

The Place of Cryptocurrencies in the Banking System

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Abstract

Blockchain technology used in cryptocurrencies provides the possibility of ensuring the security of recording and storing financial data, process automation, reducing the number of errors and reducing costs in banking. Nevertheless, financial institutions still treat cryptocurrencies with great caution. The aim of this article is to answer the question of whether it would be possible in any dimension to integrate currently functioning cryptocurrencies with the banking system. The resolution of this issue was carried out based on economic theories regarding the supply of money and the construction of the banking system. The conclusions from the study are as follows: there is no possibility of using cryptocurrency as money functioning in the current banking realities. Cryptocurrency (such as bitcoin) as central bank money would prevent the central bank from implementing monetary policy. The only form of integration of currently functioning cryptocurrencies with the banking system could consist in facilitating access to these assets by commercial banks, as an intermediary. The use of blockchain technology in banking, due to limited access for external entities, may limit its advantages. Creating CBDC is a form of response of central banks to the emergence of cryptocurrencies. However, without meeting the basic assumptions of the functioning of cryptocurrencies such as: open protocol, free access, dispersion of emissions, CBDCs cannot be identified with cryptocurrencies in the traditional sense.

Keywords: *cryptocurrencies, money, banking system, blockchain technology, bitcoin*

1. Introduction

Banks play many important roles in the economy. One of them is money creation – a process in which the central bank and commercial banks participate. The central bank decides on the amount of cash in circulation, while commercial banks participate in the creation of non-cash money by granting loans. In common terms, the central bank is responsible for achieving specific inflation targets by using appropriate monetary policy tools, which include interest rates, open market operations, or the level of mandatory reserves. The central bank has quite a lot of freedom in this activity, primarily because it manages the supply of money that it creates itself. Its monopoly in this respect, as well as the current model of functioning of money in the current economic reality, is not threatened. This situation could change when another type of money appeared on the market, issued outside the banking system, which would be widely used by entities on the market. Then the central bank would only be able to influence the supply of part of the money that functions in the economy. In order to influence the remaining part of the money in circulation on the market, it would also have to participate in its issue or somehow dispose of it. From the point

of view of the central bank, the significance of such action would be high, because through the mechanism of transmitting monetary impulses it can influence macroeconomic values.

Currently, there is no other currency on the market than traditional money in such a wide distribution that it would be alarming for central banks. However, a dozen or so years ago, a new type of medium of exchange appeared in the economy, having the characteristics of money and operating outside the financial system. This medium of exchange is cryptocurrencies. The first cryptocurrency began operating in 2009. It was Bitcoin (hereinafter: BTC). Both BTC and other, later created cryptocurrencies operate on the basis of blockchain technology, which, thanks to the use of cryptography, allows the transfer of funds between transaction parties without involving a trusted third party in this process, which in traditional finance is most often a bank. The gradually increasing capitalization of the cryptocurrency market, which in May 2025 amounts to just over \$3.3 trillion¹⁰, the continuous and uninterrupted operation of BTC for over sixteen years, as well as the growing popularity of cryptocurrencies and blockchain technology allow us to assume that the prevalence of cryptocurrencies and the scope of their use will grow.

It is not yet possible to say what size this market will reach in the future. It is even more impossible to say whether it will ever disrupt the functioning of the banking system. This does not change the fact that it is important to ask whether there is a place for cryptocurrencies in the current banking system. More precisely, this question is about whether banks would be able to accept even one of the cryptocurrencies as one of the types of money functioning in the banking system? It is not difficult to imagine the involvement of banks in investments in cryptocurrencies, but this will not be the subject of considerations in this article. More interesting from the point of view of this work is the aspect of the existence of a potential symbiosis between the cryptocurrency system and the traditional one. The aim of this article is to answer this question. The assumptions of the functioning of cryptocurrencies are completely different from those based on which current money functions. In order to answer the question posed, it would be necessary to briefly present the way the banking system and the way cryptocurrencies function. For this purpose, a comparative analysis of both monetary systems should be carried out and some financial theories should be referred to. The work will therefore be primarily theoretical.

2. The Origin of Cryptocurrencies and How They Function

When it comes to digital money, which would be an alternative to that issued by the state, it should be said that attempts to create such money took place already at a time when the Internet was not yet widely used. The creation of cryptocurrencies was preceded by the efforts of many cryptologists to create a digital version of cash over a quarter of a century before the emergence of BTC. In the process of creating cryptocurrency, a pioneering achievement was David Chaum's description of the so-called *blind signature*, a protocol ensuring the functioning of an anonymous payment system that allowed the identity of the person making the payment with digital money to be hidden (Chaum, 1983). However, this system did not effectively solve the problem of double spending. Theoretically, a user could pay with a previously issued coin at another seller. Another technological solution important from the point of view of the functioning of cryptocurrencies was proposed in 1997 by Adam Back, namely *hashcash* (Back, 2002), i.e. a *proof-of-work* algorithm of refusal to all types of internet services, currently most often used as an algorithm in the process of mining new BTC and many other cryptocurrencies. Hal Finney developed Adam Back's idea and in 2004 designed a reusable *proof-of-work* (Piotrowska, 2018). A member of the Cypherpunk group, Wei Dai, played a significant role in the development of the cryptocurrency system. In 1998, he

¹⁰ Coinmarketcap, <https://coinmarketcap.com/> (access: 20.05.2025).

presented the concept of a virtual anonymous currency called *b-money* (Dai, 1998). The most important technological solution he proposed, which was later adopted in BTC, was the concept of a distributed transaction register, copies of which would be held by each participant. This system operated without the need for a central unit. Transactions took place anonymously in a P2P architecture. A solution similar to *b-money* was the concept developed by Nick Szabo, presented in 1998, called *bit gold*. Nick Szabo's idea identifies two features that are considered to be the basic economic assumptions of BTC: decentralization and resistance to inflation (DeMartino, 2016). The creator assumed a finite level of supply of *bit gold* units. However, *bit gold* has not been named the first functioning cryptocurrency, because the project was never implemented. The anonymous creator of BTC, using the pseudonym Satoshi Nakamoto, described its operation several months before the software was launched, which gave rise to the first decentralized blockchain network. Satoshi Nakamoto believes that BTC is not only a type of electronic money or virtual tokens, but also a system of monetary and financial settlements. It allows for direct payments via the Internet between the parties of the transaction. The effectiveness of direct money transfers in the BTC system is guaranteed thanks to cryptographic encryption (Nakamoto, 2008).

The functioning of cryptocurrencies will be discussed using the example of BTC, which is the first and reference cryptocurrency with the largest market capitalization of all other cryptocurrencies. The technological solutions on which BTC operates were used to large extent by the creators of each subsequent cryptocurrency. The basis for the functioning of BTC and other cryptocurrencies is blockchain technology. This technology is a system for recording information in a decentralized network. In the case of cryptocurrencies, blockchain is the digital equivalent of a settlement book. Each transaction recorded in it has many copies distributed in the network. The system for confirming transactions and distributing newly created coins is also decentralized. The ability to dispose of one's funds is provided by a system of cryptographic private and public keys. Cryptocurrency has no physical equivalent in the form of banknotes and coins, and all coins are in digital form. BTC, being an electronic payment system, from a technological point of view consists of three basic modules (Homa, 2015):

- Peer-to-peer (P2P) network;
- Public key cryptography;
- Proof-of-work.

BTC, like other cryptocurrencies, functions as a communication protocol, which means a set of rules that allow devices to establish a connection in order to exchange information. As a protocol, it has no owner and is open-source software, which means that anyone can view it and use its code, or suggest changes and improvements. BTC, as a decentralized network of computers operating in the P2P (peer-to-peer) architecture, allows for the reconciliation and confirmation of transactions and verification of the status of funds held by individual participants. In the case of a P2P network, each participant has the ability to connect to every participant and use the protocol, which is BTC, in the same way. There are no distinguished nodes in such a network, all are equal. The entire network is therefore not dependent on a single server, which in the event of a failure would expose all BTC users to risk. In contrast to the client-server architecture, there is no hierarchy or division of roles among the participants of the network managing and sharing resources. The network is therefore independent of central management systems, which eliminates the need to monitor transactions taking place in them (Szymankiewicz, 2014). Thanks to this, BTC is the first financial network to identify the principle of neutrality, similarly to the Internet. It is neutral towards anyone sending and receiving funds, as well as to the value of the transaction (Antonopoulos, 2016).

In a computer environment where digital files can be freely copied, there is a possibility that when someone sends another person any information in the form of digital data, they can keep copies of it. In the case where the information sent plays the role of digital money, such a possibility is unacceptable. Therefore, in order for the information sent via the Internet to become money, it must be protected against counterfeiting, copying and theft. For this purpose, BTC uses public key cryptography (Homa, 2015). The right to ownership of a specific amount of BTC is established using: digital keys, addresses and digital signatures. Digital keys are created by users independent of the BTC protocol, which allows for a decentralized mechanism for ensuring trust and control. Keys come in pairs consisting of a private key and a public key. The private key is the equivalent of a secret PIN code providing control over the account, while the public key can be treated as a bank account number. In practice, digital keys are rarely visible to users, as they are stored in the wallet file and managed by its software (Antonopoulos, 2018). The public key is used to transfer funds, while the private key is used to sign transactions in which funds are spent. Operation performed to generate a public key from a private key is the multiplication of elliptic curve points. Using a one-way cryptographic hash function (Kuznetsov et al, 2021) in relation to the public key, a BTC address is generated. This address is a string of numbers and characters that the user can share with anyone who wants to send them money in the form of BTC (Antonopoulos, 2018).

Proof-of-work is another solution that is the basis for the operation of the BTC network and many other cryptocurrencies. It prevents double spending. It also makes verifying transactions and placing them in the BTC register expensive due to the computational work that computers must perform to confirm and record transactions made by cryptocurrency users. Proof-of-work is an effective tool for ensuring the security of funds held in BTC by ensuring the continuity and immutability of the record in its virtual settlement book. In the case of BTC, all issued coins were put into circulation by the so-called miners. This is the common name for network users who engage computing power in the cryptocurrency network. In practice, they use equipment equipped with computing processors for this purpose. Their computers have the software of a given cryptocurrency installed, which seeks to solve the mathematical function on which the algorithm of the BTC protocol is based. The computational work is performed by all computers in the network, in accordance with the assumptions of proof-of-work, competing to be the first to solve a given mathematical problem. After finding a solution, a new block of information is generated, which contains a record of the transaction from the moment the previous block was mined (Franków, Kopyściański, 2018). One new block is added to the chronological sequence of blocks every 10 minutes. Adding it to the register allows new owners of funds to dispose of them. For confirming transactions, miners receive payment in the form of newly generated BTC increased by transaction fees. They are received by the owner of the processor who first finds a solution to the function and adds a new block of transactions to the current chain of blocks. In this way, new monetary units are issued. After all 21 million BTC have been mined, the miners' remuneration will come only from transaction fees. Mining is therefore a process that allows transactions to be confirmed by consensus achieved at the network level, without the need for a central unit. It is true that new BTC are created in this process (from a pool of 21 million), but this is not a goal in itself, but the effect of the mechanism thanks to which the security of the BTC system can be decentralized (Antonopoulos, 2018). The more devices participate in the mining of the currency, the more secure its network is. Each transaction has a timestamp and contains a hash function of the previous transaction, which in turn has a timestamp and hash function of the previous one. Such a secured chronology of money flows ensures their immutability and security (DeMartino, 2016). The maximum number of new BTC that miners can receive for adding a new block to the register is reduced by half approximately every four years, i.e. approximately every 210 thousand

blocks. In the initial period after the launch of the BTC network in January 2009, 50 new BTC were created every 10 minutes. Currently, in May 2025, it is already 3.125 BTC for each block.

Another type of algorithm that performs security functions is proof-of-stake. Its mechanism uses many of the latest cryptocurrencies. Each user who wants to participate in the process of issuing new coins must, in accordance with the rules of proof-of-stake, block a certain number of cryptocurrency units in the network as their stake. Its size determines the chance of selecting a given node as the next validator, which will verify a new pool of transactions, create a new block and will be able to receive a reward for it. The higher the stake, the greater the chance of selecting a given node. In order for the algorithm not to favour only the richest nodes, unique selection methods are added to it (Shifferaw, Lemma, 2021).

From the above description of the functioning of cryptocurrencies using BTC as an example, several key features of this system emerge. First of all, there are no privileged units in the network created by entities participating in the issuance and transactions of cryptocurrencies. Both the issuance of new monetary units and the process of verifying and confirming transactions in the network are distributed. Therefore, the more units participate in the network, the greater its security and the certainty of the undisturbed process of transferring funds. This is the opposite of the traditional financial system, in which security is ensured by limiting access to units performing key tasks in the entire system and centralizing key competences. Differences also concern the principles and security of storing one's own financial resources. Thanks to public key cryptography, in the case of cryptocurrencies, it is possible to safely store funds only by securing the key itself. Therefore, the mechanism of ensuring trust and control is also decentralized. The user thus becomes fully responsible for their own financial resources. Of course, they can entrust the care of the key to another person or institution, but in such a case they risk losing control over their financial resources, because the only way to dispose of the cryptocurrency is to have a private key. Such a situation does not occur in traditional banking, where access to one's own money is usually guaranteed by confirmation of identity.

Another feature of cryptocurrencies is neutrality, which means that every BTC user, regardless of whether they are a private person, an organization, a bank or a government institution, has the ability to use the network of a given cryptocurrency on the same terms as every other user. This also means that every user has the same opportunity to create innovations in this system in categories such as financial instruments or payment systems. The shape of the cryptocurrency can therefore be decided by the entire community associated with it. The traditional banking system does not provide such an opportunity. While technological solutions and user facilities in the traditional system are created largely in accordance with the needs and expectations of customers, the initiative to take some action is top-down, coming from decision-makers managing the system. In the case of cryptocurrencies, e.g. BTC, the initiative is bottom-up and, as in the case of any cryptocurrency operating on the basis of the proof-of-work algorithm, the voting power depends on the actual involvement of individual units in a given network measured by the amount of computing power provided to the network of a given cryptocurrency.

Almost all the rules of functioning of a cryptocurrency are established in the process of its creation and are, in principle, unchanged throughout its operation. This assumption means that a cryptocurrency can function without any further interference. It does not have to have a control unit. With a sufficiently high level of involvement of computing power in the cryptocurrency network, the way a given cryptocurrency functions, and at the same time the assumptions regarding, among others, supply, are almost impossible to change. In the case of BTC and other proof-of-work cryptocurrencies, according to predetermined rules, newly generated coins go to the users who are most involved in the network in terms of the computing power provided, i.e. those

whose participation in the network secures it the most. This mechanism promotes fair distribution of coins and network decentralization (Capponi et al, 2021) and works great for cryptocurrencies such as BTC, where the speed of the system and the possibility of its scalability give way to security and reliability. In the world of traditional finance, money must be much more flexible. Its issuance and distribution depends on many factors, partly related to the real economy. Adopting the principles according to which, for example, BTC operates in the traditional banking system would have far-reaching effects on the economy. In this sense, it is unjustified for the banking system to use BTC as functioning money.

3. Banks and their functions vs cryptocurrencies

Banks are key institutions for the functioning of money. In the modern economy, there is a two-tier banking system, which consists of: the central bank and commercial banks. Depending on the level, the scope of the bank's influence on the money market is varied. The superior institution in this system is the central bank. It plays a key role in the functioning of the banking system and the economy. It monitors risks that appear in various areas of the economy and threaten the financial stability of the real and financial sectors (Zioło, 2017). The central bank is also considered the state bank. It maintains accounts for public administration institutions and also represents the state in foreign financial institutions (Czerwińska, 2015). In addition, the central bank implements the state's monetary and credit policy, in particular in the area of money supply by regulating its amount in circulation. It also stores and disposes of gold and foreign exchange reserves (Pietras, 2013). The central bank is also the bank of issue. It has the statutory right and exclusivity to issue cash money, so it is always solvent. It also plays the role of the bank of banks. It supervises the activities of all banks in the country and is their reserve bank, i.e. the so-called borrower of last resort. It stores the reserves of commercial banks and sets the mandatory reserve rate. Thanks to this, it influences the liquidity in the banking system by supervising the volume of credit activity carried out by other banks and regulating the circulation of money in the economy (Czerwińska, 2015).

The most frequently performed task of the central bank, and in the opinion of many economists the most important one, is to control and stimulate the amount of money in circulation. One of the basic instruments of the central bank in performing this task are interest rates, which, thanks to a decrease, support the acceleration of economic development, and an increase, affect the reduction of inflation. If it were not for the intervention of the central bank, interest rates would be set by market forces. This would mean the possibility of their large fluctuations in the short term and limit the motivation to undertake long-term investments (Grocholski, 2018). The view that the central bank is solely responsible for the issuance of money to the economy is widely accepted, although not entirely complete. The central bank does not generate the entire stream. Its operations lead to the issuance of the so-called short money, i.e. short-term loans and financial securities, while it only influences the remaining part of the money stream. Central bank money reaches the market through banks, which form the second level of the banking sector (Sopoćko, 2015). The demand of society for banking products is quite diverse, which is why over time the classic deposit and credit offer of banks has been gradually expanded to include insurance, investment and advisory services. The deposit and credit activities carried out by banks make them function as financial intermediaries. In this way, they help in the effective allocation of capital.

They act as intermediaries between entities with financial surpluses and those seeking financing. Moreover, by conducting credit activities, banks create non-cash money. This has an impact on the level of consumption and activity of economic entities on the market (Czerwińska, 2015).

The role of the banking sector in supplying economic entities with money, ensuring the security and liquidity of money transfers and ensuring the appropriate amount of money in the economy are functions that are not performed by any specific institution in the cryptocurrency market. There are indeed certain entities that act as intermediaries in the purchase and exchange of cryptocurrencies for other cryptocurrencies or traditional money, such as exchanges or exchange offices, but their activities cannot in any way be compared to the wide range of tasks performed by central and commercial banks in traditional finance.

Due to the previously described non-hierarchical architecture of the cryptocurrency network, there is no place in it for a central unit performing the functions of a central bank. At the same time, the second level of the banking system, namely commercial banks, is also unnecessary. There is no need to divide one cryptocurrency into different types of money, like central bank money and non-cash money created by the credit action of commercial banks. In the case of cryptocurrencies, there is one type of money that has the nature of digital cash.

The project of the first cryptocurrency, BTC, rejected the need for financial intermediaries in the process of efficient operation of the payment system that it was supposed to offer. The effectiveness of implementing this idea allowed to bypass the banking system and ensure security both in the storage of funds in cryptocurrency and its transfers between participants of the system. However, this contributed to the fact that BTC in its current form is in no way suitable for the use of central bank tools used in the processes of regulating money and its supply in the economy. The stability and immutability of the way cryptocurrencies work means that it would be impossible to maintain price stability if the economy operated in the environment of BTC or another cryptocurrency with a fixed level of supply. It therefore seems that both systems: traditional and cryptocurrency are incompatible in this context. However, what would the central bank have to do if it wanted to participate in the creation and distribution of cryptocurrency? Would it be possible to treat BTC as an underlying instrument and create something like paper money based on it, as in the times of the gold standard, when receipts were used in market circulation and gold was deposited in financial institutions? Paper money, or in other words, a sub-value money, based on BTC, as once on gold, with a certain fractional reserve value, could probably function on similar principles as traditional currencies currently do. However, no one in the cryptocurrency sector expects such a solution. The price of BTC, as an asset, could fall rapidly due to the dilution of its value by replacing it in circulation with a type of sub-value money derived from BTC. Moreover, from a technical point of view, this is also not justified. BTC already has a digital form and the ease of using it is similar to that of other digital money.

The only form of integration of currently functioning cryptocurrencies with the banking system could consist in facilitating access to these assets by commercial banks, as an intermediary. However, given the specific properties of cryptocurrencies and the wide availability of cryptocurrencies from entities other than banks, such as cryptocurrency exchanges, this may be unfounded.

Table 5. Comparison of traditional money system and cryptocurrency system

characteristic	Traditional money system	Cryptocurrency system
1. funds transfer intermediaries (trusted third party)	yes	redundant thanks to cryptographic solutions
2. issuance of new monetary units	within the competence of the central bank, dependent	predetermined, unchanging assumptions, diffuse

	on the level of inflation and economic indicators, centralized	
3. a form of money	material and digital	only digital enabling direct and anonymous transfers
4. transaction fees	depending on the location of the transaction parties and the transfer amount, high for international transfers	regardless of the location of the transaction parties and the transfer amount, usually low
5. security	ensured by limiting access to key resources and units performing critical functions	ensured by free access to the network and a distributed model of issuing new coins
6. a way to secure your funds	most often entrusted to an institution	entrusted to the user
7. initiative to introduce innovation	top-down, dependent on decision makers	bottom-up, user-dependent
8. system architecture	hierarchical	flat
9. neutrality	not guaranteed, for example there are groups of privileged users	guaranteed for everyone
10. reach	limited, difficult outside the country's borders	global, equal to the internet access

Source: own study

4. Bitcoin and the money supply

Money supply is the amount of money put into circulation (Pietras, 2013). In economic theory and financial practice, this concept is defined differently depending on the way the function of money in the economy is perceived and the methods of measuring its resources. The concept of money supply can therefore be understood as both money in the literal sense, i.e. cash in circulation in the form of coins and banknotes, as well as non-cash money in the form of term accounts and money in the broad sense, i.e. instruments very similar to cash money in terms of the functions they perform, including treasury securities (Czerwińska, 2015). Money supply is very important for the development of the economy. It should have optimal dimensions so that there is not an excess of money in relation to the amount of goods and services produced or there is not too little of it. Too much money in relation to the amount of goods and services creates inflationary pressure, while too little contributes to deflation. It is believed that the persistence of deflation is not beneficial for the economy, as the shortage of money available to entrepreneurs and investors limits the pace of its growth (Podstawka, 2013). Control of the money supply is one of the elements of the central bank's policy. The money supply depends on the instruments used by this institution, as well as on the banks' policy and the preferences of the non-financial sector, e.g. households and enterprises. The sphere of influence of the central bank includes shaping the amount of money held by banks in the form of cash reserves. Outside this sphere are the behaviors of enterprises

and households. Some of these entities decide to keep cash outside bank accounts. Such decisions are influenced by a number of factors, including: the interest rate on bank deposits, the situation on the capital market, tax regulations, the level of security in the financial system and the degree of trust in banks (Czerwińska, 2015). The central bank makes a decision regarding the regulation of the money supply based on the predictable increase in the volume of national income, the predictable increase in prices, the possibility of increasing the velocity of cash circulation and the impact of interest on the structure of money resources (Pietras, 2013). The level of complexity of financial instruments varies from country to country. For this reason, it is difficult to fully define which assets can be treated as money and which cannot. As a result, it is impossible to fully control the amount of money in circulation. For example, for the purposes of classifying a certain group of financial assets, the concept of quasi-money was introduced, which is a term for securities and liabilities operating on the stock market and in the investment fund sector, linked to the fulfilment of certain conditions. These securities can be immediately converted into real money on the financial market (Grocholski, 2018). Despite the fact that methods for shaping the money supply are available, it may be difficult to precisely determine its size in total.

In quantitative terms, the money supply is defined using monetary aggregates. Monetary aggregates are collections of different forms of money in circulation in an economy and are used to measure the money supply. They are defined and calculated in a similar way in different countries, but there may be slight differences in the composition of the individual aggregates. The most commonly used aggregates are M0, M1, M2, and M3. M0 usually includes coins and banknotes in circulation outside the banking sector and non-cash money of commercial banks in accounts at the central bank, while M3 is the aggregate that most broadly illustrates the money supply.

Cryptocurrencies are not included in any of the above aggregates. The variety of forms of money in the world of traditional finance contrasts in this respect with the cryptocurrency market. The only form in which cryptocurrencies can occur is as a digital record in an application file that serves as a private wallet. There are not very widespread custodial services that involve maintaining a cryptocurrency account for a client. This is a form of deposit. A company offering such services, e.g. Coinbase¹¹, is in possession of the private keys to its clients' funds. Such a solution is usually chosen by public figures associated with the cryptocurrency sphere. Storing private keys on their own would expose them to the threat of robbery. The introduction of the *proof-of-stake* algorithm has allowed holders of certain cryptocurrencies to block some of their funds in the network of a given cryptocurrency, in order to gain financial profit from acting as a validator, which to some extent resembles a bank deposit. However, the user is not bound by any contract with the network of a given cryptocurrency, the private keys are their property, and the funds are available immediately. Everyone is therefore responsible for their cryptocurrencies, and the personal wallet acts as a bank. It is expected that in the near future there will be opportunities to hold cryptocurrencies in forms resembling bank deposits thanks to the developed DeFi (decentralized finance) technologies. This technology is the offering of financial services in a distributed network and without the need to use intermediaries¹² In economic theory, the view on the impact of money supply on the functioning of the financial system seems to be systematized, among other things due to the introduction of the concept of aggregates. However, from a practical point of view, it is not possible to precisely determine the value of the supply and securities in circulation. This means that it is currently difficult to precisely answer the question of how much money is in circulation at a given moment (Grocholski, 2018). In the case of cryptocurrencies, such a problem does not exist. The lack of developed financial services means that there are no equivalents of cryptocurrency

¹¹ Coinbase, *Secure digital asset custody*, <https://www.coinbase.com/pl/prime/custody> (access: 15.05.2025).

¹² Coinbase, *What is DeFi?*, <https://www.coinbase.com/pl/learn/crypto-basics/what-is-defi> (access: 15.05.2025)

securities yet. On the other hand, data on the number of coins issued is available thanks to the possibility of analyzing the blockchain of each cryptocurrency and is published on an ongoing basis on portals such as Coinmarketcap¹³, Coinpaprica¹⁴, or Coingeco¹⁵. This transparency is a clear advantage of cryptocurrencies in relation to traditional money. In the case of many of the most important cryptocurrencies, it is known what the level of its supply will be many years in advance or when the issue of new monetary units will end. The banking sector is unable to adopt cryptocurrency solutions in this regard.

In the considerations so far, it has not been possible to find a point at which cryptocurrencies and the traditional banking system could cooperate. Therefore, it cannot be stated at the moment whether there is a place for cryptocurrencies in the banking system. For some time now, central banks have been trying to adopt some of the solutions characteristic of cryptocurrencies, without using them directly. We are talking about the central bank digital currency called CBDC. One of the reasons for taking action on the development of CBDC was the emergence of blockchain technology. However, will the use of only certain aspects of the functioning of cryptocurrencies, mainly and only the technology on the basis of which they operate, allow us to state that cryptocurrencies can be an element functioning in the banking system as one of the accepted types of money?

5. CBDC – is it a cryptocurrency?

The briefly described genesis of cryptocurrencies clearly indicates that the creators of this money, for the most part, wanted to create money that operated independently of the banking system. As a result of these efforts, innovative blockchain technology was created, thanks to which certain aspects of the operation of money and the settlement system are implemented more effectively and efficiently than in the case of traditional digital money. Blockchain technology provides cheap, in some cases almost cost-free money transfers around the world regardless of the location of the parties to the transaction. Such transfers are fast, in the case of BTC most often about 10 minutes (this is the time of mining one block), in the case of other cryptocurrencies even a few seconds. Other advantages include transparency and security of transfers (the entire history of transactions recorded in the blockchain is publicly available) and the storage of funds. It is no wonder that banks want to improve the competitiveness and efficiency of the system, they are looking at this technology, want to use it and propose a solution such as CBDC - central bank digital money.

The reasons given for introducing CBDC are usually:

- The growing role of digital private money, such as cryptocurrencies, especially stablecoins;
- The growing preference for digital payments and the decreasing use of cash;
- The obsolescence and inefficiency of previously used banking tools and systems (SWIFT or SEPA systems are expensive and slow compared to blockchain-based solutions);
- The rapid development of CBDC in China and the related concern that this country will gain a technological advantage¹⁶.

Central bank digital money is intended to be a virtual equivalent of cashless money used by central banks to maintain accounts of banking entities, i.e. to conduct transactions with commercial banks (Iwanicz-Drozdowska et al., 2023). The BIS, in turn, defines CBDS as follows: CBDC is an

¹³ CoinMarketCap, <https://coinmarketcap.com/> (access: 15.05.2025).

¹⁴ Coinpaprica, <https://coinpaprika.com/pl> (access: 15.05.2025).

¹⁵ CoinGeco, <https://www.coingecko.com/pl> (access: 15.05.2025).

¹⁶ Lazarski University, *Cyfrowy pieniądz banku centralnego [Central bank digital currency]*, <https://www.lazarski.pl/pl/34008-cyfrowy-pieniadz-banku-centralnego> (access: 12.05.2025).

obligation (or claim) on the central bank, denominated in a national unit of account, which is different from balances on traditional reserve or settlement accounts. Like today's forms of central bank money, CBDC can coexist with commercial bank money (Aurazo et al., 2024).

CBDC can be considered on two levels:

- Wholesale - a banking sector instrument, a means of settlement between central banks and national banks, also used in international transactions;
- Retail - as an available form of cash equivalent, used in commercial transactions¹⁷.

From the perspective of the average user, the wholesale aspect is not very significant. The retail concept is much more important. Retail CBDCs are often described as a digital alternative to cash issued by the central bank. CBDCs issued in the form of a token would enable direct transfer of funds between two electronic wallets (Narodowy Bank Polski [National Bank of Poland], 2021). Both retail and wholesale CBDCs can be designed in different ways depending on what functions they are to fulfill. In this type of digital money, specific features and restrictions can be programmed, such as: how funds are to be transferred, whether transactions are to be anonymous or not, who is to have access to digital cash, whether funds are to be interest-bearing or not, whether restrictions on convertibility to other digital currencies are to be introduced, etc. If CBDC were to be introduced, it would affect the size of the deposit base in the banking sector and the liquidity and activity of banks on the interbank market.

CBDC could also be an additional tool of the central bank's monetary policy leading to increased efficiency of the transmission of monetary impulses to the economy (Narodowy Bank Polski [National Bank of Poland], 2021). The introduction of CBDC would mean changes in the balance sheets of the central bank and commercial banks. This money would be shown in the liabilities of the balance sheet. One of the consequences of this would be a change in the shape of monetary policy and changes in the traditional payment system. The main challenge for central banks in the context of implementing CBDC will be to select the appropriate features of this money in such a way as to maximize benefits and minimize costs. It will be important to introduce such solutions that will meet economic needs, will be attractive to the consumer and will not threaten the stability of the two-tier banking system (Iwanicz-Drozdowska et al., 2023).

The central bank's digital currency is programmable money and theoretically enables direct transfer of funds. However, it is programmable according to the rules defined by decision-makers from the traditional financial system, not by the users of this money themselves. While the basis for such solutions may be blockchain technology, the similarity of the technological solutions used in CBDC to those used in cryptocurrencies does not make CBDC a cryptocurrency in the usual sense. While cryptocurrencies are not compatible in their structure with money, the shape and supply of which the central bank could influence, CBDCs are fully adapted to the tools of the central bank. Also in this case, CBDCs do not create a space in which the traditional banking system and cryptocurrencies could function in symbiosis. One of the postulates of introducing CBDC is the desire to limit the use of cryptocurrencies. In addition, the legal status of these two types of money is different. CBDC is state money, issued by the central bank and has the status of legal tender. Cryptocurrencies, on the other hand, are issued by private entities and do not have the status of legal tender. To further emphasize the differences between CBDC and cryptocurrencies, it is necessary to list the features and assumptions made when creating the most significant cryptocurrencies, these are:

- free access - every user has unlimited access to use the cryptocurrency;

¹⁷ Lazarski University, Cyfrowy pieniądz banku centralnego [Central bank digital currency], <https://www.lazarski.pl/pl/34008-cyfrowy-pieniadz-banku-centralnego> (access: 12.05.2025).

- open protocol - the source code on which the cryptocurrency operates is publicly available;
- global reach - equal to the reach of the Internet;
- dispersion of emissions - thanks to the fact that participation in the issuance of new coins is available to everyone in the world where the Internet is available;
- decentralized transaction confirmation mechanism - thanks to dispersed emission.

The value of the new type of money, cryptocurrencies, lies largely in obtaining these properties. CBDC does not meet any of these assumptions and cannot do so, because, like in the case of traditional money, control and security are achieved through limited access to decision-making units in a hierarchical system. Free access is therefore not possible in the case of CBDS. Similarly, the global reach and dispersion of emissions cannot be realized to such a large extent as in the case of cryptocurrencies. The dispersion of emissions and a decentralized transaction confirmation mechanism could only be achieved in the case of free access to the entire network in which the CBDC would operate and an open protocol for the functioning of such a currency. However, due to the specific model of ensuring security in the traditional banking system, such data is usually not shared. As a result, a CBDS designed in accordance with blockchain technology might not have enough computing power to ensure a high level of security of transfers and storage of funds.

6. Conclusions

The purpose of this article was to answer the question of whether there is a place for cryptocurrencies in the traditional banking system. A positive answer to this question could mean that cryptocurrencies in their current form could be adopted or used to some extent by the banking system to improve the operation of this system or to bring benefits to the users of money. The way cryptocurrencies are designed and operated makes the benefits associated with their use available to users regardless of the involvement of the banking system in this process. The benefits that emerge from the previous description are:

- low or almost zero costs of money transfers regardless of the country of the transaction parties,
- no restrictions on access to financial services in the cryptocurrency environment,
- transparency of operation - cryptocurrency software publicly available (open-source),
- transparency of money flows - data recorded in the blockchain is publicly available,
- the ability to secure funds on your own - no need for custodial services,
- security of operation - through a decentralized system of issuing new monetary units and confirming transactions,
- a predetermined and (usually) unchanging level of supply and rate of issuing new coins.

Despite the many advantages of the cryptocurrency system, there are some inconveniences such as: no or very few institutions that would offer a wide range of services such as advisory, investment or credit, similar to banks in the world of traditional finance. When it comes to the possibilities of using cryptocurrencies in the banking system, none have been indicated, primarily because they are not compatible with the assumptions of the banking system and traditional money. In this respect, it is not about technology but about the economic features of some cryptocurrencies, primarily the most important of them, BTC. This includes, among others, finite supply and immutability of operating principles. However, there are some benefits resulting from the use of blockchain technology in the banking system. Theoretically, CBDS has the potential to improve certain aspects of the functioning of the banking system, strengthening the security and speed of payment systems, as well as interbank settlements. However, the money offered by the

creators of CBDC is not identical to cryptocurrencies. Considering the basic assumptions of the functioning of cryptocurrencies, namely: free access, open protocol, global reach, dispersion of emissions, decentralized transaction confirmation mechanism, it should be said that CBDCs do not meet any of these criteria. The use of blockchain technology in banking, due to limited access for external entities, may limit its advantages.

The final conclusion is as follows: the banking system and cryptocurrencies create two separate monetary systems. The differences in their functioning mean that cryptocurrencies are not compatible with the assumptions of the functioning of the traditional banking system, so there is no basis for using cryptocurrencies as functioning money by the banking system. The advantages of using blockchain technology in the banking system, although they exist, may be limited by limiting access for external entities. Moreover, CBDCs created on the premises of this technology should not be identified with cryptocurrencies in any way.

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