Keynote Address of
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FinTech and Real-Time Regulation

Introduction

Good morning ladies and gentlemen. Thank you very much Alec for your kind introduction. I am grateful for the honor of presenting these remarks at the outset of this conference.

I would like to thank Risk and Risk.net, as well as the Operational Risk Advisory Board, for convening this conference and for hosting this program today and tomorrow. You have brought together experts and practitioners from a range of organizations. These include banks, asset managers, brokerage firms, consultancies, technology and information services firms – as well as regulators. This type of collaboration and communication is critical in facing the challenges of today’s digital markets.

Potential for Real-Time Regulation

Today, I would like to focus on some of the operational risks, as well as opportunities, that FinTech innovation and emerging technologies may bring. I will invite you to consider what the new capabilities of blockchain and distributed ledger technologies, perhaps in conjunction with artificial intelligence tools, could mean for the work of regulators. Could these technologies mean the dawn of a new era – the era of “Real-Time Regulation”? Are we ready for this? Is this something we should welcome?

But first, I would like to review the changing digital landscape and introduce you to LabCFTC, the CFTC’s hub for regulatory engagement with FinTech innovation.

¹ The remarks in this speech reflect solely the personal views of the author, a former employee of the Commodity Futures Trading Commission, and do not necessarily represent the views of the Commission, the individual members of the Commission, its staff or the LabCFTC Team. Copyright Jeffrey M. Bandman 2017, all rights reserved.
Digital Transformation

We are in a period of transformational technological change. We see digital transformation in our daily lives, at a personal as well as a professional level. We see transformation in the ways we communicate with friends and family, the ways we consume and experience information and entertainment, and in so many aspects of our business and professional lives. No matter what we do, no matter what business we are in, technology plays a central role in underpinning, producing and delivering products and services. As I look around this room, is there anyone here today who feels that he or she does not work for a “technology company”?

We have also seen the transformation of the world’s trading markets from analog to digital. Once upon a time, there were open outcry trading pits in large financial centers like New York and London, as well as places like Minneapolis and Winnipeg. These have been replaced by trading taking place electronically through high-speed networks and data centers around the globe. An increasing amount of activity reflects algorithms trading with other algorithms, themselves increasingly shaped by artificial intelligence assessing new and alternative data sources. Automated trading now constitutes up to 70 percent of regulated futures markets, approximately 80 percent of cash equities markets and 70 percent of foreign exchange spot markets.

Other digital innovations present regulatory challenges as well as challenges to businesses and business models. We can now clearly see a fundamental transformation of global trading and risk transfer markets. And today, multiple technologies are converging in maturity. This powerful convergence is poised to drive the next wave of innovation. These technologies include:

- blockchain and distributed ledger technologies;
- “big data” capabilities;
- predictive analytics;
- artificial intelligence and machine learning;
- robotics and automation;
- “smart” contracts;

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2 A recent internal report by the CFTC’s Chief Economist looked at over 1.5 billion transactions across over 800 products on the Chicago Mercantile Exchange over a two-year period. It found that the percentage of automated trading in financial futures – such as those based on interest rates, currencies or equity indices – was 60 to 80 percent. But even among many physical commodities, there was a high degree of automated trading, such as 40 to 50 percent for many energy and metals products.

• biometrics and other advanced personal identification tools;
• network cartography analysis;
• quantum computing; and
• the power and flexibility of cloud computing -- amplifying the transformational impacts of all these other technologies.

**Powerful Convergences**

And we are seeing a further powerful convergence. The cost of launching new ventures has decreased dramatically; meanwhile the speed and scalability with which innovations can be brought to market have increased dramatically – due to factors like open source software and the cloud. In the early 2000s, a single iteration of the prototype innovation cycle could take 12 to 18 months – develop an idea, test the concept with prospective customers, raise seed or Series A funds for an initial build, buy and configure expensive hardware, develop and implement software and then, finally, show the prototype to potential users. That process can now be achieved in weeks – allowing ideas to be developed, demonstrated, iterated and improved – or fail fast. That same 12-18 month period now supports countless iterations and refinements to improve – or discard -- new initiatives.

The pace of investment in these technologies, and in FinTech and RegTech more broadly, has significantly accelerated in recent years. According to one source, it has increased at a cumulative annual growth rate of over 45% from 2011 to 2016.⁴

Regulation by the CFTC and other authorities, in the U.S. and around the world, must keep pace with this transformation. The pace is accelerating, due to the powerful convergences that I have just described. A critical question – how to avoid being an analog regulator of rapidly digitizing global markets

**The CFTC’s FinTech Initiative: LabCFTC**

An important step is for the CFTC and other regulators to embrace innovation by direct engagement with innovators. That is why we launched the CFTC’s FinTech initiative: LabCFTC.⁵

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⁵ [http://www.cftc.gov/LabCFTC/index.htm](http://www.cftc.gov/LabCFTC/index.htm)
LabCFTC will be the focal point of CFTC FinTech policy consideration and development, and its hub for engagement with FinTech innovators.

LabCFTC has two core objectives. The first is to provide greater regulatory clarity that promotes FinTech innovation and provides an additional new channel for innovators to engage with regulators without engaging armies of lawyers, compliance officers and regulatory affairs specialists. The second is to identify and learn how to utilize emerging technologies that can enable the CFTC to carry out its own mission more effectively and efficiently.

As Acting Chairman Giancarlo has explained, “LabCFTC is intended to help us bridge the gap from where we are today to where we need to be: 21st century regulation for 21st century digital markets. LabCFTC will help the CFTC:

- cultivate a regulatory culture of forward thinking;
- become more accessible to emerging technology innovators;
- discover ways to harness and benefit from FinTech innovation; and
- become more responsive to our rapidly changing markets.”

LabCFTC “GuidePoint”

LabCFTC includes two core components. The first is meant to help innovators engage with the CFTC. The second will help the agency in engaging with them.

The first component, GuidePoint, provides a direct point of contact for FinTech innovators to engage with the CFTC, learn about the CFTC’s regulatory framework and obtain feedback on the implementation of innovative technology ideas for the market. GuidePoint is a tool for innovators to efficiently communicate with the CFTC to seek specific regulatory guidance about proposed applications of new technologies and obtain timely and meaningful feedback. This feedback, particularly at an early stage, could help innovators save time and money -- by helping them understand relevant regulations and the CFTC’s approach to oversight.

“Crowdsourcing” through GuidePoint

Innovation may present situations that fall within the spirit, but not the letter, of regulations. GuidePoint may thus help regulators detect analog rules – rules from an analog era, no longer suitable for a digital world. GuidePoint may also serve as a

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7 http://www.cftc.gov/LabCFTC/GuidePoint/index.htm
market-based form of crowd-sourcing in the following sense: how can regulators know and prioritize which rules are most in need of updating in the face of new emerging technology? When regulators meet with innovators, patterns may emerge – patterns of rules that come up time and time again as the most obstructive, the least able to adapt to evolving technologies – and the most relevant to active business initiatives. This will help focus limited resources

CFTC 2.0

The other core component of LabCFTC is called “CFTC 2.0.” CFTC 2.0 is designed to strengthen the agency’s understanding of new technologies, and how they could be applied to support its core missions.

The CFTC will establish an internal CFTC 2.0 FinTech/RegTech innovation lab to better understand new technologies and to identify potentially useful applications. CFTC 2.0 will look to explore ways to use FinTech to enhance CFTC functions and duties.

I am particularly pleased that that Acting Chairman Giancarlo will look to explore how LabCFTC could establish FinTech innovation competitions under the America Competes Act. Such competitions could provide innovators the opportunity to demonstrate the capabilities of emerging technologies that might apply in areas that relate to the agency’s important missions.

Early Returns

Since LabCFTC went live last month, it has received dozens of inbound communications from New York, around the country, and around the world. The LabCFTC team has rapidly begun the process of meeting and engaging with these innovators, and learning about their offerings. Early returns have been positive. The innovators appear excited that a U.S. market regulator is listening and has begun this type of initiative. They are keen to help the regulator understand the evolving landscape.

8 http://www.cftc.gov/LabCFTC/CFTC2_0/index.htm
Lessons Learned – How are regulators engaging with FinTech innovation

In January, Acting Chairman Giancarlo asked me to advise him on FinTech matters and lead a review of FinTech innovation issues. The review was focused on three issues:

• How can FinTech innovation help identify CFTC rules and regulations that need to be updated for relevance in 21st century digital markets?
• How should the CFTC leverage FinTech innovation to make us a more effective regulator?
• What is the right role of the CFTC in promoting US FinTech innovation in CFTC regulated markets?

To start to answer those questions, we took the opportunity to study the actions of other regulators around the world, as well as close to home.10 Several regulators have already established their own initiatives to promote innovation. It has been enormously helpful to learn from them as we sought to adapt their experiences and insights to our own needs and those of our markets. I am grateful for their willingness to engage in open dialogue, and to share their experiences and challenges.11

I have become a great admirer of a number of these programs and their leadership. We drew on their experiences and their successes, as we thought about how to apply it to the CFTC and worked to launch LabCFTC. We also met with innovators themselves, as well as investors in such firms. It was particularly helpful to hear from firms who had been through other regulators’ programs.

These efforts have led me to believe it would be useful to suggest for consideration some “Core Principles for Regulators for Engagement with Innovation”12. I should say at the outset that these are humbly intended to begin a dialogue, with due respect for the wisdom and experience of others, and for all stakeholders.

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10 This process involved not just my own efforts of course but that of my colleagues on the LabCFTC team, and the FinTech staff working group, and others
11 Regulators have also made important contributions through preparation of reports by formal groups; these include the CPMI’s Distributed ledger technology in payment, clearing and settlement – an analytical framework published in February 2017 http://www.bis.org/cpmi/publ/d157.pdf and the IOSCO research report on Financial Technologies (FinTech), also published in February 2017 https://www.iosco.org/library/pubdocs/pdf/IOSCOPD554.pdf
12 I introduced these principles in my keynote remarks opening the Securities Industry and Financial Markets Association (SIFMA) FinTech Conference in New York on June 5, 2017. A copy of those remarks is available via my LinkedIn page or upon request.
Core Principles for Regulators – for Engagement with Innovation

1. It’s fine to start small. In fact, most regulatory programs have started with two or three people. Further growth has occurred where tangible successes and needs have been shown to justify application of greater resources.

2. One size does not fit all. Regulators are not identical. Although there may be significant overlap, we have different statutory remits, different statutory authority, we oversee different markets and different registrants. For example, market regulators and central banks may have very different degrees of autonomy, different regulatory tools and even different degrees of flexibility in testing or procuring technology. Although innovators often expect us to be able to change these frameworks ourselves, typically they are set by statute by executive authority, legislative authority or both. Given limited resources, it is logical for regulators to focus on what we are actually authorized to do. Also, very few regulators are linked to sovereign wealth funds, so innovators should not expect investments from us.

3. We don’t regulate technology. Our focus must be on the application of technology – applied technology that takes the form of products, services, activities or regulated entities in our markets, or applied technology that can help us do our jobs more effectively and efficiently.

4. Remain technology-neutral. Regulators are not trying to pick winners and losers among innovative technologies – that is for the market to decide. Each technology will bring its own opportunities and risks. Regulators will need to understand these risks, and ensure that their regulatory frameworks and supervisory models are adequately equipped – our mission to ensure the safeguards of customer protection and market integrity, of systemic stability and resilience, remain as vital as ever.

5. Keep an Open Mind. I admit this seems obvious. However, in the process of my own engagement with innovation I have come to recognize deeper skepticism on my own part than I initially understood. Of course, it is healthy for regulators to be skeptical, and to focus on risks of new technologies, solutions and processes. A “Wake-up Moment” for me came when, in Hong Kong earlier this year, I saw customer onboarding technology and KYC/AML processes that struck me as potentially superior to and safer than those widespread today. Prior to that experience, I had assumed that existing, established methods with at least one step involving physical presence were inherently superior, and that regulators would at best be making allowances to accommodate experimentation with new alternatives. Instead, I recognized what a leap forward these new technologies
and processes could offer. These innovations also hold the promise of greater financial inclusion, greater access for end users to our own markets, in a safe and secure way.

6. **Engagement benefits both sides.** We can help innovators navigate our regulatory frameworks -- and engaging with the innovators helps the regulators too. Engaging in a constant and evolving dialogue can help regulators understand the impact of regulations on the potential application of new technologies in the markets we oversee. This is good for markets, innovation, jobs and growth -- and it is good for us too. It helps us do our jobs better.

7. **It starts from the top.** Support for the vision and direction from the leadership of the organization is critical. There will inevitably be hurdles to overcome, choices to be made, and competing priorities to be balanced at both the development and execution stages. Identifying and addressing challenges early on will help ensure that demands on resources and the creative friction introduced by innovation do not come as a surprise (although not all can be anticipated).

8. **Widen the circle.** To achieve the greatest benefits of engagement with innovation, information and engagement should go beyond the core FinTech team. From what I have learned in my own organization as well as from other authorities, this can be one of the greatest challenges -- and can lead to the greatest rewards. The women and men engaged daily in core mission activities -- supervision and examination of registrants, data and risk analysis, developing, monitoring and applying an agency’s rules and policies -- they may have the deepest level of understanding of the implications, the risks and rewards of emerging technologies, and their insights are invaluable. They may have the most to tell us and the most to gain. However, their time and attention is necessarily focused on those core mission activities due to resource constraints and established priorities. Leveraging and further developing their in-house expertise can be an important dimension of success.

9. **Go where the innovators are.** Where possible, try to meet innovators on their own turf rather than make them come to you. This is particularly relevant where the location of government -- for example Washington, D.C. -- is at a distance from the financial or innovation center.

10. **Make the process accessible.** Make it easy for innovators to contact you. Once they do, provide one stop shopping through a single point of contact. Provide timely and meaningful feedback. Regulators are unlikely to move at the pace of a start-up, however, and it is unrealistic for innovators to expect a “fail fast” approach on issues with far-reaching implications.

I look forward to your thoughts and reactions regarding these principles.
OpRisk and FinTech – Real Time Regulation

I turn now to a different subject – operational risk implications of emerging blockchain technologies, and their implications for regulation.

One of the potential benefits of adoption of the distributed ledger is the prospect that data will be available to market participants and regulators in real time. This has been heralded by some as a great improvement over current practices. Please join me as we unpack this a bit and consider what it might actually mean for regulators.

Today, except in emergencies and unusual situations, the actions of regulators are generally not performed in real time. They are for the most part performed end of day, T+1 or afterwards. This is by no means a criticism of regulatory practice or the safety and wisdom of the approach of my former colleagues or other regulators. I have the highest regard for their vigilance and dedication – these are central to the safety and soundness of our markets and the trust the public, and investors, place in them.

To the extent real time oversight occurs, that is generally a responsibility performed by the exchanges or marketplaces, which have a duty to police their own activities, and the trading and brokerage firms, which monitor their own activities and those of their clients accessing the markets through them.

So here is a vision that has been posited - as parties transact, the information is captured in real time on the shared ledger. Whether these are private permissioned ledgers or open ledgers, the information is protected from those who should not see it through advanced cryptography. Regulators however will have “auditor” or “regulator” nodes on the ledger that allow them rights to access the information in real time, as it is created and the ledger is populated. In such a scenario, we may even need a new noun or verb to describe it, as this paradigm is fundamentally different from traditional “reporting”. In the event there is improper activity such as fraud or manipulation that jeopardizes market integrity, or dangerous buildup of risk that poses threat of contagion or damage to systemic stability, regulators can detect such threats and respond immediately.

Sounds great, right?

Or does it?

13 For example, while markets are monitored in real time, intensive data analysis, including analysis of “what-if scenarios” is typically performed after the fact on end of day order book, transaction history, position and margin/financial resources data. Some data is received by regulators and supervisors less frequently — monthly, quarterly or at greater intervals, and often with considerable lag time from the end of the period the data relates to.

14 To be clear, I am not suggesting regulators have no real time tools, or that they spend no time and none of their efforts on real time market monitoring and surveillance. I also wish to be clear that I view these after the fact analyses as enormously valuable and effective.
There are operational and practical risks and challenges that I believe need to be addressed before such a scenario is achievable. And then we also need to consider whether it is truly desirable – and if so, under what terms.

Data Quality Challenges Magnified in Real Time

The data sets regulators typically receive have had the benefit of time, scrubbing, normalizing. Fat finger errors, decimals in the wrong place, false alarms – these generally should be detected and cleansed by intraday and end of day business processes – processes that the operational risk professionals gathered in this room today know all too well (and likely have developed for their organizations). Distributed ledger data coming from multiple sources with varying degrees of sophistication and error detection and correction procedures may not be of the highest reliability - at least not right away. The quality of data sourced from blockchains or distributed ledger may, in time, be of the highest quality, even better than the data available today. But the operational workflows, procedures and controls will take time to mature.

Data quality and data reliability issues are more pronounced when any of us receives and reacts to the data in real time - the risk of misreading, overreacting, overcorrecting – in the face of these apparent “facts" -- is greatly increased.

Organizations just looking at their own positions and activities are still developing capabilities for reliable understanding of “real-time risk”, for example - and that is within a single organization. For a regulator looking across multiple entities that will be even more challenging. Are regulators ready to drink from the firehouse of real time data?

Wishing for Interoperability

Operational risk may be magnified when data is coming from multiple sources. Today there are multiple protocols and platforms for distributed ledger technology - bitcoin blockchain, ethereum, ethereum classic, enterprise ethereum, Hyperledger, Digital Asset Holding's Digital Asset Modeling Language, R3CEV's Corda, the Ripple ledger protocol, Axoni Core and numerous others. In many cases, there is not a single shared global instance of the ledger - there are multiple instances being implemented, in open or permissioned fashion.

It remains to be seen what choices markets will make as these technologies compete and mature. It seems plausible that multiple platforms and protocols will survive, even thrive. For the regulator, this may mean sorting through data from multiple ledgers, operating under multiple protocols, to assemble or curate the

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15 For example, data quality could be higher if the data set in the shared ledger that regulators are viewing is the same data that transacting parties are actively using in the ordinary course of business for valuations, payment flows and other activities.
necessary view of even a single entity, market or asset type. To do this end of day or even by the end of the following day would itself be challenging. To accomplish this in real time would be an even greater challenge.

To be fair, distributed ledger pioneers have recognized the importance of developing standards and ensuring that these protocols be interoperable. I commend their prescience and their efforts to develop these standards early on. However, wishing cannot make it so. Harmonizing and standardization are difficult tasks. We have seen this when it comes to swaps data reporting, and the widely discussed challenges around harmonizing swaps data. For example, my understanding is that concerted global efforts by industry and regulators to harmonize credit default swap fields have resulted in consensus regarding approximately 50 fields in four years.

The Need for New Tools and Skill Sets

The tools needed to assess and monitor incoming real-time data are different from those that are used to assess static data from an end of day file covering all the activity of the previous day or week. The front end, the analytics, the processing capacity. The good news is that innovators are developing solutions that should help address these concerns - big data analytics, machine learning, cloud computing and so forth. However, it will take time for these solutions to develop and be reliably applied to these new data sets - even if they came from a single source. Add that to the multiple ledgers and multiple instances and multiple data standards - this is not going to happen overnight.

In this regard, the promise of Artificial Intelligence, possibly in combination with other emerging technologies, may assist regulators as well as market participants in making sense of this exploding volume of data, coming at us faster and faster.

I would note that even the definition of what we include as "data" has broadened to include alternative data, sensor data from the internet of things (IOT), satellite data and others. The growing entry of so-called “TechFins” into financial services is likely to accelerate this trend.16 17 These companies – think of Google, Amazon, Facebook, Apple or Alibaba -- have access to extensive information about consumer


historical behavior and choices that may inform traditional financial services activities like consumer and small business loans. TechFins have access to vast troves of information that traditional financial services companies do not have, and that financial regulators do not have access to and certainly do not have experience reviewing.

Likewise, in practical terms it remains to be seen whether the talented and dedicated personnel currently in place have the necessary training and skill sets to work with real time data and the new data sets. Will it be feasible to provide additional training in new skills and systems and data sets, or will it be necessary to add new staff with additional capabilities?

**Powers and Procedures**

Regulators have emergency powers and procedures, of course. However, these are designed for unusual circumstances, not daily activity. If regulators are receiving information in real time, then what will they do with the information if it raises concerns as to risk, market integrity, systemic stability, improper conduct or other matters within their statutory domain? It strikes me that they will need procedures and protocols in place that do not exist today for review and escalation, appropriate checks and balances by senior leadership, before action may be taken. These will need to be considered and may be the appropriate subject for a formal rulemaking with public notice and comment.

"Real Time Regulation"

If regulators have the tools and information to monitor and respond to developments in real time, the temptation to act on that information will inevitably develop. Indeed, that is likely to be consistent with the public's expectation. What is the point of the regulator having all this information if it is not going to do anything? When a catastrophe or crisis occurs, the questions will intensify: if the regulator had this information in real time, shouldn’t it have taken the necessary steps to prevent it? And indeed, through timely intervention, the regulator may quickly mitigate or prevent the impacts of wrongdoing. It may nip in the bud contagion or system-threatening risk events.

Or – a regulator may misread the information. It may misreact or overreact. Its intervention, though well meaning, could exacerbate problems, disrupt markets, reallocate gains and losses, and have the impact of central command and control picking winners and losers.

I see this scenario as a "when", not an "if". The day is coming -- although certainly not tomorrow -- when regulators will be receiving data in real-time, whether through distributed ledgers or other technological advances. This will present a set of new operational risks, due to the challenges of working with real-time data, and important new policy choices. Should the regulator have greater power to intervene in real
time? Under what circumstances? How should those powers be constrained, what are the appropriate checks and balances? Whose voices should be around the table when those decisions are made?

And what if the regulator does act on this newly available information - how should gains and losses resulting from regulatory intervention be allocated?18 Today, in financial markets, this question is posed in extraordinary circumstances, such as the resolution of a systemically important financial institution - what happens when these circumstances become ordinary?

Conclusion

I am very excited about the benefits FinTech innovation will bring to our markets, to make them even more resilient and competitive. I believe regulators understand the need to keep pace with these changes and with the digital transformation of our economy and markets. Over time, I also believe the capabilities of regulators to process and use the fruits of innovations, new tools and real-time data, will improve – and then we will see what the era of Real Time Regulation brings.

Thank you again for inviting me here today, and I would be happy to take a few questions.

18 Consider for example, the “No Creditor Worse Off” doctrine developed in the context of regulatory intervention in extreme circumstances, such as when a systemically significant financial institution (such as a bank or clearinghouse) is deemed to be failing or likely to fail, and the “resolution authority” exercises its resolution powers. The exercise of those powers by a governmental authority is itself viewed as extraordinary, and subject to calibrated procedural safeguards. The allocation of losses due to that intervention is likewise of critical importance, as is the determination of the “counterfactual” scenario – what would have happened absent intervention – as a baseline of comparison in calculating the economic impact of the regulator’s actions.