the design

1 of the CBDC and whether or not you have a CBDC that
2 enters into the wholesale space or into the retail
3 space. If you have a retail CBDC where, ultimately,
4 the money creation that has been reserved to the
5 central banks is somehow now being sort of reasserted
6 by the Federal Reserve, and where people and
7 individuals are taking their money out of commercial
8 bank deposits and are putting that money in central
9 bank deposits, that naturally is going to have a
10 destabilizing impact on some of the intermediaries in
11 the financial system.

12 And as a result, for some of the broker-dealers -
13 - I mean, for some of the FCMS, it could add at a
14 minimum, again to complicate sort of the float that
15 they use in order to engage in their transactions.

16 Only because, for the purposes of being complete,
17 there's no sense really that there's any central bank
18 that I know of, that's necessarily looking to dis-
19 intermediate their local financial systems to that
20 degree, and there's a number of reasons for it. You
21 know, central banks don't have experience onboarding
22 customers and they're interested in AML-KYC questions

1 and then there are even more profound questions about
2 well, you know if the money is taken out of a bank,
3 how and what happens to lending just overall.

4 And that ends up oddly undermining the capacity
5 of financial institutions. To lend does that create
6 some kind of knock-on effects for GDP growth, much
7 less monetary stability or instability. So no one, no
8 one knows and just that we're sort of operating at the
9 frontier of what is money.

10 You know, we're also operating at the frontier of
11 sort of digital economics and the transmission of
12 monetary policy and banking services, but it's clear
13 that if the greater that penetration by a central
14 bank, the more that risk becomes something you have to
15 take seriously in terms of the design of the CDBC, so
16 you put a cap in terms of how much money people can
17 move over or certain kinds of speed bumps, you know,
18 and the more it would become relevant to the
19 policymaking and supervision, that's being exercised
20 by the CFTC.

21 CHAIRMAN GORELICK: Thank you very much, Chris.
22 Thank you to the presenters for the questions. And I

1 think we are ready to wrap up now so for that I will
2 hand it over to Meghan Tente.

3 MS. TENTE: Thanks, Richard. I'll now move on to
4 closing remarks. I think we'll start with Chairman
5 Tarbert if you have anything you'd like to say?

6 CHAIRMAN TARBERT: Thank you very much. I
7 don't have anything in particular, other than to
8 say that this has been tremendously beneficial for
9 me. And I very much appreciate all of the hard
10 work that for the presenters that have gone into
11 these presentations. They've been very valuable
12 and insightful and I will give them a lot of
13 thought in the weeks ahead.

14 And I also want to thank again, my fellow
15 Commissioners particularly Commissioner Quintenz.
16 But also, most importantly, all of the members of
17 the TAC for spending your time on these matters.
18 It is very, very important to our Commission and
19 how we consider policy issues. So thank you so
20 much.

21 MS. TENTE: Thank you. Commissioner Behnam.

22 COMMISSIONER BEHNAM: Thanks Meghan. I'd just

1 echo the Chairman's comments. Thanks to all the
2 Committee members for your work, your contributions
3 and your Council really on these important issues a
4 broad range of topics that I think touch every part of
5 what we do at the CFTC. So a big thanks to all of
6 you, especially, Meghan, your leadership as DFO and
7 Richard as Chair of the Committee. And, of course, a
8 special thanks to Commissioner Quintenz for his
9 leadership on the TAC and bringing up these important
10 issues for us to hear about and consider from a policy
11 perspective.

12 So, with that I wish everyone well and obviously
13 safety and good health in these difficult times and I
14 certainly looking forward to seeing everyone as soon
15 as possible. Thank you,

16 MS. TENTE: Thanks. Commissioner Berkovitz.

17 COMMISSIONER BERKOVITZ: I'd just also like to
18 thank everybody. I feel they were extremely
19 informative and we could go on for hours on each of
20 these topics. I feel them to be very helpful
21 presentations, but really just scratching the surface
22 and you really have very thought provoking

1 presentations and questions and it's been very helpful
2 so thank all the TAC members. And thank you, Meghan
3 and Richard and Commissioner Quintenz for your
4 leadership in sponsoring this really important
5 committee. So thank you all again and be safe.

6 MS. TENTE: Thanks. We will now go to
7 Commissioner Quintenz.

8 COMMISSIONER QUINTENZ: Thank you, Meghan. Can
9 you hear me?

10 MS. TENTE: Yes.

11 COMMISSIONER QUINTENZ: Okay, thanks. I had
12 gotten disconnected and had to call back in and I
13 wanted to make sure my line was open.

14 Thank you to all of the presenters today for what
15 I thought were fascinating and very helpful and
16 insightful comments, thoughts, discussions,
17 interpretations on each of their topics. I think
18 everyone knows this, but I'd just like to highlight
19 that you know what is presented today is actually the
20 result of a number of conference calls that take place
21 on a weekly or biweekly basis, in which these very
22 talented and quite busy people give their time and

1 energy, so that the Commission can benefit from their
2 thoughts in this kind of format.

3 I'm just very grateful for, you know, obviously,
4 the participation today but the consistent
5 participation in those calls, you know, between
6 meetings and for the last number of months, and few
7 years here.

8 So I'd like to thank everyone for another great
9 and successful meeting. Meghan thank you to you for
10 your leadership. And thanks again to our subcommittee
11 ADFOs John, Scott, Jorge, and Phil and Richard again
12 to you for your leadership and guiding hand on
13 motivating the discussion. And with that, Meghan I'll
14 turn it back to you to close the meeting.

15 MS. TENTE: Perfect. Thanks, everybody. With
16 that, this meeting is now adjourned.

17 OPERATOR: Thank you all for participating. That
18 concludes today's conference. You may now disconnect.

19 (Whereupon, at 1:50 p.m., the Technical Advisory
20 Committee meeting was adjourned.)

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