

## CENTRAL BANK DIGITAL CURRENCY EFFECTS ON FRACTIONAL RESERVE BANKING

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**KEY WORDS:** CBDC; Money; Credit; Fractional reserve banking; Monetary system.

J.E.L. classification: E4, E5.

DOI: <https://doi.org/10.52244/ep.2022.23.06>

**For citation:** Khidasheli M., (2022) Central bank digital currency effects on fractional reserve banking. Vol. 17, 1(23), p. 8-14. DOI: <https://doi.org/10.52244/ep.2022.23.06>

**Abstract:** *An aim of the paper is to explore the outlines of the looming monetary order. For these purposes, we have made a brief retrospective analysis of money genesis. In its inception market had selected gold as a medium of exchange and gold had become a social institution. After WWII the leading force of monetary order changed. The Bretton Woods conference had made a political agreement to endorse the US dollar as a reserve currency. In 1971 the picture had become more clear, and the gold-backed dollar system collapsed as it was predicted earlier. A digital environment has given the reborn of new types of money. The pioneer of digital money was the cryptocurrency, a decentralized and transparent system to pay and hold the value. As the old saying tells, everything new is well forgotten old one. Since 2021 central Bank of China has launched a digital RMB pilot program. It is easy to grasp that the state tries to substitute the market-developed money (cryptocurrencies) with the monopolistic system of CBDC. We have found out the effects of CBDC on*

*retail banking and the incapability of CBDC monetary order with fractional reserve banking.*

**Introduction.** Since 2009 we have observed a tremendous expansion of the cryptocurrency market. The pioneer of them obviously was bitcoin, based on block chain infrastructure. After quickly attracting popularity bitcoin prices have soared from zero to more than \$60 000 in 2021. In 2022 there are 10,363 active cryptocurrencies and the crypto market's value stood at \$2.04 trillion.

In April 2021 P.R.C. central bank issued the first digital RMB as a legal tender, which has equivalent value to other forms of the Renminbi (CNY). The action of China's government was obvious, the totalitarian state has grasped that digitalization is an irreversible process and decentralized cryptocurrencies are a real threat to their regulatory power of finance.

Today almost all central banks are working on their models of CDDB but the complexity of the issue constrains their agenda to implement the reforms in the short-run future.

### **The genesis of money**

There could be endless disputes, about the most important invention of mankind. But from my personal point of view, it is money as a social

institution. The progress of mankind is based on labor division and specialization of the workforce. Internet, smartphones, cars, and other complex instruments are developed by scientists and made by plants with plenty of high skilled workers. Therefore, money as a basis of the labor division process is a driving force of progress.

But money, as we know and use in ordinary life, had gone through long phases of evolution, from barter to gold and fiat currencies. From its inception, there was some cumulative evolution of money as a social institution. For example, when we are talking about gold money, it was not a state invention or product of state coercion for the mandatory use of gold as legal tender.

Money did not and never could begin by some arbitrary social contract, or by some government agency decreeing that everyone has to accept the tickets it issues. Even coercion could not force people and institutions to accept meaningless tickets that they had not heard of or that bore no relation to any other pre-existing money. Money arises in the free market, as individuals on the market try to facilitate the vital process of exchange. (Rothbard Murray N, 1994)

There was a transition process from the gold standard to the fiat currency regime. As Rothbard mentioned above, gold was a social institution, but after WW II we had got new financial order, called the gold-dollar standard. The US dollar had a fixed price in gold, \$35 per ounce of gold and each central bank could hold the reserves in USD dollars instead of gold. The system dissolved between 1968 and 1973. In August 1971, U.S. President Richard Nixon announced the "temporary" suspension of the dollar's convertibility into gold. In fact, it was the end of the system and we have got a fiat currency model.

From its inception, the money evolution process was managed by the free market but, as we have seen above, since 1945 the character of the evolution

changed and became a political process. In a fiat money monetary system, the central bank doesn't have any limits to print money because it is not backed by gold or anything else. The quantity of the monetary base is not determined by the market. The central bank executives are analyzing and decide how much money is needed in the economy at a particular date of time.

I do not believe we can now remedy this position by constructing some new international monetary order, whether a new international monetary authority or institution or even an international agreement to adopt a particular mechanism or system of policy, such as the classical gold standard. I am fairly convinced that any attempt now to re-instate the gold standard by the international agreement would break down within a short time and merely discredit the ideal of an international gold standard for even longer. Without the conviction of the public at large that certain immediately painful measures are occasionally necessary to preserve reasonable stability, we cannot hope that any authority which has the power to determine the quantity of money will long resist the pressure for, or the seduction of, cheap money. (Hayek F.A. 1976)

### **CBDC phenomenon**

We define a central bank's digital currency simply as an electronic, fiat liability of a central bank that can be used to settle payments or as a store of value. It is in essence electronic central bank, or 'narrow', money. (Bank of England, 2018)

There are some similarities and differences between crypto and CBDC. In both cases, the currency is given in the digital form, but cryptocurrencies are decentralized blockchain products. In contrast, CBDC is given as a centralized account in the central bank's balance sheet.

The arrival of digital money has reopened the debate about the role of central banks. First, CBDCs have become feasible. Second, the internet allows a central bank to skip building an extensive network of branches, either directly or in cooperation with existing commercial banks. Both factors suggest that we can, and very likely will, revisit the sharp separation wall between central banks and the public at large. But, for such an endeavor, we require a formal economic model (Fernández-Villaverde Jesús, 2020)

CBDC gives new scope of central bank functionality and operations. In the current fiat currency system, monetary architecture central banks are in the role of wholesale dealers of money, but they don't execute retail banking services. First of all, from point of view of central banks, it is inefficient to make branches and

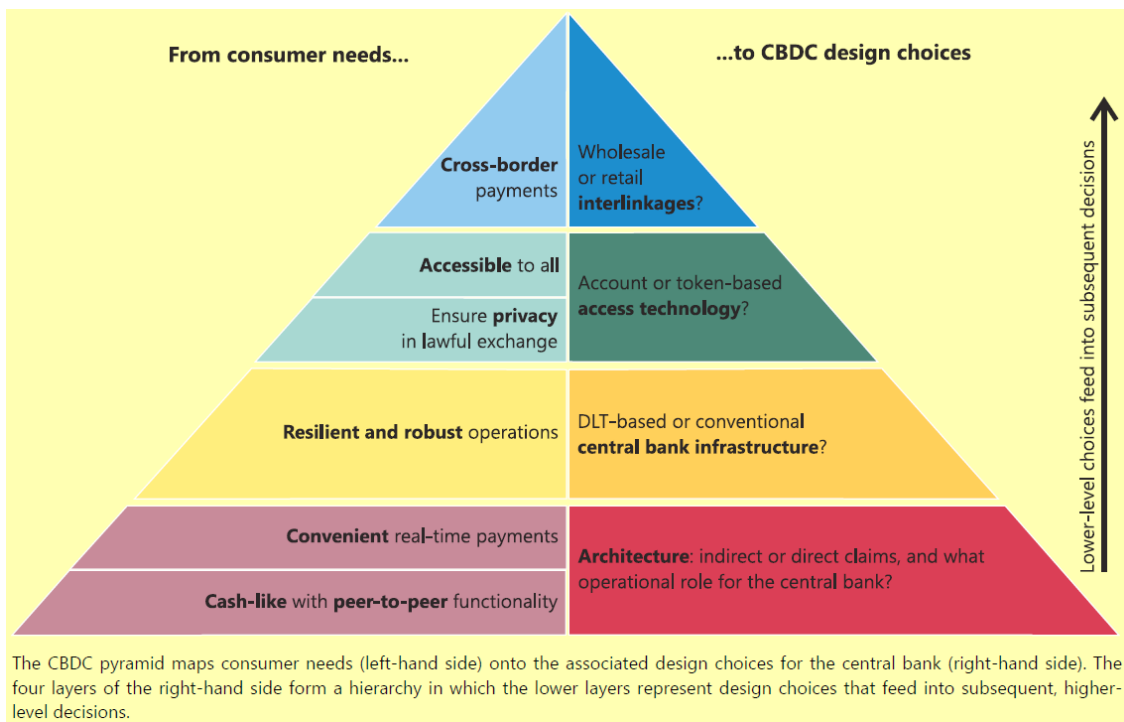
manage retail banking globally. The second factor is a conflict of interest, to supervise the banking sector and operate in the sector at the same time. CBDC is a game-changer, it gives an opportunity to the central bank to provide retail banking without significant cost and management burden.

We thus sketch the development of a CBDC through an approach that proceeds from consumer needs to design choices.<sup>4</sup> The left-hand side of the CBDC pyramid (Graph 1) sets out such consumer needs and six associated features that would make a CBDC useful. Starting with cash-like peer-to-peer usability, these features also comprise convenient real-time payments, payment security, privacy, wide accessibility, and ease of use in cross-border payments (Graph 1). The pyramid's right-hand side lays out the

The CBDC pyramid

Graph 1

Source: BIS Quarterly Review, March 2020



associated design choices. (BIS Quarterly Review, March 2020.)

There are 3 types of possibilities to provide retail banking with CBDC:

- The direct CBDC, when retail banking is provided by Central banks;
- The indirect CBDC, when retail banking is provided by commercial banks;
- The hybrid CBDC, in this model, a direct claim on the central bank is combined with a private sector messaging layer

Why the private sector itself has not found ways of enabling households and companies to hold bank deposits that are fully secured by central bank money. Such an approach would offer public deposits that are virtually identical to digital central bank money or sovereign money accounts. Why does nothing like this exist? The answer may be that bank customers are broadly satisfied with what is available today. Banks offer customers holding sight deposits with them a range of services, mostly relating to account management and payment transactions. In addition, they generally pay interest. From the point of view of customers, the services offered by commercial banks and the fact that they are paid interest on deposits probably offset any disadvantages stemming from the fact that sight deposits with commercial banks are not central bank money (Jordan Thomas J. 2018)

It will be hard to find out which mix of the above-mentioned forms of CBDC retail banking will be better. Empirical examples had shown that economic factors will not be decisive arguments in this field. The primary factor would be the political environment. In a totalitarian state probably we will see the direct CBDC models. In the case of free-market democracies, there will be some segment of the banking sector for commercial bank operations. The question is how to provide the CBDC transactions? Make an individual account on central banks' balance sheets and give permission to commercial banks to develop on this

basis or use distributed ledger technology. From my point of view, the case of Yap described by Milton Friedman (The Island of Stone Money) is so interesting one. The model was incredibly simple and effective.

Large stones quarried and shaped on a distant island were used as, money on the Island of Yap. After Germany acquired the island at the turn of the century, its officials had difficulty inducing the residents to repair the footpaths until they resorted to the desperate expedient of taking possession of many of the stones by marking them with a cross in black paint, to be removed when the paths were repaired. (Friedman M, 1991)

If implement the Stone Money model for CBDC architecture, the system will become more flexible and safe. First of all, you will be able to hold your CBDC offline as a digital key, and the second monitoring of the accounts will not be needed at all, the central bank only needs to register the digital currency as property and change its owner after transactions. It does not need to create personal financial accounts at all. The approach with the digital currency will be the same as with the property and its right.

### **Credit and fractional reserve banking**

An individual commercial bank cannot use the granting of loans to ensure a lasting increase in the deposits it holds. Due to payment transfers, the deposit created by a loan flows out and disappears from the books of the lending bank. For the banking system as a whole, however, things look different. The payment transfer creates a new deposit at another bank. While the total volume of central bank money remains unchanged, lending by an individual bank increases deposits in the banking system and hence also the overall money supply (Jordan Thomas J. 2018)

A more interesting process is going on with

fractional reserve banking. As we know within the fractional reserve system, commercial banks make loans from deposit accounts also. The process is suitable for the fiat currency system because no one records and tracks the serial numbers of banknote bills. but how is it will possible in the case of CBDC? As we mentioned above, clearing of CBDC means tracking each move of digital currency, because it is a “serial number” itself. So, at any stage of the transaction, the owner will have full control of his (her) money. Therefore, commercial banks will not have the ability to give this money for credit and create such type of money by using a fractional reserve system and the money multiplier.

In a free-market economy, where there is no fractional reserve banking practice, the source of credit resources is savings, temporarily free money funds, which, through the banks as the mediators, flow from the savings holders to business operators in the form of loans. The existence of savings is, on the one hand, are the means for obtaining credit resources for business, and on the other hand, the indicator of the existence of the additional demand, which should provide support for the economic growth, as well as the application of the additional issue. Everything changes in the conditions of a fractional reserve system, when the source of loan is not the real savings but a monetary multiplier (Khidasheli M, Chikhladze N, 2019)

In a fiat money system, you are not holding or tracking the serial number of your money, because it does not have an essence. Your interest is an amount on your bank account indifferently what serial numbers they have. The fractional reserve banking itself is based on this condition. But everything is changing in the case of CBDC because it’s a “serial number” itself and you primarily hold CBDC as a property rather than merely an amount. The implementation of the

CBDC system will demolish the basis of fractional reserve banking.

### **Conclusions**

As we have seen above the evolution of the monetary system had two layers:

- Cumulative evolution shaped the social institution – gold standard;
- The Breton wood s agreement transited the nature of the monetary system’s evolution, from social institution to political one.

Empirical pieces of evidence have shown that social institutions are born (with cumulative evolution) and are sustainable creatures. Artificial (political) institutions don’t have the same characteristics. The gold standard lasted centuries and the Breton Woods agreement only two decades. The development of the digital economy creates an alternative economic environment, not fully controlled by a state, and the process of evolution starts again. Primarily we saw cryptocurrencies, decentralized, blockchain products without any state regulator and interventions from a central authority. The distributed ledger technology gives much more control, transparency, and safety over your crypto money than commercial banks account. The popularity of cryptocurrency was considered a threat to the current monetary order and the process of political intervention to control the process is going on.

CBDC was an echo of decentralized cryptocurrencies, the state approach to the money digitalization process. In some states may we will see a ban on decentralized currencies and fully substitute them with CBDC but one is inevitable: fractional reserve banking is inconsistent with the CBDC environment, where you own a currency as a property with a specific form and not an account with an amount on it.

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## ცენტრალური ბანკის ციფრული ვალუტის გავლენა ნაწილობრივი დარეზერვების სისტემაზე

### მირზა ხიდაშელი

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**საკვანძო სიტყვები:** CBDC; ფული; კრედიტი; ნაწილობრივი დარეზერვების სისტემა; მონეტარული სისტემა.

**J.E.L. classification:** E4, E5.

DOI:

<https://doi.org/10.52244/ep.2022.23.06>

**ციტირებისთვის:** Khidasheli M., (2022) Central bank digital currency effects on fractional reserve banking. Vol. 17, 1(23), p. 8-14. DOI: <https://doi.org/10.52244/ep.2022.23.06>

### რეზიუმე

ნაშრომის მიზანია შეისწავლოს მონეტარული სისტემის მოსალოდნელი ცვლილების კონტურები. ამ მიზნებისათვის ჩავატარეთ ფულის, როგორც ეკონომიკური კატეგორიის გენეზისის მოკლე რეტროსპექტული ანალიზი. ფულადი ურთიერთობების დასაწყისში ბაზარმა ოქრო აირჩია როგორც გაცვლის უნივერსალური საშუალება და ამ სახით ოქრო გახდა ერთგვარი სოციალური ინსტიტუტი. მეორე მსოფლიო ომის შემდეგ შეიცვალა მონეტარული წესრიგის წამყვანი ძალები. ბრეტონვუდის კონფერენციამ მიიღო პოლიტიკური გადაწყვეტილება ოქროს ნაცვლად აშშ დოლარის სარეზერვო ვალუტად დამტკიცების შესახებ. 1971 წელს სურათი უფრო ნათელი გახდა, როგორც მოსალოდნელი იყო ოქროთი უზრუნველყოფილი დოლარის

სისტემამ კრაზი განიცადა. ციფრულმა გარემომ დასაბამი მისცა ახალი ტიპის ფულის აღორძინებას. ციფრული ფულის პიონერებად კრიპტოვალუტები მოგვევლინენ, რომელთაც შეემნეს დეცენტრალიზებული და გამჭვირვალე სისტემა ღირებულების გადახდისა და შენახვისათვის („ყველაფერი ახალი კარგად დავიწყებული ძველია“). 2021 წლიდან ჩინეთის ცენტრალურმა ბანკმა დაიწყო ციფრული RMB საპილოტე პროგრამა. ადვილი მისახვედრია, რომ სახელმწიფო ცდილობს შეცვალოს ბაზრის

მიერ განვითარებული ფულადი სისტემა (კრიპტოვალუტები) ცენტრალური ბანკის ციფრული ვალუტების მონოპოლისტური სისტემით. ნაშრომში ჩვენ შევეცადეთ გაგვეჩვენებინათ ცენტრალური ბანკის ციფრული ვალუტის, როგორც ფულადი ერთეულის გავლენა საცალო საბანკო სერვისებზე და ვაჩვენეთ ცენტრალური ბანკის ციფრული ვალუტის შეუთავსებლობა ნაწილობრივი დარეზერვების სისტემასთან.