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April 5, 2018

LabCFTC

FinTech, DLT, and the Impact on Agriculture & Commodity Markets

CFTC

What Is FinTech?

FinTech: *an economic industry composed of companies that use technology to make fin'l systems more efficient*.†

On the retail-facing side of the spectrum, FinTech innovations are occurring across platforms involving:

- Payments;
- Lending;
- Crowdfunding;
- Virtual Currencies;
- Open Data and Finance Analytics; and
- Robo-Advisory.

On the capital markets side of the spectrum, including the markets regulated by the CFTC, we are witnessing significant activity involving:

- Distributed Ledger Technology (DLT) and Blockchain Technologies (including virtual currencies/digital assets);
- Smart Contracts;
- Artificial Intelligence and Machine Learning;
- Predictive Data Analytics (and Internet of Things);
- Algorithmic Trading;
- Cloud Computing;
- Digital Identity; and
- RegTech (or technologies that can enhance or improve compliance and oversight activities).

† Christophe Williams, *What is FinTech?*, Wharton FinTech Club Blog (Feb. 16, 2016), available at https://www.whartonfintech.org/blog-archive/2016/2/16/what-is-fintech

Why Now?

- The nature and characteristics of technological innovation challenge regulatory approaches and frameworks, as well as existing business models:
  - Computing Power and Rapid Pace of Innovation and Adoption
  - Disintermediation of Traditional Functions or Actors
  - Industry Convergence Technology Drives
  - Borderless Platforms
  - Opportunity for Greater Inclusion and Access
  - Need for Greater Technological Literacy
- Proactive and forward-looking regulatory and business engagement is necessary to stay ahead of change and avoid being reactive – need ‘to skate to where the puck is headed.’

Mission

LabCFTC is dedicated to facilitating market-enhancing financial technology (FinTech) innovation, fair market competition, and proactive regulatory excellence and understanding of emerging technologies.

LabCFTC Work Streams

1. ***GuidePoint*: Engage with Innovators**
   - Learn about technology-based market developments and facilitate market-enhancing innovation with feedback and guidance regarding applicable regulatory frameworks
   - Assess how innovations square with existing rules and regulations or may inform policy
   - Identify future regulatory opportunities, challenges, and risks to enable proactive regulatory planning
     - *Recent Example(s):* LabCFTC Primer on Virtual Currencies

2. ***CFTC 2.0*: Faclitating, Testing, and Incorporating Emerging Technologies**
   - Identify, test, and foster FinTech/RegTech that can help make the CFTC and its markets more efficient and effective
   - Coordinate with internal stakeholders to help inform agency technology strategy
     - *Recent Example(s):* Science Prize Competition Act (SPCA) RFI and Enforcement Surveillance Tool

3. ***DigitalReg*: Help Build a 21st Century Regulator (Educate & Collaborate)**
   - Foster regulatory approaches that facilitate market-enhancing innovation, ensure market integrity, and satisfy key regulatory objectives
   - Serve as an agency resource to help educate and identify issues on fintech-related market developments
   - Collaborate with key stakeholders, including US and International regulatory bodies and leading research universities, in order to share best practices
     - *Recent Example(s):* CFTC-FCA Cooperation Arrangement on Financial Technology Innovation and Internal Educational FinTech Repository

What Bitcoin Unlocked

- Bitcoin was created in 2008 by a person or group that used the name “Satoshi Nakamoto,” with the belief that:

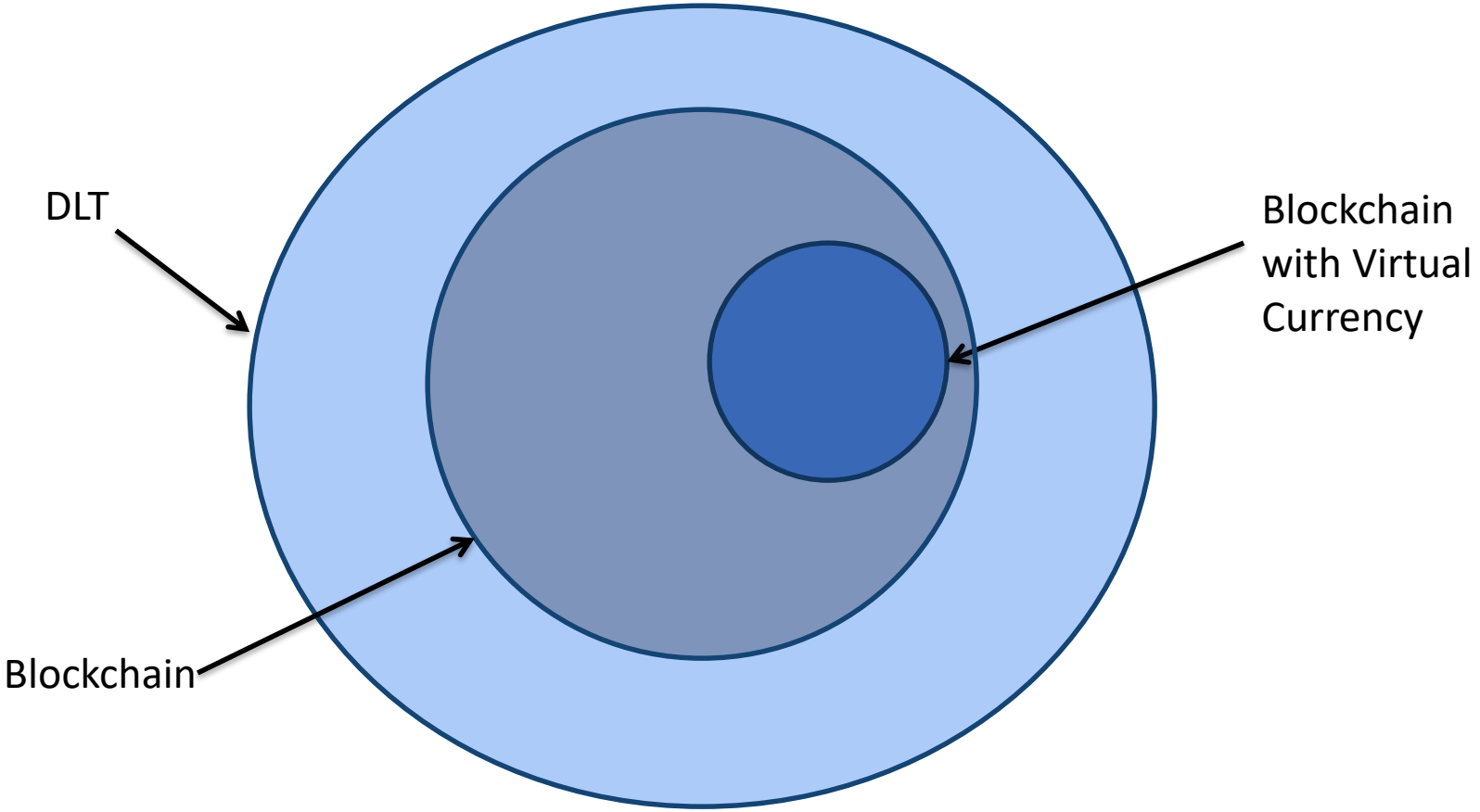
  “[w]hat is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party.”

- Bitcoin:
  - Relies on cryptography (and unique digital signatures) for security based on public and private keys and complex mathematical algorithms;
  - Runs on a decentralized peer-to-peer network of computers and “miners” that operate on open-source software and do “work” to validate and irrevocably log transactions on a permanent public distributed ledger visible to the entire network;
  - Solves the lack of trust between participants who may be strangers to each other on a public ledger through the transaction validation work noted in the sub-bullet above; and
  - Enables the transfer of ownership without the need for a trusted, central intermediary.

Public v. Private Ledger Networks

- Public distributed ledger systems typically are underpinned by virtual currencies – there is **no inherent trust** in this decentralized system.
  - Virtual currencies create an economic incentive for dispersed, independent, computers, or groups of computers, around the world to confirm transactions and perform verifiable “work” (that creates consensus) to publish a new block of transactions on the public ledger in exchange for a payment of the applicable virtual currency.
- Private / permissioned distributed ledger networks typically have some degree of trust between participants.
  - Private ledger systems allow a network of known participants to share transaction information between themselves more efficiently.
  - While cryptography and consensus may still be involved in private ledger systems, these systems do not necessarily involve a virtual currency that may serve as the economic incentive for miner or validator participation in public networks.

Blockchain is DLT, but not all DLT is Blockchain



Potential Benefits of Private DLT

- Increased efficiency between transacting parties
  - Eliminates manual or segregated functions frequently involving multiple levels of organizational bureaucracy
- Reduced transaction time and costs
  - Speeds information and financial transfers through real-time distributed ledger publication
- Greater access for market participants
  - Reduces barrier to entry and standardizes participation in networks
- Enhanced transparency, compliance, and audit trails
  - The immutable distributed ledger creates a permanent record and shares real-time information with all participants, who can then detect fraud and changes or efforts to tamper with the ledger.
- Greater standardization of data and enhanced analytics
  - DLT requires agreement on data fields and standards, which unlocks enhanced data analytics
- Improved regulatory reporting and surveillance
  - The regulator can received real-time access to transaction information
  - Market surveillance and monitoring functions benefit from real-time, standardized data access

Potential Risks & Challenges of Private DLT

- Scalability challenges
  - Existing proofs of concept are rather small/contained and have indicated potential scalability challenges
- Interoperability challenges
  - Large front-end investment costs may not justify early adoption given the risk of future shifts in prevailing technologies or standards
- Governance and accountability
  - Depending on DLT structure there are open questions regarding rules, governance structure, and accountability
- Cybersecurity concerns
  - Given reliance by all participants on a DLT system the cost of a cybersecurity breach could prove substantial
- Technology risk
  - DLT remains unproved at scale in commercial or market settings
- Adoption risk
  - There must be a business case to make investment into new systems and ultimate utility is largely predicated on broad network adoption

DLT in Agriculture and Commodity Markets

- Supply-Chain Tracking & Logistics
- Agriculture and Commodity Trading
- Post-Trade Infrastructure & Clearing and Settlement
- Enhanced Market Depth, Participation, and Liquidity
- Transparency, Traceability, and Fraud Prevention

Supply Chain Tracking & Logistics

- Walmart is working with IBM on a supply chain ledger system intended to track food from farm to market.†
  - Food safety as a major focus
  - It is estimated that 420,000 die annually as a resulted on contaminated food
- Interest in applying DLT to agriculture and physical commodities, where disparate paper recording systems along the supply chain remain prevalent and subject to high risks of fraud.
  - *"If you can use blockchain to improve the traceability and fungibility of physical commodities, it would be a very important step towards the further financialisation of commodities,"* says Jean-Marc Bonnefous, managing partner at Tellurian Capital, a London-based commodity hedge fund.‡
- Software and technology-provider, The Seam, formed a blockchain consortium in conjunction with IBM for the billion dollar global cotton industry in order to enhance efficiencies in supply chain management and trading.*

† Roger Aitken, *IBM Forges Blockchain Collaboration With Nestlé & Walmart In Global Food Safety* , Forbes (Aug. 22, 2017), available at https://www.forbes.com/sites/rogeraitken/2017/08/22/ibm-forges-blockchain-collaboration-with-nestle-walmart-for-global-food-safety/#5740dc7f3d36

‡ Alexander Osipovich, *Commodities may be a sweet spot for blockchain,* Risk.net (Sept. 14, 2016), available at https://www.risk.net/commodities/2470393/commodities-may-be-sweet-spot-blockchain

* Roger Aitken, *IBM's Blockchain Consortium With The Seam Deploys 'Hyperledger' For Cotton* Trading, Forbes (Jan. 7, 2017), available athttps://www.forbes.com/sites/rogeraitken/2017/01/07/ibms-blockchain-consortium-with-the-seam-deploys-hyperledger-for-cotton-trading/#60f0ff587e8a

Trading

- DLT can enhance trading operational efficiencies and reduce costs by eliminating existing, fragmented manual processes.†
- A leading global commodity trader, Louis Dreyfus, recently utilized a DLT system to sell and deliver 60,000 tons of soybeans to China in December 2017.‡
  - Partners joining the initiative included ABN AMRO, Shandong Bohi Industry Co., Ltd, ING and Societe Generale.
  - The system resulted in a reported 80% reduction in trade processing times.
  - ABN AMRO stated that: *"The blockchain technology has the potential to significantly optimise administrative processes around international trade. We are excited that this test was succesfully [sic] completed and that we can move to further exploring the added value and use of the blockchain technology."*

† Dan Nosowitz, *The Blockchain Comes to Agriculture*, Modern Farmer (Feb. 7, 2018), available at https://modernfarmer.com/2018/02/blockchain-comes-agriculture/

‡ Emiko Terazono, *Commodities trader Louis Dreyfus turns to blockchain,* Financial Times (Jan. 22, 2018), available at https://www.ft.com/content/22b2ac1e-fd1a-11e7-a492-2c9be7f3120a; William Suberg, *'Higher Than Expected': Louis Dreyfus Reports Results of First Blockchain Agricultural Trade,* CoinTelegraph (Jan. 22, 2018), available at https://cointelegraph.com/news/higher-than-expected-louis-dreyfus-reports-results-of-first-blockchain-agricultural-trade.

Market Liquidity and Participation

- DLT is being viewed as potentially helping to create more robust markets for agriculture products and commodities, including by enhancing access for new participants.†
  - For example, real-time execution of trades may permit participation of market actors previously viewed as credit risks.
- Farmers can use DLT to help find a market for their products – one estimate notes that farmers currently "sit on 20% unused land capacity, and they routinely compost about 10% of their output at peak season" in part due to market inefficiencies.‡
- Companies like Australian AgriDigital are using DLT to provide "real time payment to growers, increased efficiencies for brokers, flexible supply chain for buyers and financiers, and paddock to plate transparency for consumers."*

† Shelley Goldberg, *How Blockchain Could Revolutionize Commodity Markets*, Bloomberg (Dec. 22, 2017), available at https://www.bloomberg.com/view/articles/2017-12-22/how-blockchain-could-revolutionize-commodity-markets

‡ Raja Ramchandran, *The Blockchain of Food*, Forbes (Oct. 23, 2017), available at https://www.forbes.com/sites/themixingbowl/2017/10/23/the-blockchain-of-food/#496a1627775f

* James Eyers, *Agriculture blockchain startup AgriDigital raises $5.5m in Square Peg led round,* The Australian Financial Review (Feb. 26, 2018), available at http://www.afr.com/technology/agriculture-blockchain-startup-agridigital-raises-55m-in-square-peg-led-round-20180223-h0wkbp#ixzz5BX2KCP9b.

Post-Trade Infrastructure & Clearing and Settlement

- DTCC is working on a DLT network in an effort to re-platform its repository for credit default swap (CDS) contracts.†
- There further remains significant interested in utilizing DLT to create more transparent and efficient clearing and settlements processes, including with respect to:‡
  - Syndicated Loans;
  - The repo market;
  - Corporate bonds; and
  - Payments
- Of course, there must be a valid business case to drive adoption of these new technologies given the existence of operational (and perhaps lower cost) legacy systems.

† Larry Thompson, *Modernizing Market Infrastructures With Fintech,* DTCC (Apr. 19, 2017), available at http://www.dtcc.com/news/2017/april/19/modernizing-market-infrastructures-with-fintech

‡ FINRA, *Distributed Ledger Technology: Implications of Blockchain for the Securities Industry* (Jan. 2017), available at https://www.finra.org/sites/default/files/FINRA_Blockchain_Report.pdf

Transparency, Traceability, and Fraud Detection

- The transparency and traceability of DLT ledgers can help ferret out a broad range of fraud, including false labeling of food products.
  - An example: “Blockchain in agriculture allows the consumer to scan the barcode of a product in the supermarket and instantly view the entire supply chain from supermarket to farmer. In terms of consumer orientated transparency. From a regulatory perspective, agricultural contamination can be very quickly isolated.”†
- Example of where DLT may have helped – 2014 Metals fraud in Chinese port of Qingao.‡
  - Banks suffered $648M in fraud losses involving specific copper and aluminum stocks that had been fraudulently used as collateral for multiple different rounds of loans.
  - DLT ledgers may have been able to shed light that the metals had already been committed on other loans.
- Some are now exploring innovations such as the “Blockchain of Things,” whereby even doors to a warehouse could be linked to a blockchain and help track the movement of items or inventory from the warehouse.

† Ann Maslova, *Growing the Garden: How to Use Blockchain in Agriculture,* CoinTelegraph (Nov. 2, 2017), available at https://cointelegraph.com/news/growing-the-garden-how-to-use-blockchain-in-agriculture

‡ Wassim Bendella, *How Blockchain Can Prevent Storage Scams That Hit Banks*, CoinTelegraph (Jul. 9, 2017), available at https://cointelegraph.com/news/how-blockchain-can-prevent-storage-scams-that-hit-banks