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# Blockchain Technology – Transforming Global Financial Markets

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## Blockchain Technology – Transforming Global Financial Markets

Bitcoin and cryptocurrencies, in general, have been under strict scrutiny by both regulators and leaders in the financial industry. We must understand, however, that blockchain technology does not equate to bitcoin or to cryptocurrencies. Bitcoin is only one example of a blockchain technology use case. The possible applications of blockchain technology, in general, and for financial markets, in particular, are far beyond bitcoin or payments.

### Blockchain Technology – Why Should You Care?

Jamie Dimon, JPMorgan Chase CEO, called Bitcoin “a fraud” in an interview with CNBC in September 2017. In that same interview, however, he also said that we should make a distinction between bitcoin and blockchain technology<sup>i</sup>. Indeed, JPMorgan has made this distinction and has been one of the leaders in blockchain technology and its applications. The bank has been experimenting with blockchain technology since early 2016 and built its own blockchain, Quorum, a permissioned variant of Ethereum public blockchain. We will discuss some of JPMorgan’s blockchain projects below.

Regulators worldwide are also recognizing the benefits of blockchain technology. Jay Clayton, SEC Chairman, said at the Sandler O’Neill Global Exchange and Brokerage Conference in New York City in June 2018: “I think that blockchain technology has tremendous promise for the securities industry, eliminating costs. The cost of verification in the security industry is incredibly high. If we can make that more efficient – terrific.” Commodity Futures Trading Commission (CFTC) chairman Heath Tarbert is also a supporter of the technology. At the Yahoo Finance Summit in October 2019 he said: “I want to stress the importance of blockchain and digital assets to the United States, and in particular, as CFTC Chairman, I want the U.S. to lead in this technology.” Christine Lagarde, when serving as the director and chairwoman of the International Monetary Fund (IMF), said at Singapore Fintech Festival in November 2018 that central banks and the IMF “are embracing change and new thinking” – referring to the initiatives of various central banks on the implementation of Central Bank Digital Currency (CBDC)<sup>ii</sup>.

Reviewing the list of top companies in number of blockchain patents (as of October 2019)<sup>iii</sup>, it is evident that prominent financial companies and financial institutions are some of the most active players in the blockchain space. Mastercard, Bank of America, TD Bank, and Capital One are in the top ten of this list. Other financial companies that do not make the top of the list but which have more than 20 patents in the blockchain space are Nasdaq, Barclays, PayPal, Visa, JPMorgan and Thomson Reuters<sup>iv</sup>.

It is clear the financial industry – companies, institutions and regulators, as well as central banks – has acknowledged the potential benefits of blockchain technology and has been experimenting

with different use cases. Most of the projects are in their pilot stage, but the feedback has been positive and promising.

Let's have a look at some of the areas where blockchain can benefit global financial markets.

## **Payments, Stablecoins<sup>v</sup> and CBDC**

Cross border payments have been a pain point, both for banks and businesses. Receiving money internationally is a complicated process. There is no omnipresent system in place for routing money across borders. Banks are connected through a dated system, which proves to be slow and financially inefficient. Furthermore, since each bank has its own accounts ledger, each transaction needs to be reconciled and approved by both banks – a process prone to errors and delays.

A few companies are currently exploring how to implement a blockchain solution to alleviate the problems stated above. A couple of projects are of particular interest: JPMorgan Inter Information Network (IIN) and Mastercard and R3 Payment Platform partnership. Other proposed solutions include banks issuing their own stablecoins and nations issuing their own CBDCs.

### **JPMorgan Inter Information Network (IIN)**

IIN was launched as a pilot in 2017, powered by Quorum, with the intent to provide a scalable, peer-to-peer network using blockchain technology – from minimizing frictions in the cross-border payments process to enabling payments to reach beneficiaries faster and with fewer steps. Currently, banks communicate one-way, bank-to-bank, usually through a third party such as SWIFT. But IIN has transformed their interactions. It allows member banks to exchange information in real-time to verify that a payment has been approved. On IIN, when a payment detail is flagged for confirmation, different parties can interact simultaneously, requesting and sharing information. The more banks join the network, the greater the reduction in payments delays and errors will be. As the network scales, payments will be processed faster and with lower operational expenses.

As of January 2020, IIN has 397 banks on the network including Germany's largest bank, Deutsche Bank, which clears more Euro denominated payments than any bank worldwide. With IIN, Deutsche Bank expects to lower costs and speed up cross-border disbursements to avoid expensive lag times.

### **Mastercard and R3 Partnership**

Mastercard's ambition is to develop a new and better cross-border B2B payment solution by improving worldwide connectivity in the account-to-account space. To deliver this ambition, in March 2019 they acquired Transfast, a global payment company, reaching 90% of the population and over 90% of the world's bank accounts. In September 2019, Mastercard partnered with R3, an enterprise open-source blockchain consortium of more than 300 financial services, technology companies, regulators, and associations. The strategic partnership aims to

build a new blockchain-enabled solution to bridge international payments infrastructures, schemes and banks, combining R3 expertise in blockchain and its ecosystem with Mastercard's existing payment system and brand distribution.

### **Stablecoins**

As previously noted, Jamie Dimon has bashed bitcoin, which may explain JPMorgan's route of a stablecoin. In February 2019, JPMorgan became the first U.S. bank to create and successfully test a stablecoin, dubbed JPM Coin. It runs on Quorum, enabling the instantaneous transfer of payments between institutional clients. The ultimate goal is to speed up transactions – not only payments between firms, but also the settlement of bonds and commodities transactions.

Other financial institutions are also considering issuing their own stablecoins. Goldman Sachs CEO David Solomon said in an interview to the French newspaper, *Les Echos*, in June 2019 that the bank could absolutely follow JPMorgan in launching a stablecoin. He further said that the bank is carrying out “extensive research” on asset tokenization and stablecoins<sup>vi</sup>. WisdomTree Corporate Strategy director, William Peck, revealed in January 2020 the company's intentions to create a regulated stablecoin “similar in structure and purpose to an ETF backed by dollar-denominated assets like short-term U.S. Treasury bonds.”<sup>vii</sup>

### **CBDC**

Many central banks are seriously exploring the implementation of a CBDC. In May 2019, the Bank of Canada and the Monetary Authority of Singapore (MAS) conducted a successful experiment on cross-border and cross-currency payments using CBDC<sup>viii</sup>. This is the first such trial between two central banks and has great potential to increase efficiencies and reduce risks for cross-border payments. The aim is to make the cross-border payment process cheaper, faster, and safer.

Forced by its citizens' deep aversion to cash<sup>ix</sup>, Sweden's Riksbank has been working on an e-krona since late 2016. In February 2020, Sweden's Riksbank launched testing of an e-krona. If successful, Sweden will be the first nation to create a CBDC. The goal is that the e-krona will be used by customers, not banks, to simulate everyday banking activities, such as payments, deposits, and withdrawals from a digital wallet using a mobile device.

The European Central Bank (ECB) and the People's Bank of China (PBOC) are also working on a CBDC. China has been working on its CBDC since 2014 and had plans to launch it in early 2020. Due to the COVID-19 pandemic, these plans have been delayed.

It would be interesting to see how CBDCs and banks' own stablecoins work. Will they coexist? Or will one dominate the other? It seems that once a nation issues its own CBDC, it might diminish the need for a stablecoin backed by a central bank fiat currency, unless these stablecoins offer other benefits to users, such as interest or rewards.

## **Custody and Post Trade Services**

In October 2019, Deutsche Bank published a whitepaper stating that custodians will have to start formulating plans to operate in a post-trade world backed by Distributed Ledger Technology (DLT)<sup>x</sup>, if they have not already done so. These plans should include post-trade collaborative pilots to reduce current costs and inefficiencies and possibly exploring DLT applications to create new products and services<sup>xi</sup>.

The whitepaper asserts that DLT will have the potential to disintermediate the roles of custodians from post-trade process. To mitigate this possibility, it calls for cross industry collaboration with financial market infrastructure at the center, in order to modernize the industry structure in the long term. “DLT can play an important role here by allowing custodians and post-trade participants to reposition their core capabilities, deliver further efficiencies and create visible new value for clients.”

### **Deutsche Bank – Custody**

A week prior to the release of the whitepaper, Deutsche Bank successfully piloted a DLT custodial service solution, which addresses the transparency requirements within many custodial services, such as tax processing of asset holdings and streamlining complex data and reconciliation processes for both banks and clients. Currently, this level of information is not disclosed to or captured by sub-custodians. Data is provided in spreadsheets, as and when needed, and across multiple levels of disclosure. Deutsche Bank’s DLT service is in line with Shareholders Rights Directive (SRD) II. The bank plans for more DLT services in the future.

### **Paxos – Clearing and Settlement**

In November 2019, Paxos obtained approval from the U.S. Securities and Exchange Commission (SEC) to deploy its blockchain project for settlements of trades in the U.S. stock market. Built on Paxos’ own private version of Ethereum, the settlement process uses smart contracting protocols to transfer cash and securities to the appropriate accounts once the settlement date arrives, while participants can monitor the trade via the blockchain platform. It aims to shorten the clearing process for stocks from two business days to the same day. This will help companies unlock capital that is tied up in legacy settlement processes, which will not only reduce costs, but will also increase market liquidity.

In February 2020, Paxos launched the service with the participation of Credit Suisse, Société Générale, and Nomura owned broker dealer, Instinet. A successful pilot of the Paxos blockchain clearing and settlement services means competition for the Depository Trust and Clearing Corporation (DTCC), which has a monopoly on the clearing and settling of the U.S. equities market.

## Raising Capital and Trading

Blockchain solutions can be very beneficial for both debt and equity securities, in both the primary (i.e., raising capital) or secondary (i.e., trading) markets. Benefits include increased transparency, faster transactability and settlement, reduced costs, fewer intermediaries, and increased security<sup>xii</sup>. Several projects already have had successful pilots – both for debt and equity issuance and trading. Below are a few examples.

### **Société Générale**

In April 2019, SocGen issued 100 million Euros of covered bonds, a type of security that is backed by specific assets but remains on the issuer's balance sheet. The intent of the successful pilot was to explore a more efficient process for bond issuance. The rating agency Moody's said it considers the use of blockchain technology "credit positive" for the issuer, because of increased transparency and reduced likelihood of errors "arising from the complexity and the number of intermediaries involved in issuing covered bonds using traditional means."<sup>xiii</sup> Rating agencies Moody's and Fitch have rated the covered bond security token as Aaa and AAA, respectively.

### **Banco Santander**

In September 2019, the bank issued a \$20 million blockchain based bond on the public Ethereum blockchain. It then redeemed it, using smart contracts<sup>xiv</sup> in December 2019. The experiment was to unequivocally prove that a debt security can be managed through its full lifecycle on a blockchain.

### **HSBC**

In November 2019, the bank partnered with Singapore Exchange and Temasek, an investment firm, to explore the use of blockchain technology for issuance of fixed income securities. It intends to bolster the bond issuance process and reduce associated costs by applying tokenized securities and smart contracts.

### **Morningstar**

The credit rating arm of financial services Morningstar is developing a blockchain platform for the \$117 trillion debt securities industry (as of October 2019). Morningstar Credit Ratings is building an evaluation system for debt securities issued as tokens<sup>xv</sup> on a blockchain. The firm is working with several blockchain-oriented firms, who are seeking to issue debt instruments on a blockchain.

In addition, the company is working on two blockchain-based projects:

1. Putting Morningstar's system for rating bonds directly on the Ethereum blockchain via a technology called an oracle<sup>xvi</sup>.

2. Making quantitative rating models for debt securities available on a blockchain. Currently, credit agencies use their models to determine the creditworthiness of different types of debt securities, but they do not completely reveal the mechanics of these models. If the models are available on a blockchain, it would increase transparency to the rating process of debt securities.

### **World Bank (International Bank for Reconstruction and Development, IBRD)**

The World Bank has had two successful bonds issuances on its DLT Bond-i platform – AUD 110 in August 2018 and AUD 50 in August 2019. The platform is managed by Commonwealth Bank of Australia (CBA), RBC Capital Markets (RBC), and TD Securities (TD) and brings together new market participants. In May 2019, with TD acting as the market maker, it enabled a secondary bond market (i.e., trading) on the platform. Thus, making it the first bond created, allocated, transferred, and managed through its full life cycle on a DLT.

### **London Stock Exchange (LSE)**

During 2019, LSE came out with a regulatory sandbox for companies which would like to explore blockchain technology. Companies can issue shares themselves, reducing the costs, which usually goes to intermediaries like Goldman Sachs or Morgan Stanley. This represents a very tempting value-added for incumbents.

The first experiment was in April 2019. Equity of FinTech company, 2030, was sold in tokenized form – a digital representation of shares – and its transactions are recorded on a blockchain.

### **SIX Swiss Exchange (SIX)**

In September 2019, SIX launched a pilot of its exchange and Central Securities Depository (CSD) for digital assets. The prototype platform was launched under SIX digital asset subsidiary, SIX Digital Exchange (SDX), and expects to see more functionality added as it approaches a full launch in Q4 2020. SDX intends to show that a DLT-based CSD can “be integrated with a central order-book stock exchange model to ensure fair market conditions for all.” Ultimately, SDX aims to enable instant settlement with no counterparty risk or requirement for default fund collateral at a central counterparty. In its second phase, SDX will also add post-trade and digital custody functionality, where users will be able to hold their assets on the SDX DLT-based platform and access it with the use of a private key.

### **Proxy Voting**

Proxy voting seems a process well suited for blockchain technology. Currently, companies conducting proxy votes still use paper ballots for their shareholders who might be in diverse locations. Blockchain provides a secure and transparent way to tally results anonymously.

### **SWIFT e-Voting**

In 2019 SWIFT launched a blockchain proof of concept (PoC) for e-Voting in Asia Pacific, partnering with SLIB, a securities software provider, and the Singapore Exchange (SDX). Participant issuers include Deutsche Bank, HSBC, and Standard Chartered Bank. The aim is to simplify the management of shareholder meetings and proxy voting. The PoC tests the voting system in collaboration with a Central Securities Depository where the data is on a permissioned blockchain. It combines ISO 20022 messaging with blockchain for interoperability.

### **Other projects**

Nasdaq had a pilot offering a blockchain based e-voting service to shareholders of companies listed on Nasdaq's Tallinn Stock Exchange in Estonia. In Canada, the TMX stock exchange created a prototype for e-Voting; and Russia's National Settlements Depository created perhaps the very first blockchain pilot for proxy voting. IBM is working with the Central Securities Depository of Poland (KDPW) to develop a blockchain-based e-voting system for Annual General Meetings (AGMs).

### **Data Management**

Managing and protecting companies' data is very crucial, especially for financial institutions, which are highly regulated.

Bank of New York Mellon (BNYM) created a system called BDS 360, which uses DLT for clearing transactions and has been operational since 2016. BDS 360, however, is not a complete overhaul of its clearing system; rather, BNYM created BDS 360 as a way of backing up data with the purpose of boosting resiliency. The blockchain takes a snapshot of transactions every ten minutes, providing a record, in case of a catastrophic event.

Another potential DLT use case could be for managing reference data. Financial institutions are required to share data with regulatory agencies. Using blockchain technology helps in collaboration between two non-competing parties, who prefer to maintain contractual data between them. It could lead to an accurate and automated blockchain reference data, reducing costs and operational risks.

### **Other Use Cases**

Financial institutions are testing other use cases for blockchain such as peer-to-peer lending, leasing of cars and equipment, user privacy, and identity verification and protection.

Evidently, financial institutions see the benefits that blockchain technology could bring to financial markets – reducing costs and increasing efficiency and security – to both banks and their clients. With collaboration among financial institutions and clarity from regulators, a reality of financial markets fully running on blockchain technology might materialize in five to ten years.



## About the Author: Merav Ozair, PhD

Dr. Merav Ozair is a data scientist, a quant strategist and a Crypto/Blockchain expert. She has 12+ years of business and consulting experience and in-depth knowledge and experience in the global financial markets and market microstructure. Currently, Dr. Ozair applies her unique expertise to investigating the blockchain ecosystem, digital assets, and crypto markets. In particular, she has been developing innovative methodologies to evaluate digital assets and crypto markets – including cryptocurrency indexes, valuation metrics, ratings and tokenized products.



Dr. Ozair is the founder of Digital Novelty – assisting institutional investors navigate the Crypto Market for investing/trading decisions, utilizing in-depth research and analysis, proprietary indexes, metrics, ratings and proprietary valuation framework for digital assets and crypto markets.

She has instructed for over 15 years, currently teaching at NYU. Her research interests include Blockchain, Cryptocurrencies, Market Microstructure, Risk Modeling and Macroeconomics. She also conducts workshops for financial professionals at CFANY (formerly New York Society of Security Analysts (NYSSA)) and ELEV8, and webinars for Market Technicians Association (MTA) and for Professional Risk Management International Association (PRMIA). She earned her PhD in Finance from Stern Business School at NYU.

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- i “JPMorgan CEO Jamie Dimon says bitcoin is a ‘fraud’ that will eventually blow up”, September 2017, CNBC
- ii CBDCs are traditional money, but in digital form, issued and governed by a country’s central bank.
- iii “Top Companies in blockchain patents”, Harrity, October 2019
- iv “China Leads in Global Blockchain Patent Applications in First Half of 2019”, Coinspace, August 2019
- v A stablecoin is any cryptocurrency pegged to a stable asset, such as gold or fiat currencies. By pegging it to another asset, which is considered stable (or less volatile), Stablecoins are designed to stabilize the value of the coin, making it less volatile.
- vi <https://cointelegraph.com/news/goldman-sachs-looking-at-potential-of-creating-virtual-currency-ceo-reveals>
- vii “Wisdomtree mulls new stablecoin as us money manager drives towards crypto”, Coindesk, January 2020
- viii <https://www.mas.gov.sg/news/media-releases/2019/central-banks-of-canada-and-singapore-conduct-successful-experiment-for-cross-border-payments>
- ix In 2018, only 13 percent of Swedes reported using cash for a recent purchase, according to a nationwide survey, down from around 40 percent in 2010
- x DLT is a consensus of replicated, shared, and synchronized digital data, which is spread across multiple sites, countries or institutions. There is no central administrator or centralized data storage. Hence, no single point of failure. Blockchain is a type of DLT where transactions are recorded with an immutable cryptographic signature called a hash.
- xi According to Bain & Co., a consultancy firm, the global revenue for the post-trade segment could drop between 35%-40%, as a result of the entrance of cross asset data utilities and digital asset providers.
- xii Increased security is attained due to cryptography, immutability of transactions and no single point of failure.
- xiii <https://www.crowdfundinsider.com/2019/04/146809-french-bank-societe-generale-issues-e100-million-bond-as-security-token-on-ethereum-blockchain/>
- xiv Simply put, smart contracts are self-executing contracts with the terms of the agreement written into a computerized line of code.
- xv Read about the benefits of tokenization on GFMI blog: <https://www.gfmi.com/tokenization-why-should-you-care/>,
- xvi An oracle is a blockchain middleware that creates a secure connection between smart contracts and various off-chain resources that they need to function. It acts as the middle layer between a blockchain and an API that translate information for the blockchain to read.