

An Evaluation of Central Bank Digital Currency
Merkez Bankası Dijital Parası Üzerine Bir Değerlendirme

Abstract

The gold standard, which was created as an alternative to fiat currencies, has been tried to be implemented by countries in different periods of history. With the development of technology, the use of cash has decreased and paved the way for innovations to emerge. One of the innovations in the field of payment systems is cryptocurrencies. Cryptocurrencies; can be defined as digital currencies based on mathematical algorithms, that do not lose their value due to inflation and are not affiliated with central institutions such as the central bank. States had to come up with new strategies to prevent the flight of fiat money and adapt to technology in emergencies. One of these strategies has been Central Bank Digital Currency (CBDC) and studies have been initiated to determine whether the CBDCs can replace traditional money. This study aims to make evaluations in the field of CBDC. It can be said that most of the central banks have ongoing research on CBDC, very few of them have started and are continuing pilot projects.

Öz

İtibari paralara alternatif olarak ortaya çıkartılan altın standardı, tarihin farklı dönemlerinde ülkeler tarafından uygulanmaya çalışılmıştır. Teknolojinin gelişmesi ile birlikte nakit para kullanımı azalmış ve inovasyonların ortaya çıkmasına zemin hazırlamıştır. Ödeme sistemleri alanında ortaya çıkarılan yeniliklerden birisi de kripto paralardır. Kripto paralar; temelinde matematiksel algoritmalar yatan, enflasyon nedeniyle değerini kaybetmeyen ve merkez bankası gibi merkezi kuruluşlara bağlı olmayan dijital paralar olarak tanımlanabilmektedir. Devletlerin, olağanüstü durumlarda itibari paralarından kaçışı engellemek ve teknolojiye adapte olmak için yeni stratejiler ortaya çıkarması gerekmiştir. Söz konusu stratejilerden birisi de Merkez Bankası Dijital Parası (MBDP) olmuş ve MBDP'lerin geleneksel paranın yerini alıp alamayacağı ile ilgili çalışmalar başlatılmıştır. Bu çalışmanın amacı MBDP alanında değerlendirmeler yapmaktadır. Çoğu merkez bankasının MBDP hakkında araştırmalarına devam ettiği ancak, çok azının pilot projelere başladığı ve devam ettiği söylenebilir.

Introduction

The gold standard, which was created as an alternative to fiat coins, was used in different periods of history. One of the main reasons for using gold for a long time is that it is shown as hard money. It has the basic characteristics of money such as divisibility, portability, durability, being a standard, and not losing its value over time.

Key functions of money today; to carry the purchasing power to the future as a means of value storage, to be a tool of exchange for the payment of goods and services, and to be a unit of value. It seems difficult to use these concepts, which can be used for hard money, for the fiat currencies used by the citizens of developing countries. The flight from fiat currencies, which constantly depreciates in the face of inflation, is increasing day by day. In the absence of hard money, gold, and gold standard, there is no way to protect savings against inflation (Greenspan, 1966).

With the development of technology, the use of cash has decreased and paved the way for innovations to emerge. One of the innovations introduced in the field of payment systems is

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cryptocurrencies. Electronic money and derivatives have started to attract the attention of central banks. Central banks need to closely follow these innovations in terms of price and financial stability. It is thought that the widely accepted private cryptocurrencies will reduce the effectiveness of the monetary policy and weaken the central bank's ability to be the lender of last resort (Fung & Halaburda, 2016).

Cryptocurrencies; can be defined as digital currencies that are based on mathematical algorithms, do not lose their value due to inflation, and are not dependent on central institutions such as the central bank. The best-known cryptocurrency is Bitcoin which was discovered by an unknown person or persons nicknamed Satoshi Nakamoto in 2009. Bitcoin is also called the gold standard of cryptocurrencies thanks to its decentralized structure, the absence of any institution or state behind it, its limited number, its divisibility, and its mining (Leblanc, 2016; Akdag & Bozma, 2021).

It is seen that investors, individuals, or institutions rely on cryptocurrencies when uncertainties regarding their fiat currencies increase in their countries. The rising prices of cryptocurrencies during the period of the USA government's closure in 2013, the excessive depreciation of the Russian Ruble in 2014, or the exit of the UK from the European Union (Brexit) draw attention (Leblanc, 2016). States, on the other hand, had to come up with new strategies to prevent the escape of their fiat money and adapt to technology in emergencies. One of these strategies was the Central Bank Digital Currency (CBDC) and studies on whether CBDCs can replace traditional money have been initiated (Cœuré & Loh, 2018). According to a study published in 2020; it is stated that 70% of global central banks accelerate research on CBDC and CBDC can be issued within 3 years (Boar et al., 2020).

CBDC, which will be the most important change after Bretton Woods among monetary instruments; can be defined as the monetary value stored electronically to make payments, which is the obligation of the central bank (Fung & Halaburda, 2016). Also, CBDC; can be explained as a monetary base that is available 24/7, can be used for person-to-person payments, is issued by the central bank and is withdrawn from circulation, and can be exchanged for fiat currencies and reserves (Pfister, 2019).

It is thought that this study will contribute to the literature in the field of CBDC. After defining money, crypto money, and CBDC in the first part, the advantages, and disadvantages of CBDCs are mentioned in the second part, and CBDC models are explained in the third part. The fourth part includes important pilot projects, while the fifth part concludes.

1. Advantages and Disadvantages

With the emergence of CBDC, its potential benefits and losses can be observed. It is thought that unwanted situations such as protection against identity theft and physical theft, blocking unsolicited messages to e-mails and phones, and selling information to third-party companies can be prevented by providing privacy with cryptocurrencies (Kahn et al., 2005; McAndrews, 2017). A digital version of the cash money will be obtained by issuing the CBDC. While changing hands in cash between individuals, the identity information of the person is not required, and with the CBDC, where privacy is provided, there will be no need to share identity information between the people with whom the money changed hands (Akdağ, 2019).

Distributed ledger technology usage shows that the system can be safe from malicious attacks thanks to the presence of multiple data servers instead of a single point. With the development of smart contracts and person-to-person micropayments, volatility can be reduced, and pay-as-you-go systems can become widespread with the Internet of Things (Klein et al., 2020).

Terrorist financing, tax evasion, or money laundering are among the most challenging issues against the anonymity feature in payment systems. However, the criminal activities mentioned so far have generally been carried out with fiat currencies, and even billions of dollars were fined against banks such as HSBC and JPMorgan for being intermediaries in money laundering (Sykes, 2018). The 500 Euro banknote, known as the "Bin Laden" banknote, which was the largest of the Euro banknotes released in 2002, was discontinued in 2016 and was withdrawn from the market in 2019 because it is easy to carry and has the highest banknote value (ECB, 2016).

As a result of partial reserve banking, banks do not have as much cash in circulation. According to the European Central Bank, only 13% of the money defined as bank money in Europe is in cash (Klein et al., 2020). Bank bankruptcies may occur if citizens quickly convert their money in commercial banks to risk-free CBDC due to the one-to-one conversion of bank money with cash (Tolle, 2016).

Another major motivator for CBDC research is the opportunity to bring underbanked communities into the financial system, as well as enhance the cost, speed, and the resilience of payments. The commission charged during money transfers is often high. With CBDC, very low commission rates can be used for low amounts of money transfers and costs can be reduced. Although central banks are in a monopoly position in issuing banknotes, discussions are continuing that they do not need to be in a monopoly position in issuing electronic money (Weber, 2015).

2. CBDC Models

While defining the place of CBDCs among money types, the most used example was the Money Flower created by Bech and Garratt (2017). As can be seen in Figure 1, CBDCs are divided into small-scale payments and large-scale payments. Although both are in the category of electronic money, person-to-person money, and money issued by the central bank, it has been evaluated that the CBDC used in small-scale payments should be in the universal accessible money category.

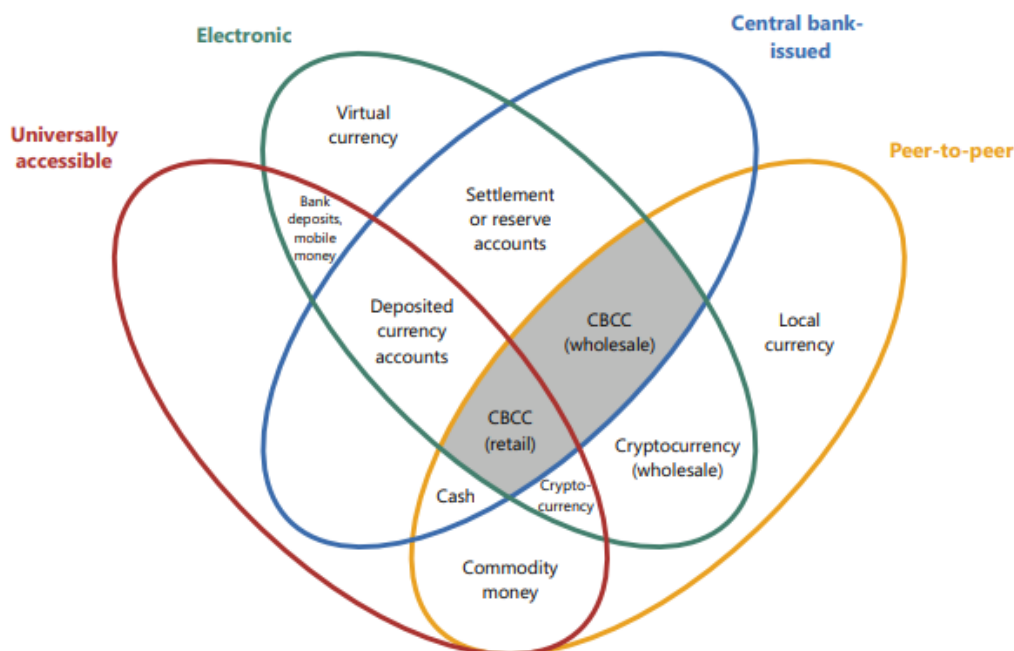


Image 1. Money Flower

Source: Bech ve Garratt, 2017.

An example of a fictitious FedCoin for CBDC that can be used for small-scale payments is given. It has been argued that FedCoin, which is thought to be supported by US Dollars, should be managed by the FED, the amount supplied should not be predetermined like Bitcoin, and the amount of supply should be determined by users in a cash-like manner (Garratt & Wallace, 2016).

An example of CADCoin is given for CBDC that can be used in large-scale payments. CADCoin, which is a cryptocurrency produced by the Bank of Canada for experimental purposes, adopting distributed ledger technology and aiming to make a large number of payments, includes the Canadian Central Bank, the financial technology company named R3, and various Canadian banks.

3. Pilot Projects

Cryptocurrencies are still considered niche projects by the majority of central banks. Although the majority of central banks are unlikely to issue CBDC in the near future, many are becoming more

open to the idea. BIS Survey shows that approximately 60% of central banks believe that issuing any sort of CBDC in the near future is improbable (Boar & Wehrli, 2021).

Project Jasper, created by the Bank of Canada, is a payment system project planned to be used in wholesale payments with a distributed ledger system. In this project, which is an experimental study, the strengths and weaknesses of the distributed ledger system were revealed. It is stated that the distributed ledger system alone cannot replace the existing central system and may cause operational risk, and sector-based gains can be achieved in terms of cost and efficiency gains (Chapman et al., 2017).

With the contributions of the Singapore Monetary Authority, some banks in Singapore, central bank, and financial regulators, a payment system prototype under the name of Ubin Project has started to be developed. The purpose of the project in question; shortening long transaction processes, eliminating intermediaries, and high transaction fees. The project, in which the digitalized version of the Singapore Dollar is used, is a real-time payment project and it is aimed to achieve faster liquidity for participants by using SWIFT message formats (Dalal et al., 2017).

The Banque de France is testing wholesale CBDC interbank settlements and has revealed the participants in its pilot program: Accenture, Euroclear, HSBC, Iznes, LiquidShare, ProsperUS, SEBA Bank and Societe Generale. In the next months, the bank will begin working with these eight finalists to carry out the trial programs (Deloitte, 2020).

Klein et al. (2020) stated that the work done by China has been accelerated, the CBDC belonging to China has started to be used in some cities and even the salaries are paid by CBDC. The People's Bank of China called the project as Digital Currency Electronic Payment (DCEP) to improve the efficiency of its payment system, replace cash, and secure peer-to-peer transactions. Commercial banks have already conducted internal tests such as cash-to-digital money conversion, account-balance checks, and payments using the system, which has already been trialled in numerous cities.

The Bank of Japan has been preparing to start testing CBDC in early fiscal year 2021 to see if the main functions and features required for CBDC are technically feasible. It is stated that Proof of Concept (PoC) Phase 1 begins in April 5, 2021, with all necessary preparations completed. The Bank intends to establish a test environment for the CBDC system and perform experiments on the essential operations that are core to CBDC as a payment instrument, such as issuance, distribution, and redemption, in Phase 1 of PoC which will last from March 2022 to March 2023 (BoJ, 2021).

Another study on CBDC was initiated by the Central Bank of Brazil. The purposes of this digital currency; built on smart contracts, the internet of things, and programmable money. In addition, it has been stated that it can be used in retail payments, can be used in offline operations, will not interest-bearing, will complement banknotes, have legal certainty, and have privacy and security features (BCB, 2020).

The importance of reaching social consensus on how programmable digital money may be integrated into the existing financial system has been emphasized by European Central Bank. With the Digital Euro, it is planned those individuals can open an account with the central bank and use CBDC. In this way, it can be said that individuals can use risk-free money in their payments and will be in circulation with cash, but it will be early to give information about its specific design (ECB, 2020)

4. Conclusion and Evaluation

Along with the digitalization of the economy, the development of money and payment systems continues. Most central banks are now looking into the case for CBDCs in some way. The emergence of CBDCs, which are expected to have a feature to complement the physical banknote, is approaching day by day. Although ensuring monetary and financial stability is defined as the duties of central banks, they have to keep up with new technologies with the decrease in the use of banknotes and changes in payment methods. Although most central banks continue their research on CBDC, which is seen as an innovation, very few have started and continue to pilot projects. Skepticism to CBDCs are continued as it is thought that their costs are more than their benefits yet. With its advanced features, CBDCs will be able to provide the infrastructure of faster and safer

payments and make the digital economy personal with programmable money, smart contracts, and cheap micropayments. However, it is necessary to prevent risks such as the prevention of money and terrorist financing, the sudden withdrawal of CBDCs from commercial banks, bankruptcy risk of banks. On the other hand, measures should also be considered for stable cryptocurrencies supported by fixed assets that can be used as an alternative to fiat currencies. CBDCs, which will affect monetary policy and financial stability, should be examined in detail by regulators, banks, payment providers, academics, and end-users. Despite all the advancements broad use of CBDCs appear to be a long way off. It is thought that this study will contribute to this new research area.

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