

Presentation of

Jeff Bandman¹

to the

**P2P Financial Systems (P2PFISY) Third International Workshop,
University College London Centre for Blockchain Technologies
London**

July 20, 2017

Real-Time Regulation and Blockchain Data

From Derivatives to Blockchain – A Regulator’s Journey

Introduction

Good morning ladies and gentlemen. Thank you very much 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 Dr. Paolo Tasca and the Organizing and Scientific Committees for inviting me here today, as well as for convening this conference and for hosting this program today and tomorrow. You have brought together scholars, experts, scientists, technologists, regulators and practitioners from a range of countries and organizations. This type of collaboration and communication is critical in facing the challenges of today’s digital markets.

I must also say – it was an unexpected pleasure to be greeted in the lobby by the embalmed skeleton of Jeremy Bentham, father of utilitarianism, when I arrived here this morning.²

¹ Jeff Bandman is Principal, Bandman Advisors, a New York-based consulting and advisory practice. www.bandmanadvisors.com. He was previously FinTech Advisor at the U.S. Commodity Futures Trading Commission (CFTC). He was Founding Director and architect of LabCFTC, the first regulatory FinTech innovation hub launched by a U.S. market regulator. He ran the CFTC’s Division of Clearing and Risk, the CFTC’s Office of International Affairs, and was Special Counsel to CFTC Chairman Timothy Massad. The remarks in this speech reflect solely the personal views of the author. Copyright Jeff Bandman 2017, all rights reserved.

² This is not a joke. Bentham left instructions for his body to be dissected for science and then preserved as an “auto-image”. It was given to UCL in 1850. On special occasions, it has been brought to meetings of the college council and listed as present, not voting. <http://www.chem.ucl.ac.uk/resources/history/chemhistucl/hist03.html>

Introduction

To introduce myself a bit –

- Until recently I served as a financial regulator at the U.S. Commodity Futures Trading Commission, where I was responsible for FinTech engagement and set up LabCFTC. LabCFTC is the first innovation lab established by a U.S. market regulator – I will return to this subject later.
- Prior to that, I was responsible for overseeing critical market infrastructure – to be specific, running the division overseeing clearinghouses and clearing members.
- With respect to the topic of this conference – P2P Financial Systems – my experience gives me two very different types of focus and two different lenses:
 - On a bad day in clearing – financial stability could be in peril.
 - On a bad day in FinTech – the webex didn't work . . . slides were missing.
 - Kidding aside, I do feel strongly that FinTech engagement and engagement with innovation is critical for regulators – otherwise they risk getting left behind by pace of change
 - From the clearing perspective, some of the initial concepts of blockchain technologies struck me as troubling – for example, reliance on an anonymous, permissionless ledger – if applied to mission critical systems and operations of systemically important market infrastructure.
 - A known, trusted, permissioned blockchain sounded more promising for that type of use case. A ledger network comprised of a small group of trusted, known participants – that framework sounded more familiar for a clearinghouse regulator – akin to the relationship between a clearinghouse and its members as it exists today. A node for regulators built in from the outset struck me as another promising idea.
- I lived in London 10 years ago, and worked on two startups, what we would now call FinTechs, for electronic trading of financial products. One launched, one did not.
 - It's great to see all the support for innovation – more than we had then.
- So I look at the world from the business as well as the regulator lens.

Real-Time Regulation – The Dawn of a New Era? Are we ready?

Today, I will invite you to challenge one of the core potential “benefits” of distributed ledger technology. I expect that most of us here share a belief in the transformational potential of blockchain technology. I hold that belief as well. I am excited by the great opportunities it may bring – these include benefits to markets, to regulators of those markets, to P2P activities, to our economy and to society writ large. 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?

And today I will also focus on potential risks that I consider quite frightening indeed – in the hope that the clever and creative minds gathered here at this conference and around the world can start to tackle these challenges, to pave the way for safe adoption of these powerful technologies.

That will be the principal focus of my presentation here today – the risks of Real-Time Regulation powered by DLT. These risks may be powered by the ways in which regulators will receive the new data -- made newly possible through DLT. Data has been called the new oil, the energy fueling the FinTech and blockchain revolutions.³ I believe that acceleration of adoption of blockchain technology will tempt many into believing that, DLT data in hand, we are ready for an era of “Real-Time Regulation”.

I am not suggesting that regulators themselves will necessarily be overconfident in their ability to understand and use this new data wisely. I dare say, speaking as a former regulator, we tend to be a cautious lot! Public expectations may be the greatest accelerator of these risks. If regulators have information, the public expects them to use it. This intensifies in hindsight, when connections and causal relationships that may have been difficult to detect before a financial catastrophe or crisis are more plainly visible.

Parallel lessons from regulators’ experience with new swaps data

I will also compare, as an instructive parallel, the experience of my former agency, the U.S. Commodity Futures Trading Commission (CFTC), as well as European regulators. Challenges they faced with new swaps data they began to receive in recent years can help inform our appreciation of these risks and pitfalls. I will suggest that we can regard these as a highly relevant and recent case study of distributed ledgers – though importantly, without distributed ledger or blockchain technology. We can study the experience of regulators and industry with over 30⁴ of these Swap Data Repositories– and since I am in the UK I will call them by their local name, Trade Repositories (TRs) – around the world. We can apply the lessons of this array of Trade Repositories as we consider use of DLT data and the practicalities and policy implications of Real Time Regulation.

³ <https://www.quora.com/Who-should-get-credit-for-the-quote-data-is-the-new-oil>

⁴ see Svein Andresen, *Reforming Derivatives Markets, a Stocktake*, at p. 3 <http://www.fsb.org/wp-content/uploads/Andresen-ISDA-Reforming-derivatives-markets-a-stocktake.pdf>

I will also share some of the lessons I’ve learned in recent years from leading the CFTC’s efforts to learn about new blockchain technologies and digital assets. This culminated in the CFTC’s launch of LabCFTC earlier this year – the first FinTech innovation hub to be launched by a U.S. market regulator.

Introducing “Real-Time” 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.⁵ 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. Most of these regulatory actions and analyses are typically performed no sooner than end of day, or the next day, sometimes referred to as “T+1”, or considerably afterwards.⁶ Many types of data are received by regulators, supervisors and examiners less frequently – monthly, quarterly or at greater intervals, and often with substantial lag time from the end of the period the data relates to. 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.⁷

To the extent real time oversight occurs, that is generally a responsibility performed by the regulated parties themselves. This may be the exchanges or marketplaces, which have a duty to police their own activities. This may be trading and brokerage firms, which monitor their own activities and those of their clients accessing the markets through them, or they may be swap dealers or clearinghouses using new “real-time risk” tools monitoring their own counterparty credit exposures. This may be banks that have a duty to monitor their own consumer finance practices, to ensure that there are not unfair or deceptive practices, predatory or discriminatory lending, or the like. Or this may be credit institutions monitoring the performance of their commercial or real estate loans, or the status of trade goods in transit.

There is plenty of real-time monitoring taking place – but virtually none of it is being done by regulators. It is being done by businesses, for the most part using purpose-built systems and data sets for those activities.

⁵ See, for example, “R3 Targets Regulators for Next Wave of DLT Expansion,” CoinDesk, March 22, 2017. <https://www.coindesk.com/r3-targets-regulators-next-wave-dlt-expansion/>.

⁶ 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.

⁷ 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.

So here is a vision that has been posited - as parties transact, the information is captured in real time on the shared ledger.⁸ 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 relevant information in real time, as it is created and the ledger is populated.

New vocabulary for a new paradigm?

In such a scenario, the vocabulary we use today may itself no longer be up to the task of describing the new practices. We may even need new nouns or verbs to describe all this, as this paradigm is so fundamentally different from traditional “reporting”. In this new paradigm, the data may become available and known to the regulator at the time of its creation, by virtue of its mere existence.

So for example, the movement of goods from manufacture, to intermediate steps in transportation and shipping – can be tracked via a shared ledger updated in real time throughout that lifecycle. As these updates occur, they can be viewed by the relevant parties – and by their regulators. When new trades occur, when loan payments are made – or notation of failure to be made when due, when appraisals are made of properties for rent or sale – that may likewise be reflected on the shared ledger in real time.

Consider also that blockchain technology may operate in combination with other advances, like sensor data from the Internet of Things, telling us the condition and status of crops that are harvested and sent to market at every step along the way, of oil in tankers, of chickens in trucks.

So as a result of the availability of data in real time from all these ledgers, regulators can see patterns emerge – not in the rear view mirror under today’s methodologies, but through the windshield and on their dashboards, in front of their eyes.

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, or a pattern of non-performing loans that threaten the integrity of a financial institution, regulators can detect such threats and respond immediately. Perhaps they can even anticipate the threats before they fully materialize. They can grip the steering wheel and perhaps turn it to one side or another, or even apply the brakes! They can avert the dangers and harms!

⁸ See, e.g. Financial Conduct Authority Discussion Paper on Distributed Ledger Technology, p. 15 <https://www.fca.org.uk/publication/discussion/dp17-03.pdf>; European Securities and Markets Authority Discussion Paper, June 2, 2016 https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf

Sounds great, right? Or does it?

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 standard business processes – processes for regulatory reporting that those of you here today who have worked for regulated institutions know all too well (and may indeed have developed for their organizations).

It is worth spending a moment to consider what reporting means today. Regulatory reporting is one of the largest costs in the financial services industry, requiring enormous resources measured by spending, people or technology.⁹ Reporting typically means that the data is assembled by the reporting parties, cleansed and normalized, scrubbed to correct errors, adapted from (in all likelihood) multiple internal systems and ledgers of the reporting entity to fit whatever format, guidebook or requirements the regulator has stipulated. The same data may be reported to multiple regulators for different purposes, often multiple regulators in multiple jurisdictions, and sometimes to different divisions of the same regulator but for different purposes and in different formats. No matter how many different formats or protocols, each report must be compliant. Penalties for non-compliance may be severe, and general expectations are that the cost of future compliance will grow.¹⁰ Entities often face challenges in managing or reporting data because data may be generated by different business lines, and managed in independent silos within the organization. These may result in operational or technical barriers – or even legal barriers – to efficient data sharing within an entity. Much of the effort and spend in regulatory reporting involves efforts to aggregate, reconcile and fix data to meet all of these reporting between the time the data is created, and when it must be provided to the regulator – whether overnight, T+1, end of month, end of quarter or end of year.

These processes are extremely expensive, time-consuming, labor- and processing-intensive, and repetitive. A big part of the promise of blockchain/DLT is the opportunity to introduce vast efficiencies and to reduce all these efforts and costs dramatically. BUT – and this is important – these processes have been refined and battle-tested, and the output of all these processes is, for the most part, data that has been cleansed and may reliably be used by businesses and regulators. It isn't pretty. It definitely could be

⁹ See generally, Thomson Reuters Study, Cost of Compliance 2016, <https://risk.thomsonreuters.com/content/dam/openweb/documents/pdf/risk/report/cost-compliance-2016.pdf>

¹⁰ See Thomson Reuters Study, Cost of Compliance 2016, p. 24.

more efficient. But what you get is generally clean, reliable data. So when you put that data into the engine, the engine should work just fine.

Distributed ledger data coming from multiple sources with varying degrees of sophistication and error detection and correction procedures – is it realistic to expect those to be of the highest reliability? Certainly not right away. The quality of data sourced from blockchains or distributed ledgers may, in time, be of the highest quality, even better than the data available today. 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. But these operational workflows, procedures and controls will take time to mature.

Are regulators ready to drink from the firehouse of real time data? Someday, perhaps – but not today.

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.

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, bitcoin unlimited, bitcoin cash, bitcoin classic, ethereum, ethereum classic, enterprise ethereum, Hyperledger Fabric, Digital Asset Holding's Digital Asset Modeling Language, R3CEV's Corda, the Ripple ledger protocol, Axoni Core and numerous others. In most cases, there is not a single shared global instance of the ledger. We can expect that in the future, a multitude of instances will be implemented.

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 is likely to mean sorting through data from multiple ledgers, operating under multiple protocols, to assemble or curate the 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.¹¹ 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.¹² Even the simplest terms and fields can be represented in a multitude of different ways – which mean the same thing in certain settings and different things in others. As an example, CFTC Chairman Timothy Massad presented this slide during a speech on swaps data in 2015. It shows 9 different ways the most widely used vanilla Reuters benchmark rate for foreign exchange is represented in the swap data repositories regulated by the CFTC.¹³



Variations in Reporting

How is the WM Reuters FX benchmark reported?

- 1) REUTERS
- 2) LONDON 4PM WMR
- 3) WMR (PTAX)
- 4) WMCO (4PM LDN)
- 5) WMR
- 6) WMR SPOT 10AM
- 7) WMR (NDF)
- 8) 4PM LDN
- 9) WMR SPOT 01

1

¹¹ See e.g. SWIFT White Paper, September 19, 2016, Distributed Ledgers, Smart Contracts, Business Standards and ISO 20022, available at <https://www.swift.com/news-events/white-papers#topic-tabs-menu>

¹² See Keynote Remarks of Chairman Timothy Massad before the Futures Industry Association Expo, November 4, 2015. <http://www.cftc.gov/PressRoom/SpeechesTestimony/opamassad-33>.

¹³ http://www.cftc.gov/idc/groups/public/@newsroom/documents/file/wm_slide_massad110415.pdf

Let us pause to consider this: how is it that something so widely understood and agreed shows up 9 different ways?

He also showed this slide – it shows 8 different ways that a single reference rate for the most liquid, standardized 5-year credit default swaps appears.¹⁴



Variations in Reporting

How is the 5-year term of a single series of CDX reported?

1. **CDX-NAIGS19V1-5Y**
 2. **CDX.NA.IG.19-V1: 5YR**
 3. **CDX.NA.IG.19-5Y**
 4. **CDXIG-19_V1_125_5YR_DFS_NR**
 5. **MARKIT CDX.NA.IG.19 12/17**
 6. **CDX.NA.IG.19 12/17**
 7. **CDX-NAIGS19V1-5Y.Dec.2017**
 8. **CDX NA IG 19 12/17**
-

2

And to my knowledge, concerted global efforts by industry and regulators to harmonize credit default swap fields have resulted in completion of consensus regarding approximately 50 fields in four years.

If Interoperability were so easy, this would have been done by now!

My purpose is not to criticize the CFTC or the other regulators or industry practitioners around the world who are working on these challenges with swaps data. Quite the contrary – I think they are on the right track with their roadmap – I am trying to convey the massive difficulty and complexity of what they are attempting to do – it is taking far longer than anyone expected, with plenty more still to go.¹⁵

¹⁴ http://www.cftc.gov/idc/groups/public/@newsroom/documents/file/cdx_slide_massad110415.pdf

¹⁵ See e.g. CPMI-IOSCO Technical Guidance, February 2017, Harmonisation of the Unique Transaction Identifier at <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD557.pdf>; and CPMI-IOSCO Consultative Report, June 2017 –

Earlier this month, the CFTC put out a concept release and request for comment on the staff's proposed roadmap for swaps data.¹⁶ I strongly support this – they are very much on the right track. But let me draw your attention to a very interesting statement. CFTC staff are explicitly considering providing market participants more time to cleanse and report their data.¹⁷ This would provide extra reporting time, until the end of the next business day after something happens.

Let's think about what this means – in a very mature market – the swaps market – with hundreds of trillions of dollars of notional value at stake, with hundreds of billions of dollars' worth of margin posted to clearinghouses, and comparable amounts (or more) in the bilateral, uncleared space, a market that has been maturing over the past 30 years since the initial ISDA agreements were put in place (the original smart contracts, some might say) -- the leading regulator is considering giving the market an extra business day to get this data right.

An EXTRA DAY – that's heading in the opposite direction from Real-Time Regulation. At least for now.

That should also serve as a strong warning about the difficulties of obtaining reliable data from distributed ledgers in real-time.

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 – all are different. Add that to problem I noted earlier – of data coming from the multiple ledgers and multiple instances and multiple data standards - this is not going to happen overnight.

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. 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.

Harmonisation of critical OTC derivatives data elements (other than UTI and UPI) – third batch at <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD565.pdf>

¹⁶ <http://www.cftc.gov/PressRoom/PressReleases/pr7585-17>; for Roadmap see

http://www.cftc.gov/idc/groups/public/@newsroom/documents/file/dmo_swapdataplan071017.pdf

¹⁷ Roadmap, p. 10

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"¹⁸ into financial services is likely to accelerate this trend.¹⁹ 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 new procedures and protocols 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 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.

¹⁸ Coinage of the term "TechFin" has been attributed to Alibaba CEO Jack Ma, although this is debated – see *From FinTech to TechFin*, *infra* note 16, at FN 3. See also Zen Soo, "TechFin: Jack Ma Coins Term to Set Alipay's Goal to Give Emerging Markets Access to Capital", South China Morning Post, 2 Dec. 2016, available at: <http://www.scmp.com/tech/article/2051249/techfinjack-ma-coins-term-set-alipays-goal-give-emerging-markets-access>.

¹⁹ See "From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance", Zetsche, Buckley, Arner & Barberis https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2959925

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.

Consider the film *Minority Report* – once the regulator has these new tools, has access to real-time data from distributed ledgers, has powerful new AI tools to help make sense of that data, has somehow managed to standardize, reconcile the data, to make it interoperable when it comes from multiple ledgers. What then? What about predictive analytics? Will the public expect the regulator to intervene *before* the harm has occurred, before the market manipulation or fraud takes place – to prevent the action or even to punish the actor.

I see elements of 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?²⁰ Today, in financial markets, this question is posed in extraordinary circumstances, such as the resolution of a systemically important financial institution.²¹

What happens when these circumstances become ordinary? What happens when the regulator has the information and power to intervene every day?

²⁰ 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.

²¹ See FSB *Key Attributes of Effective Resolution Regimes for Financial Institutions (Key Attributes) and FMI Annex*, www.fsb.org/2014/10/r_141015/ and FSB *Guidance on Central Counterparty Resolution and Resolution Planning*, p. 10 (*No Credit Worse Off Safeguard*) <http://www.fsb.org/wp-content/uploads/P050717-1.pdf>

Part II – How should Regulators Promote Responsible Innovation?

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 organization”?

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,²² approximately 80 percent of cash equities markets and 70 percent of foreign exchange spot markets.²³

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;

²² 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.

²³ McKinsey & Company and Greenwich Associates *reprinted in* Bank for International Settlements, Markets Committee, Electronic Trading in Fixed Income Markets, Jan. 2016, <http://www.bis.org/publ/mkctc07.pdf>

- robotics and automation;
- “smart” contracts;
- 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 2016.²⁴

Regulation by my former employer, 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.²⁵

²⁴ Sources: Venture Scanner April 2017, <https://www.venturescanner.com/blog/2017/financial-technology-startup-market-trends-and-insights-q2-2017>

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 as a regulator 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.”²⁶

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,²⁷ 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

²⁵ <http://www.cftc.gov/LabCFTC/index.htm>

²⁶ Address of Acting Chairman J. Christopher Giancarlo to the New York FinTech Innovation Lab announcing the launch of LabCFTC, May 17, 2017. <http://www.cftc.gov/PressRoom/SpeechesTestimony/opagiancarlo-23>

²⁷ <http://www.cftc.gov/LabCFTC/GuidePoint/index.htm>

analog era, no longer suitable for a digital world. GuidePoint may also serve as a 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.”²⁸ 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 Act²⁹. 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

When LabCFTC went live, it received dozens of inbound communications from New York, around the country, and around the world. The LabCFTC team rapidly began 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.

²⁸ http://www.cftc.gov/LabCFTC/CFTC2_0/index.htm

²⁹ 15 U.S.C. 3719. The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education and Science (COMPETES) Reauthorization Act of 2010 added Section 24 of the Stevenson-Wydler Technology Innovation Act of 1980, codified at 15 U.S.C. 3719, which authorizes prize competitions. The American Innovation and Competitiveness Act of 2017 expanded the scope of authorized prize competitions.

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.³⁰ 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.³¹

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".³² I should say at the outset that these are intended to begin a dialogue, with due respect for the wisdom and experience of others, and for all stakeholders.

³⁰ This process involved not just my own efforts of course but that of my colleagues on the LabCFTC team, and members of the CFTC FinTech staff working group, and others

³¹ 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, also published in February 2017 <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD554.pdf>

³² I first introduced these proposed 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 at <https://www.bandmanadvisors.com/publications/>

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 traditional physical presence and presentation of physical government-issued documents 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, and 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.

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.