

Bitcoin Revolution: Real or Fluke?

Ke Xu

Shijiazhuang foreign language education group, 050022 Hebei, China.

Abstract

Cryptocurrency come into reality since the debut of Bitcoin in 2009. Although some think it represent the future, the currency in the digital time, others doubt the validity from the fundamental principles of economy as well as currency. Nevertheless, the phenomenal performance of Bitcoin landed into the most successful innovations in the century, and a series of developments afterwards that is changing the way we live. This paper looked into the key stages in the digital revolution and its latest event, in the name of DCEP, the central bank digital currency from China. The analysis covers both the impact and significances of Bitcoin, Stablecoin, Libra, DCEP as well as deficiency in some cases, and concludes that the trend started from Bitcoin will continue and the digital revolution for currency will lead the transformation of our civilization into the digital future. In the same time, a cooperation rather than competition internationally will benefit the technology mature and advance.

Keywords

Cryptocurrency, Bitcoin, DCEP, Blockchain.

1. Introduction

November of 2008, right after the financial crisis engulfed US and were extending to the rest regions of the world, a paper, titled "Bitcoin:A Peer-to-Peer Electronic Cash System"¹, authorized by Satoshi Nakamoto, published on a forum that cryptography lovers frequents. In that paper, it laid the foundation for the Bitcoin protocol, which later, becomes the biggest internet phenom of this century. On January 3, 2009, the first Bitcoin trade was revealed to the public. At the time, few realized the significance of the event that marked an epoch, and no less signifying, to this date, the identity who brought all of this remains mysterious.

Originally, Bitcoin was created for move money or value, faster, cheaper and more efficiently than the mediums or means that were then available. In this regard cryptocurrency is taking the common function of a fiat currency. Despite of the prominence of Bitcoin today, its theoretical foundation and legality is yet questionable. For as long as modern money theory exists, currency issuance is in the power of state, which is regarded as a symbol of national sovereignty. State-issued currency is guaranteed by the finance of the corresponding country. In the contrary, Bitcoin is relying on technology to solve the trust-worthy problem. It employs a technology called blockchains as its underlying support, and is characterized by decentralization, peer-to-peer communication, cryptology-based security verification, consensus mechanism, and so on. As of April 2020, there are more than 5,000 cryptocurrencies being traded with a total market capitalization of \$201 billion.² In this work, we analyzed the key developments in the cryptocurrencies and from the aspects of economy, finance, as well as technology dimension, we elucidated how the digitalization process is driving the changes of our society and come to the conclusion that digital revolution of currencies are the future and requires the regulatory system and technology to adapt.

2. Bitcoin as a payment system

Electronic cash system is the original purpose of the Bitcoin creation. It aims to substitute or replace paper money. To subvert its deficiency of lack of authority, it relies on technology to create an irreversible, inerasable, tampering -proof mechanism to gain trust.

As a payment medium, or as it is originally billed, electronic cash, Bitcoin theoretically should be an extension of one or a basket of legal currencies. Nevertheless, Bitcoin does not represent any sovereign currency. Without a legitimate value anchor, the price fluctuation quickly rendered Bitcoin useless in terms of payment medium.

The creator of Bitcoin had its own ideology built in the Bitcoin. For instance, it sets the total amount of Bitcoin near 21 million. This is in stark contrast of economy expansion, which is the precise reason Gold standard system was abandoned in the last century, especially the last attempt after World War II, the Bretton Woods system.³

The original Gold Standard System was abandoned by various nations after World War I and in the age of Great Depression. It was caused by the economy hardship and the government had no other means but printing money. However, people still believed in the system, and therefore, attempt was made after World War II to restart the system at a new scale. Considering the US economy dominated the world at the time, and the international economy development and trade need a more flexible system than simple gold standard. Thus, an international monetary system was drawn up at the Bretton Woods Conference in New Hampshire, US in 1944. The Bretton Woods system was designed to fix the dollar to gold at the existing parity of US\$35 per ounce, while all other currencies had fixed, but adjustable, exchange rates to the dollar. Unlike the classical Gold Standard, capital controls were permitted to enable governments to stimulate their economies without suffering from financial market penalties. For the next 20 years, the Bretton Woods system had stabilized world currencies, promoted international trade, and was an important reason of economy expansion worldwide after World War II. Despite of all the benefits, the deficiencies also gradually revealed. The foremost obstacle is the rigid fix to gold, i.e., the limited gold supply vs. the endless of economy expansion need. From the economy point of view, any currency with fixed amount, including Bitcoin, is deflationary and causes economy contraction.

The birth of Bitcoin had its own social and economy back-drop. The financial crisis of 07-08 led to the public distrust to the government regarding its monetary policy. Against the lack of fiscal responsibility, gold standard once again comes to the mind of general public. This was the social background when Bitcoin burst into the scheme. For a currency, in addition to payment instrument, modern money theory also adds value scale, circulating medium, store of value, and world money to its function, and Bitcoin apparent lacks. Therefore, from the view of economist, the legal attribute of Bitcoin is regarded as either as non-monetary property or as currency.

3. Bitcoin as investment subject

Although Bitcoin today isn't suitable to act as a payment medium, it is no doubt that Bitcoin has become the hallmark of a new class of investment asset. The potential to treat it as an investable product, has brought attention to Bitcoin far beyond the original tech cycles.

The price of Bitcoin has experienced roller-coast ride in the last five years, nevertheless, it is realized phenomenal return since its inception, as shown in Figure 1.

The latest run was from early 2017, from less than 1,000 USD per coin all the way to the top near 17,000 USD per coin (December 17th, 2017, 20089.00). After reaching the pinnacle, it turned around, going downward. Not until it reached below 3,500 (February 5th, 2019, 3478.15), it turned again, starting upward climb. On August 20th, 2020, it now trades at 11900 USD.



Figure 1 Bitcoin price graph from May 2017 to August 2020, data from internet

Bitcoin has already become an investment instrument, although not for the faint heart. Compared to other investment asset classes, Bitcoin, or other cryptocurrency afterwards, is unique in several ways.

3.1. Fundamentally, Bitcoin has no intrinsic value.

Bitcoin believers argue that fiat currencies have no intrinsic value, either. However, since it is the official currency circulated in US, a true level of demand creates a true value. While Bitcoin, at this point in time, has only limited applications, the simple speculation and imagination, has put Bitcoin into the stratosphere space.

Bitcoin supporters often compare it with gold, which many see as the new digital alternative. Fundamental gold investors have traditionally used the precious metal as a hedge against inflation to protect themselves from economic turmoil. And there are some similarities with Bitcoin in that there is effectively a limited supply. Therefore, scarcity is the main reason that investors see in Bitcoin and so far, drives the massive gains.⁴

However gold speculators also, buy gold because they believe the price will simply move higher over time. The heightened enthusiasm for Bitcoin speculation, and not necessarily the belief, make it a roller coaster ride, to put it mildly.

3.2. Volatility, it is likely to accompany Bitcoin investor for a long time.

At current time, the price of a bitcoin is purely driven by speculation. In this matter, investing in Bitcoin is likened speculative rather than rational. Because Bitcoin is still a relatively small market valuation, which currently it stands at \$226 billion, it doesn't take significant amounts of money to move the market price up or down, and thus the price of a bitcoin is very volatile.

It is interesting to note that study revealed a strong correlation of Bitcoin volatility and search intensity of Bitcoin-related words on Google, particularly for the word "bitcoin". Further analysis reveals that the culprit of Google search volumes and market volatility points at retail investors, rather than large institutions, being the most important drivers of Bitcoin volatility.⁵

The volatile price movement can also be attributed to the exchanges where the Bitcoin is traded. Notwithstanding, the volume of Bitcoin trade is skyrocketing in the recent years, the exchanges it is traded remains obscure. But this situation has been changing with the announcement of Bitcoin derivatives.

Derivatives Giant CME Group has Launched Bitcoin Futures Contract in December 2017.⁶ About the same time, The Chicago Board Options Exchange (CBOE), another major option exchange, started trading a similar Bitcoin future contract. Furthermore, NYSE Arca (New York Securities Exchange's specialized market for ETF) has applied to the Securities and Exchange Commission

(SEC) to list both Bitcoin investment trust and Bitcoin ETF.¹ All the above, there is no doubt that more institutional investor would jump into Bitcoin frenzy, which may stabilize Bitcoin trading price. On the downside, Bitcoin derivatives may also cause the price movement more dramatic in some instances.

3.3. Which is more valuable, Bitcoin or its underlying technology Blockchain?

It becomes apparent that Bitcoin and cryptocurrencies clearly represent a seismic shift in the way currencies operate. This is evident by the price Bitcoin trades. However, it might just be the technology upon which they are built, known as blockchain, that is contributing to the lofty valuations. The blockchain is a digitized ledger system that tracks transactions. Potential applications for blockchain technology are popping up in the banking sector, the insurance industry, record keeping and forecasting amongst many others.

There is a fierce contemplation between people who believes in cryptocurrency and who believes in technology underneath it. It is worth of pointing out, due to the differences in regulation, different jurisdiction exhibits distinctive pattern and emphasis on the development of blockchain or cryptocurrency.

Although Bitcoin as well as other cryptocurrencies, are abended in China, the blockchain technology is now formerly in the national technology initiatives for the future. A wide variety of blockchain applications in finance, insurance, digital government, supply chain management, legal, and so on, have been reported in the last two years. The blockchain technology is playing an important role in the digitalization movement of China.

4. Stablecoin, the new kid after Bitcoin

Despite its revolutionary solution, cryptocurrencies are struggling to land a foot in the real world. One of the reasons, cryptocurrencies are extremely volatile with prices fluctuating rapidly and unpredictably. A major contribute to the extreme volatility is speculation as demand for cryptocurrencies are fueled by trading and speculation rather than real-world adoption. Considering cryptocurrencies' volatile nature, it would be extremely hard to use cryptocurrencies to transact. In order to alleviate the volatility of the cryptocurrency, the concept of stable coins was introduced.

Stablecoin, as the name suggests, is a cryptocurrency which is pegged to an asset with a stable value, such as gold or fiat money (USD, in most cases). A stablecoin usually has a fixed valuation in relation to its underlying asset. For example, Tether (USDT) is backed by USD dollars and has a stable value of USD \$1 for each USDT token. A stablecoin should always remain stable in its value no matter of the circumstances.

There are different categories to stablecoin, i.e., different underlying assets to which a stablecoin anchors.

4.1. Fiat-backed stablecoin

In this case, every unit of the stablecoin is backed by a fixed amount of sovereign currency in reserve. When a holder of the stablecoin wants to redeem, the corresponding amount of fiat money will be transferred to the holder's bank account and those coins will be either destroyed or taken out of circulation.

Among the fiat-backed stablecoins, Tether (USDT) is the more popular one. Tether is mainly used as a tool for hedging by cryptocurrency traders where it provides a way for traders to convert their holdings into the equivalent of USD value, without having to actually cash-out. However, there are some controversies surrounding Tether as there is a lack of transparency in whether USDT is fully backed by the equivalent fiat reserves.

TrueUSD (TUSD) was created as a more 'transparent' alternative to Tether. TUSD customers can exchange USD directly through an escrow account, which will never be touched by TUSD team. They employ smart contracts to ensure the 1:1 parity between their USD reserve in the escrow accounts and the TUSD tokens issued. The TUSD team has its plan for e-commerce and international transfer.

It is worthy of mentioning that the New York State Department of Financial Services (NYDFS) had gotten into stablecoin business since 2018. The Paxos Standard™ (PAX), also tethered to USD, was the first stablecoin approved by NYDFS. It operates under legal property of trust.⁷

4.2. Commodity-backed stablecoin

The most common collateralized commodity is gold. As mentioned earlier, gold has a long history being a value anchor of a currency, before being finally abandoned in the 1970s.

Digix Gold Tokens (DGX) is one of the more credible commodity-backed cryptocurrencies. DGX is backed by physical gold that has been fully audited and stored in a vault in Singapore. DGX is fully redeemable at any point of time. The value of each token is fully dependent on the market value of gold. Each gold bar is tracked accurately on the Ethereum blockchain.

4.3. Cryptocurrency-backed stablecoin

Crypto-backed stablecoins are backed by other digital currencies, usually the top-ranked cryptocurrencies such as Bitcoin or Ether. Typically, crypto-backed coins are backed by a basket of cryptocurrencies rather than just a single currency. This allows for better risk distribution, less volatility. The crypto-backed stablecoins are often over collateralized, so that it can withstand the extreme price fluctuations of the underlying cryptocurrencies. The most common crypto-backed stablecoins require users to stake, and lock-up, a certain amount of cryptocurrency into a smart contract which will then result in the creation of a fixed ratio of stablecoins. MakerDAO (DAI) is one example of this category.

4.4. Seignorage-style stablecoin

Seignorage are the only category of stablecoins which are not backed by any asset. Seignorage-style coins utilize an algorithm to expand or contract a stablecoin's money supply. As the total demand for the coins increases, new supply of stablecoins are created to reduce price back to stable levels, so that the coin's price as close to USD \$1 as possible. Seignorage-based stablecoins are not popular in practice but it has lately gained considerable interests by academia.

4.5. Stablecoins issued by bank

In addition to publicly traded/available stablecoins, wall street banks such as JPMorgan Chase, UBS, and giant tech company IBM⁸ all have announced plans for stablecoins. While banks are intended for internal payment machinery, enabling them to transfer efficiently between clients, IBM is taking on Swift for cross boarder payment.

To conclude, the stablecoins are created to address the extreme volatility of cryptocurrencies. In practice, the USD-backed stablecoins are much widely accepted than any other kind. In terms of usage, it is used as a hedging tool much more than any other scenarios.

5. Libra, tethered to a basket of sovereign currencies

On June 18th, 2019, US Internet giant Facebook announced its own cryptocurrency, named Libra. In the white paper⁹, Facebook puts the mission of Libra as:

"A simple global payment system and financial infrastructure that empowers billions of people. Provide people everywhere access to safe and affordable financial services. So people everywhere can live better lives."

5.1. Libra as a cryptocurrency or cryptocurrencies)

To achieve that, Libra is initially planned to be backed by a basket of fiat currencies to avoid volatility, much like SDR by International Monetary Fund (IMF). In September 2019, it is announced that the reserve basket would be made up of 50% United States dollar, 18% Euro, 14% Japanese yen, 11% Pound sterling and 7% Singapore dollar. However, as many attractions as Libra draws, the design and plan are also evolved in fast fashion. It quickly moved onto the idea of individual stablecoin pegged to individual national currency alongside the basket-based Libra token. On April 16, 2020, Libra announced plans to create an infrastructure for multiple cryptocurrencies, the preponderance of which will be backed by individual fiat currencies.

5.2. Libra as an organization

Libra is managed by Libra Association, with initial member, as of October 2019, including payment processor PayU and Checkout.com; Technology and Internet firm Farfetch, Lyft, Spotify, Uber, and Shopify; Blockchain company Anchorage, Bison Trails, Coinbase, and Xapo; Venture capital firm Andreessen Horowitz, Breakthrough Initiatives, Ribbit Capital, Thrive Capital, and Union Square Ventures; and Nonprofit organizations. Facebook has announced that each of the partners will inject an initial US\$10 million, so Libra has full asset backing on the day it opens.

5.3. Libra as blockchain

Libra intends to process transactions via the permissioned blockchain. The Libra Blockchain is a decentralized, programmable database designed to support a low-volatility cryptocurrency that will have the ability to serve as an efficient medium of payment for billions of people globally. In contrast to other cryptocurrencies modeled on bitcoin, Libra abandoned the idea of open system and open access. This leads fundamentalist questioned whether Libra is decentralized.¹⁰

In the center of Libra Blockchain is the Libra protocol. Functionally, the Libra protocol designed a set of replicas, referred to as validators, from different authorities to jointly maintain a database of resources. These resources are belonged to different user accounts authenticated by public key cryptography Validators process transactions and interact with each other to reach consensus on the state of the database. Transactions are based on predefined smart contracts programmed in a new programming language called Move.

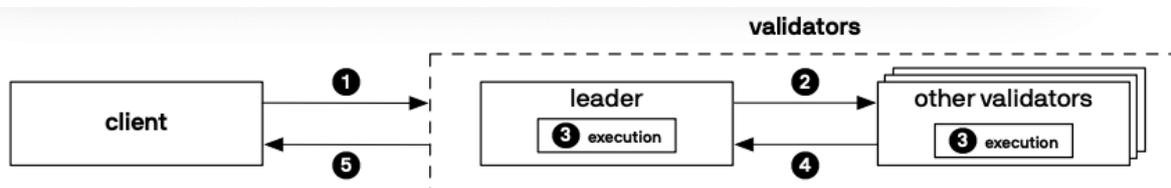


Figure 2. Overview of the Libra protocol, sourced from Ref. [11]

In figure 2:

- ① client submits transactions for inclusion in the database
- ② one validator acts as a leader, to propose transactions to other validators
- ③ all validators execute the transactions and form an authenticated data structure that contains new ledger history
- ④ validators vote on the authenticated data structure per consensus protocol
- ⑤ committing a transaction, response back to clients, complete the transaction

The key components of Libra protocol contain logical data model, executing transactions by smart contract, authenticated data structures and storage, Byzantine Fault Tolerant consensus, and networking.

Performance will be paramount important for global financial infrastructure, which is measured by Throughput, Latency, and Capacity. At the initial launch, Libra protocol is designed to support 1,000 payment transactions per second with a 10-second finality time between a transaction being submitted and committed. Over time, by employing techniques to process payment transactions off-chain, for example, within a custodial wallet or by using payment channels, to meet the demand for system's throughput.

The Libra protocol is designed to achieve performance goals by protocol design as well as validator selection. In the former, many elements of the Libra protocol are chosen partly based on performance. For example, the LibraBFT algorithm achieves consensus in three rounds of network communication and does not require any real-time delay to propose or vote on blocks. This allows the commit latency to be limited only by the network latency between validators.

5.4. Libra in the eyes of regulator

Since its announcement, Libra faced criticism and opposition from central banks. For instance, French Finance Minister stated that Libra could not be allowed to become a sovereign currency and would require strong consumer protections.¹² Concerns raised include privacy, money laundering and terrorism finance. Bank of England governor Mark Carney although agreed there was a need to keep an "open mind" about new technology for money transfers, but "anything that works in this world will become instantly systemic and will have to be subject to the highest standards of regulation." German warned that Facebook could become a shadow bank.

Libra also received strong criticism in US. Jerome Powell, chair of the Federal Reserve, testified before Congress that the Fed had "serious concerns" as to how Libra would deal with "money laundering, consumer protection and financial stability."¹³ US regulators also contacted Visa, PayPal, Mastercard and Stripe, asking for a complete overview of how Libra would fit into their anti-money-laundering compliance programs.¹⁴ This had a direct impact on the participation by other companies. By October 2019, the initial members of Booking Holdings, eBay, Mastercard, Mercado Pago, PayPal, Stripe and Visa Inc., all had left the Organization.

As of today, Libra is yet officially launched. The software is also in the infancy. The publicly released code for Libra, did little more than put fake coins in a wallet; almost none of the functionality outlined in the white paper is implemented, including "major architectural features that have yet to be invented."¹⁵

6. DCEP, the first sovereign digital currency

On 16 April 2020, The People's Bank of China (PBC), the central bank of China, has started the test phase of its CBDC, or Central bank digital currency, called Digital Currency / Electronic Payment (DCEP). It is currently tested in four Chinese cities: Shenzhen, Suzhou, Chengdu, and Xiong'an. China might be the first industrial economy worldwide to introduce a CBDC.

The Chinese CBDC aims to replace a part of the M0 money supply in the Chinese monetary system. Hence, DCEP is a digital form of the physical Renminbi (RMB). It is designed as digital cash and does therefore not carry any interest rate.

DCEP uses a two-tiered system, as illustrated in Figure 3. The first layer is between the central bank and the banking sector where PBC supplies CBDC to banks. These banks can then channel the CBDC through the second layer to retail clients via digital wallets. Users do not need to hold a bank account to use the DCEP.

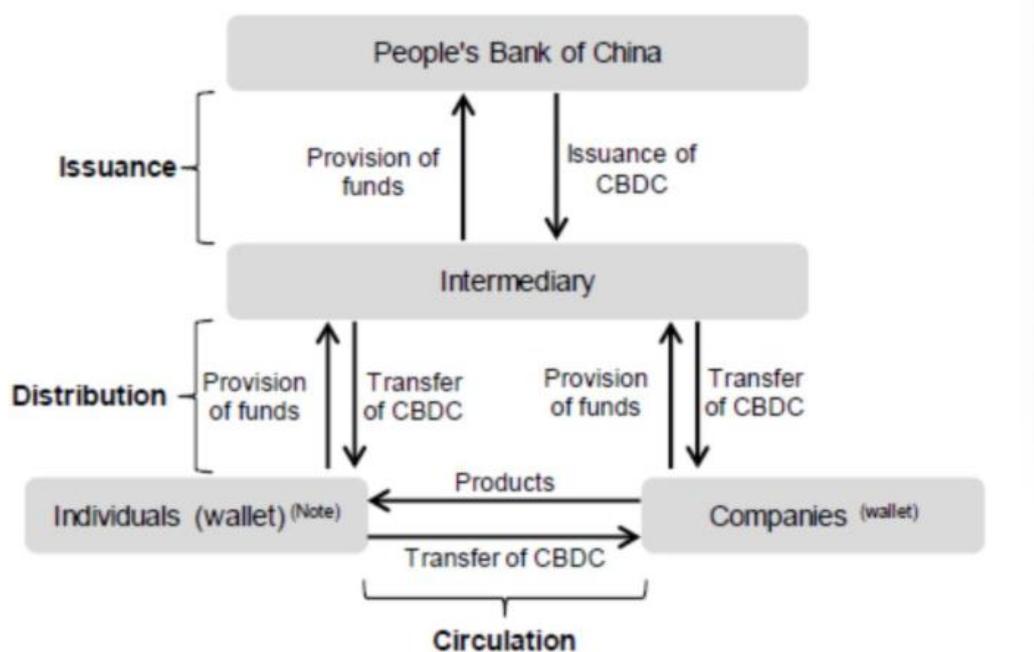


Figure 3. System of CBDC Issuance, Distribution and Circulation, taken from Ref. [16]

DCEP is not decentralized. The decision power is fully allocated to the central bank, even if distributed ledger technology (DLT; Blockchain is one implementation of DLT) might be one technology used for the DCEP. The exact role of DLT yet remains unclear.

DCEP will have NFC based payment method that don't require devices to be online during the fund transfer. This will be poised as a direct replacement of paper money, as DCEP will be usable in areas without internet coverage. In addition, DCEP doesn't require the mobile device to be bound to a bank account, or the unbanked population will also have access to the digital currency, make it almost as inclusive as paper money.

The start of CBDC can be traced back to 2014, with the form of several research projects. The fruits of these research were collectively published in "China Finance" in 2016 issue 17th. The establishment of the Research Institute of Digital Currency represents the official start of digital currency journey within PBC. Although hidden from public eyes, the prototype DCEP, including the two-tie system, was readily drafted in early 2017. No doubt that the pace was sped up in the later part of the 2019, attributed to the announcement of Libra. On June 22nd, 2020, former Vice Chair of the PBC's National Council for Social Security Fund announced that China had already completed the backend infrastructure of DCEP.¹⁷ In addition to the four cities mentioned above, the venues for the 2022 Winter Olympics to be hosted by China will also participate in the pilot testing of DCEP.

The significance of DCEP is that it's the first central bank digital currency global-wise, designed as a replacement of the Reserve Money (M0) system, cutting back the cost and friction of bank transfers. One benefit of CBDC, as suggested, it will alleviate the risks of offline paper money underground transactions such as anonymous counterfeiting, money laundering and terrorist financing because regulators can better monitor and trace digital currency transactions. In addition to greatly improve financial and monetary supervision, CBDC can also reduce the costs involved in maintaining and recycling banknotes and coins. Therefore, DCEP is poised to become the digital version of the RMB.

Furthermore, the issuance of DCEP is conducive to promoting and executing the internationalization of RMB, and thus, reshaping the current cross border payment system. Prior to the RMB Cross-Border Inter-Bank Payments System (CIPS) going live in early October

2015, RMB cross border clearing and settlement was mainly done through CHIPS (Clearing House Interbank Payments System) or SWIFT (Society for Worldwide Interbank Financial Telecommunication). However, some consider that both the CHIPS and SWIFT systems have fatal flaws from Chinese point of view. Firstly, CHIPS is a US company while SWIFT, in particular, is seen as a cause for concern to the Chinese due to its foothold in the international banking system. It is almost essential to rely SWIFT on inter-bank transfers across countries. The underlying worry is, whoever controls SWIFT's data center would have access to information on almost every cross-border remittance, which brings concerns on nation's security financial system. In the past, there were incidents its transactional data were found to have supplied to the US. Hence it is paramount that China is building up its own cross border banking system in internationalizing RMB. There is no doubt that DCEP will help the process.

Thirdly, DCEP will give central bank a new tool for adjusting monetary policy. It allows central banker to introduce the liquidity to specific sector or scenario never before.

7. Conclusion

From cryptocurrency pioneered by Bitcoin, to Libra which destined a universal payment medium, to the first central bank digital currency DCEP, the trend for currency digitization is evident. Although from an Economist view, Bitcoin is deficient in several aspects in the function of currency, it is no doubt being opened an eye for the public to give a glance of the enormous potential of the digital currency. From this point of view, Bitcoin indeed started a revolution that will transform our lives.

Since the trend of digitization, both for economy and finance, is inevitable, CBDC will be a new contention point in the world financial system, especially with the expansion of Chinese economy and the ambition of RMB internationalization. Between competitions, there are actually more room for cooperation. Optimistically, a new balance will be sought after and achieved.

Obligated by the market, central banks and regulatory authority are required making amendments in their financial regulation framework. For anti-money laundry, anti-corruption, and anti-terrorism financing, cryptocurrency raised new challenge. Furthermore, cryptocurrency represents a new class of assets, and different nations currently adopted different stance towards it, from a more strict approach such as China being banned cryptocurrency's trading to more open approach such as Swiss which even permitted issuance of new coins (ICO), it no doubt make confusion and conflicts among the marketers and in the long run, it will prevent technology from advancing in a healthy way.

References

- [1] Nakamoto, S. (2008) Bitcoin:A Peer-to-Peer Electronic Cash System, <https://bitcoin.org/en/bitcoin-paper>
- [2] Bagshaw, R., Rivet, C. (2020) Top 10 cryptocurrencies by market capitalization, <https://finance.yahoo.com/news/top-10-cryptocurrencies-market-capitalisation-160046487.html>
- [3] Steil, B. (2013) The Battle of Bretton Woods: John Maynard Keynes, Harry Dexter White, and the Making of a New World Order, Princeton University Press, Princeton
- [4] Meta, S. (2018) The Bitcoin Bubble, <https://www.fxleaders.com/cryptocurrency/the-bitcoin-bubble/>
- [5] Byström, H., Krygier, D. (2018) What Drives Bitcoin Volatility? Working Papers 2018:24, Lund University, Department of Economics. Available at SSRN: <https://ssrn.com/abstract=3223368>
- [6] Higgins, S. (2017) Derivatives Giant CME Group to Launch Bitcoin Futures Contract, <https://www.coindesk.com/cme-group-plans-launch-bitcoin-futures-contract>

- [7] De, N. (2018) Blockchain startup Paxos announced Monday that it has launched a stablecoin with regulatory backing from the state of New York, <https://www.coindesk.com/paxos-unveils-dollar-backed-stablecoin-approved-by-new-york-regulator>
- [8] Tanaya, M. (2019) IBM's Blockchain is Live and Bank-Issued Stablecoins Are On Their Way, <https://cheddar.com/media/ibm-blockchain-is-live-and-bank-issued-stablecoins-are-on-their-way>
- [9] Libra Association (2019) <https://libra.org/en-US/white-paper/>
- [10] Brandom, R. (2019) Facebook's cryptocurrency has a trust problem, <https://www.theverge.com/2019/6/18/18683867/facebook-cryptocurrency-libra-calibra-trust-banking>
- [11] Amsden, Z. etc. (2019) The Libra Blockchain, <https://developers.libra.org/docs/assets/papers/the-libra-blockchain/2020-05-26.pdf>
- [12] Lesaffre, C. (2019) Facebook va créer sa monnaie : 'Nous allons demander des garanties', prévient Bruno Le Maire (in French), <https://www.europe1.fr/economie/facebook-va-creer-sa-monnaie-nous-allons-demander-des-garanties-previent-bruno-le-maire-3905215>
- [13] Popper, N., Isaac, M., Smialek, J. (2019) Fed Chair Raises "Serious Concerns" About Facebook's Cryptocurrency Project, <https://www.nytimes.com/2019/07/10/technology/fed-chair-facebook-cryptocurrency-libra.html?searchResultPosition=1>
- [14] Andriotis, A., Rudegeair, P. (2019) Visa, Mastercard, Others Reconsider Involvement in Facebook's Libra Network, <https://www.wsj.com/articles/visa-mastercard-others-reconsider-involvement-in-facebook-s-libra-network-11569967023>
- [15] Ou, E. (2019) I Tried Using Facebook's Libra Blockchain. It Didn't Work, <https://www.bloomberg.com/opinion/articles/2019-06-20/facebook-s-libra-cryptocurrency-isn-t-actually-supposed-to-work>
- [16] Kwan, C. (2019) China Aiming to Issue a Central Bank Digital Currency—Expected Macro-Level Effects, <https://www.rieti.go.jp/en/china/19122701.html>
- [17] Musharraf, M. (2019) Digital Yuan's Backend Development Complete, Says Chinese Official, <https://cointelegraph.com/news/digital-yuans-backend-development-complete-says-chinese-official>