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Article

Democratizing money? The role of cryptocurrencies

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Abstract:

The article proposes a critical perspective on the potential impact of the growing cryptocurrency ecosystem on the process of democratizing money. After examining the various interpretations of the term "democratization", we focus on one interpretation: that of financial inclusion. We propose a categorization of currently available cryptocurrencies, distinguishing four macro-categories: Bitcoin; altcoins, which include all alternative and/or complementary cryptocurrencies to bitcoin; stablecoins, which are digital coins whose value is pegged to a fiat currency; and central bank digital currencies (CBDCs). We provide a description of the economic characteristics of each category and analyse how and whether these instruments can contribute to financial inclusion. While each category appears to be capable of contributing to the democratization of money, CBDCs are the only ones that can truly pursue the goal of financial inclusion. Therefore, we argue that it is not money as such that needs to be democratized, but rather the role that central banks play in the economic system.

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> *Reorganizing the economy around publicly created money is not utopian. It simply requires recognizing and reorienting what exists, and what underpins our money system today. In the wake of the financial crisis of 2007-2008, the sovereign power to create public money was made clear when governments used it to rescue the banks and other large businesses, such as auto manufacturers and insurance companies. Let it now be used to provision the people*. (Mellor, 2019, p. 649)

According to the literature, the first step towards the democratization of money is to ensure equal opportunities for all to own property and guarantee full participation in the democratic governance of society. The second step in the same direction should imply equal access to the credit system. As Kregel stresses:

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> If the divergence between capital and labour – between rich and poor – is explained by the monopoly access of capitalists to finance, then reducing this divergence is crucially dependent on the democratisation of money (Kregel, 2019, p. 2).

It is clear that, to set such an ambitious goal in the context of a polycrisis like the one in which we live in,[1] leads to the need of finding a set of proper tools.

Our article is based on the idea that money, as we know it, cannot be the appropriate tool to be used in a democratization process as outlined above (Weber, 2018). Therefore, we investigate whether cryptocurrencies can be employed in such a process.

Over the past decade, a multitude of digital currencies and means of payment have emerged thanks to technological innovations. We may be on the eve of an epochal revolution: whether this revolution will lead to a greater democratization of the financial system is not yet clear.

The article is organized as follows: first we outline the problems associated with the "democratization" process; then we propose a possible categorization of the main cryptocurrencies currently in circulation and analyse their main economic characteristics, taking into consideration whether and how they can contribute to making the monetary instrument more democratic. Finally, we draw some conclusions.

1. What "democratizing money" means

The concept of "democratization" can take different meanings depending on the context in which it is addressed, be it economic, political, sociological, or philosophical. Within the same framework, it can refer to different processes or take on different meanings.

It is not our aim to propose an analysis of the various possible meanings of democratization found in the literature. Rather, we focus on a single concept of democratization and, based on it, we propose a technologically innovative tool that, according to our analysis, might facilitate a step towards achieving democratization.

According to some authors, democratization could involve the sharing of ownership of the means of production, and thus of capital in the Marxist sense, between workers and entrepreneurs, resulting in a more democratic management of the enterprise (Blackburn, 2007; Mattei, 2022). At a lower level, but still within a similar concept of democratization, one could consider workers' shareholding in the enterprise of which they are part (Engelen, 2002; Johanisova and Wolf, 2012; Varoufakis, 2020). An even more democratic process could involve the state itself becoming an entrepreneur, nationalizing companies, and sharing the resulting profits within society (Blackburn, 2007; Mazzucato, 2013; Mattei, 2022).

Another potential interpretation of democratization in the economic sphere is the search for greater control over market mechanisms and the implementation of more comprehensive market regulation, within a monetary or territorial union, through shared and homogeneous regulation (Johanisova and Wolf, 2012). The consequence of this approach is greater

[1] A polycrisis can be understood in terms of a multiplicity of shocks feeding each other with growing complexity. The shocks may appear disparate but they interact, such that the whole becomes even more overwhelming than the sum of the parts. The polycrisis Europe now faces includes climate change, the Covid 19 pandemic, the energy crisis, a cost-of-living crisis, the war in Ukraine, and an emergent hegemonic rivalry between the United States and China. It also includes a care crisis in ageing societies, social inequalities, and a crisis of democracy (see Tooze, 2022).

transparency of markets and greater access to information that drives the underlying mechanisms (Stiglitz, 1998).

Another potential route to democratization within an economic system concerns the central bank and its relationship with the government. The independence of the central bank and the monetary policy decisions it makes with respect to the policies pursued by the government are the subject of considerable debate. Some argue for the depoliticization of economic issues and the separation of fiscal policy from monetary policy, with central bank governors having almost exclusively technical profiles (Burgess, 1952; Levy, 1995; Cama and Pittaluga, 1999). Others argue that, since monetary policy has a significant impact on the real economy, citizens, at least indirectly, should have more say in the selection of central bank governors, rather than relying on private institutions (Stiglitz, 1998; Rochon and Vallet, 2022). This would increase the transparency of the decision-making process and increase citizen participation.

As already mentioned, our paper aims to focus on a specific meaning of the term "democratization" in the economic context, which differs completely or partially from the ones mentioned above. In what follows, democratization is defined as the process in which the goal of achieving greater and fairer access to credit or, more generally, to certain financial services within an economic system is pursued. As Brown (2019) states, in the economic systems constructed so far, it is the banking system that decides the rules for access to credit, a vital service for the economic growth of individuals or businesses. But the control of the money supply is crucial to the concept of democracy and therefore we should advocate an economic system in which money is a tool in the hands of the people and for the people, proposing a "bottom-up" concept of money.

2. The role of cryptocurrencies

While we present our idea of how a cryptocurrency could have a positive impact on the process of democratizing money, we also analyse the different forms of cryptocurrencies that have been developed since 2008 by presenting the main characteristics of each type of cryptocurrency and complementing the description with a simplified outline of some technical aspects at the basis of this technological innovation. It is out of the scope of our analysis to propose a taxonomy or to provide a detailed analysis of each type of cryptocurrency currently available.

As of April 2023, the cryptocurrency market boasts a capitalization of over $1,150 billion USD, with more than 22,000 cryptocurrencies and nearly 550 exchanges in existence. (A crypto exchange is a platform for buying and selling cryptocurrencies).[2] Bitcoin is currently the most capitalized currency, with a value of $528 billion USD and a "dominance" of over 45%, with a counter value of approximately $27,000 USD. Ethereum (ETH) is the second most capitalized cryptocurrency, with a value of over $223 billion USD (about 19%) and a per-coin value of roughly $1,900 USD.[3]

For the sake of clarity, we propose to divide cryptocurrencies into four distinct macro categories:

[2] For more information, see https://www.gemini.com/cryptopedia/what-is-a-crypto-exchange or https://time.com/nextadvisor/investing/cryptocurrency/what-are-cryptocurrency-exchanges/

[3] Data is available at www.coinmarketcap.com

1. Bitcoin
2. Stablecoins
3. Altcoins (alternative coins)
4. Central bank digital currencies (CBDC)

The first category comprises a single currency that is both the first and most valuable and well known.

The second category includes digital coins issued by a private company, whose value is pegged to the value of a specific fiat currency, usually the US dollar or the euro.

The third category is the broadest, encompassing all coins or tokens,[4] created with a specific idea and/or particular "need" to be fulfilled. What is especially relevant in this category of cryptocurrencies is the introduction of smart contracts, i.e., contracts implemented by means of a specific code language capable of being activated, resolved, cancelled, or progressed automatically, without human intervention or the intervention of a third party.

The fourth and final category pertains to digital currencies issued by a central bank and therefore a direct liability of it.

2.1. Bitcoin

With the online publication in October 2008 of the white paper "A peer-to-peer electronic cash", Satoshi Nakamoto (the pseudonym for the creator(s) of Bitcoin), sanctioned the birth of the first cryptocurrency. The published document clearly shows how the intent of this invention was to create *digital cash*. This technological development was made possible by the combination of IT tools already known and used for other purposes, i.e., blockchain technology and cryptography.

It is not the purpose of this work to explain in detail the functioning of the blockchain or in particular the Bitcoin blockchain (for further information about Bitcoin, see Nakamoto, 2008; Poelstra, 2016). It is enough to say that the Bitcoin blockchain is a technology for which two users connected to the network can exchange value (in the form of bitcoin currency – BTC) without having to rely on a third party to act as a guarantee. In fact, it is the Bitcoin network itself that acts as a guarantee for the transactions; each node participating in the network has a copy of the register of all the transactions carried out (*distributed ledger technology*, DLT), written in consecutive time blocks and verified through *mining*. "Mining" is the process by which, through computational work, the various nodes of the network, using their computing power, solve a specific computer problem that serves to verify that each transaction written in the block is valid. That is, they must check that every agent who spends a certain number of bitcoins owns them and, above all, cannot spend them twice. As remuneration for this work, which is increasingly expensive both in terms of energy and work required, the nodes obtain newly issued bitcoins thanks to the algorithm implemented by Satoshi Nakamoto. Every four

[4] The main difference between coins and tokens concerns their different purposes and uses. A blockchain coin is deemed a financial asset with the sole function of making payments on the blockchain, while a token, by contrast, has extended functionality that goes beyond money, for example to represent an amount of stock or equity (equity tokens), or to grant the user access to products or services (utility tokens). For more detail, see https://www.bitstamp.net/learn/crypto-101/crypto-coins-vs-tokens/ or https://economictimes.indiatimes.com/markets/cryptocurrency/crypto-class-difference-between-crypto-coin-token/articleshow/88947666.cms?from=mdr

years (actually after a specific number of blocks, which is reached about every four years), "*halving*" occurs, i.e., the remuneration for the validating nodes is halved and the difficulty for validation is increased. In this way, the Bitcoin issuance process has a decreasing growth rate. It is estimated that the last bitcoin will be mined around 2140.

Apart from considering the technical-IT aspect of Bitcoin, it is necessary to mention the economic motivations that led Satoshi Nakamoto to create such an instrument.

The history of Bitcoin's origin is replete with interesting details that go beyond the enigma of the identity of its creator(s). Bitcoin did not come into being in 2008 by mere chance (in fact, the genesis block of the Bitcoin blockchain dates back to 2009). Bitcoin was created with a strong political connotation. Its creator(s) and the community of computer scientists and cryptographers, in which bitcoin initially spread, were highly critical of the economic reality of their times. Just two years before, the largest financial crisis since the 1929 crash had erupted. The commercial banks, largely responsible for the 2007-2008 crisis, had been rescued, while the real economy was suffering the drastic consequences of their risky behaviour. It was for this reason that the "cypherpunk" community conceived the idea of a monetary system that did not rely on the current banking systems (Hellegren, 2017). Thus, Bitcoin was born as a currency for everyone, managed by everyone, and governed by no one: a "bottom-up" money.

These concepts may, to some extent, remind us of the concept of "democratization" discussed earlier. However, the idea of Bitcoin and its purposes are often associated with the Austrian school of economics, particularly with the ideas of Hayek (1999). On this basis, we could argue that such a project could lead to a form of monetary anarchy rather than a democratic framework in which the state plays a central and democratic role for the entire community (Amato and Fantacci, 2020).

As a matter of fact, Nakamoto's intention was to create "a purely peer-to-peer version of electronic cash that would allow online payments to be sent directly from one party to another without going through a financial institution" (Nakamoto, 2008), but over the years it has become clear that Bitcoin presents certain problems that make its use as a currency almost impossible. Many authors have highlighted the use of bitcoins as part of criminal schemes (Foley et al., 2019), although the overall number and value of cryptocurrency transactions related to criminal activities still represent only a limited share of the criminal economy when compared to cash and other forms of transactions (Europol, 2021).

A range of constraints are related to the extreme daily volatility of Bitcoin's counter value in fiat currency, rendering Bitcoin unable to fulfil its function as a store of value and unit of account.

Bitcoin's limited supply also poses a problem if it were to become a substitute for currency. Bitcoin's algorithm envisages a maximum issuance of 21 million coins. Even with the ability to exchange as little as 0.00000001 BTC, in the long run there is a risk of exerting a deflationary force on the economy (i.e., an ever-slower growth of the money supply). This results in an incompatibility between an increasing money supply and economic growth (Yermack, 2014; Seetharaman et al., 2017).

Defining what Bitcoin is today is difficult, but what we can say is that the emergence of Bitcoin has provided the impetus for the development of new (digital) realities that have had and will have a major impact on economies around the world.

2.2. Stablecoins

The need for a less volatile instrument led to the emergence of "stablecoins". While a precise definition is not universally agreed upon, stablecoins are generally defined as cryptocurrencies whose value is stable and pegged to the value of a traditional currency, such as the US dollar or the euro (FATF, 2020). Stablecoins come in different types, and the variations are not only in the general features typical of cryptocurrencies but also, and more importantly, in the system used to peg a stablecoin to the value of a traditional currency.

Speaking of the possible general differences of stablecoins, we may introduce concepts that apply to this specific class of cryptocurrencies, as well as to other alternative digital currencies that we will discuss later (the "altcoins"). The characteristics of these cryptocurrencies can change depending on who uses them, since they can be used by anyone ("retail" or "general purpose") or used only by a limited set of actors, e.g., a specific industry sector or a selection of financial institutions ("wholesale"). They can be "permissionless", in the case where anyone can read and write to the underlying transaction ledger, or "permissioned", where only selected entities can read and/or write to the transaction ledger. They can also be "public", where anyone can use the transaction ledger for transactions, or "private", where only selected entities can initiate transactions (G7 Working Group on Stablecoins, 2019; FATF, 2020).

Looking in detail at the different types of existing stablecoins, we can distinguish between:

- Stablecoins guaranteed by fiat currencies (e.g., Theter,[5] BUSD,[6] BGBP[7]), when fiat currency reserves are used as collateral for the value of the issued stablecoin.
- Stablecoins guaranteed by commodities (PAXG),[8] when commodities (usually gold) are used as collateral for the value of the issued stablecoin.
- Stablecoins guaranteed by other cryptos (DAI),[9] when stablecoins are guaranteed by a basket of cryptocurrencies, with large capitalization. They are over-collateralized so as to prevent any fluctuations in the crypto market.
- Algorithmic stablecoins (LUNA),[10] that aim to maintain a stable value via protocols that provide for the increase or decrease of the supply of the stablecoins in response to changes in demand (FSB, 2020; BIS, 2022).

In accordance with Van der Merwe (2021), and in order to further clarify the nature of the analysed instrument, the macro-category of stablecoins can be further divided into "stablecoins backed by cryptocurrencies" and "stablecoins backed by fiat currency or traditional financial assets". In the first subcategory we find stablecoins guaranteed by other cryptocurrencies and algorithmic stablecoins, while in the second subcategory we find stablecoins guaranteed by fiat currency or equivalents and stablecoins guaranteed by commodities.

As previously mentioned, the emergence of stablecoins was primarily driven by the need for a less volatile instrument that would not be affected by the crypto market's fluctuations.

[5] https://tether.to/en/how-it-works
[6] https://academy.binance.com/en/articles/what-is-busd
[7] https://www.criptolog.com/coin/binance-gbp/
[8] https://paxos.com/paxgold/
[9] https://makerdao.com/it/whitepaper
[10] For more information on the failure of the LUNA ecosystem, see the speech by Fabio Panetta, member of the Executive Board of the European Central Bank (2022b) and also the article by Sandor and Genç (2022).

While initially designed to serve as a "safe parking space" for crypto-investors and a way to avoid expensive exchanges between cryptocurrencies and fiat money, the evolution of the crypto sector has presented new uses for stablecoins, especially within the DeFi ecosystem, which we will discuss later with altcoins (Adachi et al., 2021; Adachi et al., 2022).

Despite their functionality as a means of payment and a store of value, which is typical of traditional currencies, it is not reasonable to consider stablecoins as substitutes for traditional currencies (Carstens et al., 2021). However, unlike Bitcoin, stablecoins can perform these functions and are essentially a digital transposition, equivalent to traditional currency. For this reason, both the Financial Stability Board (FSB) and the Bank for International Settlements (BIS) believe that stablecoins can positively impact payment systems currently in use. Although they may not replace them, the existence of stablecoins may motivate payment system providers to upgrade their systems to include services that stablecoins can provide quickly, efficiently, and at a lower cost, such as cross-border payments (BIS, 2020; FSB, 2020).

However, it is worth noting that stablecoins present considerable risks, particularly in terms of financial stability, as emphasized by major global institutions and the literature on the subject.

2.3. Altcoins and DeFi

If Bitcoin was the first cryptocurrency and is still the most valuable one, the publication of the Ethereum white paper by Buterin (2014) marked the advent of the second generation of cryptocurrencies. Before delving into the specific case of Ethereum, which has had a significant impact on the world of crypto finance, it is important to emphasize that the category of "altcoins" is the largest. Not only does it consist of a greater number of projects, but it also encompasses a wider range of fields in which these alternative digital currencies are developed and applied. To provide a better understanding of this category, it suffices to mention that altcoins include projects with a focus on the exchange of value, such as Bitcoin, as well as projects like Ethereum that serve as the basis for the development of decentralized blockchain projects and ideas. Altcoins also include projects related to non-fungible tokens (NFTs),[11] the Metaverse, joke coins such as DOGE coin,[12] tokens issued by cryptocurrency exchanges with special rights within the exchange itself (e.g., Binance Coin – BNB),[13] tokens related to video games, and many more (Adachi et al., 2022).

The literature has discussed the value of these alternative cryptocurrencies in relation to Bitcoin and other traditional currencies. It is evident that the strongest link of altcoins, especially those with a higher capitalization, is with Bitcoin. The value development of altcoins follows the behaviour of the "first" cryptocurrency, both positively and negatively (Tetsuya, 2016; Cagli, 2019; Meynkhard, 2020).

As mentioned earlier, the birth of Ethereum and its related currency, Ether, was a significant milestone in the development of the crypto world, as recognized by Aramonte et al. (2021). Ethereum is a technology that enables the creation of decentralized applications, organizations, resource allocation, transactions, and communication, utilising a programmable blockchain that differs from Bitcoin's blockchain.

[11] For further information, see Wang et al. (2021).
[12] https://dogecoin.com/#what-is-dogecoin
[13] https://www.binance.com/en/bnb

It is out of the scope of this paper to explain what a programmable blockchain is (Buterin, 2014; Wood, 2014).[14] However, it is worth noting that Ethereum's blockchain, in contrast to Bitcoin's blockchain, enables the execution of smart contracts.[15]

Smart contracts are computer programs that reside on the Ethereum blockchain (now not only here, since other blockchains capable of executing smart contracts have sprung up, e.g., Polygon)[16] and are only executed when triggered by a transaction from a user or another contract.[17]

The real innovation, therefore, was not only to create a blockchain capable of performing "transactions" other than just transferring value, but to create a (digital) environment in which everyone can implement ideas, combine them with those of other users, and create "smarter and smarter" contracts. This continuous innovation led to what is now called DeFi (decentralized finance).[18] As Aramonte et al. (2021) underline, the vision behind DeFi is to provide financial services without the need for a third party to give consent, but simply through the implementation of automated contracts, with the main purpose, at least originally, being to increase financial inclusion. The non-need for an entity that can determine who can and who cannot access financial services is one of DeFi's main objectives. Again, Aramonte et al. (2021) show how, due to the technological construction underlying DeFi platforms, we should speak of an "illusion of decentralization", because a certain degree of centralization regarding certain tasks is still necessary.[19]

Table 1 shows some examples of the services performed by DeFi and digital platforms that deliver them. Certainly, one of the first services developed and now one of the main is cryptocurrency trading. Initially, there were only centralized exchanges (CEX), which allowed for the exchange of cryptocurrencies, i.e., third-party companies that collected the supply and demand of a certain cryptocurrency and carried out the exchanges. This, however, implied a certain degree of trust in the company providing the service and, over time, several scandals occurred relating to cryptocurrency theft and the disappearance of the exchange (e.g, the Mt. GOX exchange in 2014).[20]

[14] https://ethereum.org/it/what-is-ethereum/

[15] The original concept of a smart contract was coined by Szabo (1994). Buterin (2014) proposed a decentralized blockchain-based smart contract platform to solve any trust issues regarding the execution environment and to enable secure global states (Schär, 2021).

[16] For more detail about the Polygon project, see https://polygon.technology/

[17] For a more detailed analysis, see Levi and Lipton (2018)and Pinna et al. (2019).

[18] Schär (2021) defines DeFi as a financial infrastructure based on the Ethereum blockchain, which, using smart contracts, creates protocols able to replicate existing traditional financial services in a more open, interoperable, and transparent way.

[19] We are referring, for example, to some fundamental units for the functioning of decentralized applications (Dapp). Among these additional blockchain elements are "oracles", that is, entities that connect blockchains to external systems, thereby enabling smart contracts to execute based upon inputs and outputs from the real world. For more detail, see https://academy.binance.com/en/articles/blockchain-oracles-explained and https://chain.link /education/blockchain-oracles

[20] For more detail, see: https://en.cryptonomist.ch/2022/08/28/story-mt-gox-exchange/#:~:text=birth %20to%20failure-,Mt.,%3A%20The%20Gathering%20Online%20Exchange.%E2%80%9D

Table 1 – *Crypto vs. traditional financial system (illustrative example given in parentheses)*

Function	Service	Crypto financial system		Traditional finance
		Decentralized finance (DeFi)	**Centralized finance (CeFi)**	
Trading	Funds transfer	DeFi stablecoins (DAI)	CeFi stablecoins (USDC, USDT)	Traditional payment platforms
	Asset trading	Crypto asse DEX (Uniswap)	Crypto CEX (Coinbase, Binance)	Exchanges and OTC brokers
	Derivates trading	Crypto derivatives DEX (Synthetix, dYdX)		
Lending	Secured lending	Crypto decentralized lending platforms (Aave, Compound)	Crypto centralized lending platforms (BlockFi, Celsius)	Broker-dealers active in repo and securities lending
	Unsecured lending	Crypto credit delegation (Aave)	Crypto banks (Silvergate)	Commercial banks and non-bank lenders
Investing	Investment vehicles	Crypto decentralized portfolios (yearn, Convex)	Crypto funds (Grayscale, Galaxy)	Investment funds

CEX = centralized exchange; DEX = decentralized exchange; OTC = over-the-counter; USDC = USD Coin; USDT = Tether.
Source: Aramonte et al. (2021, p. 23).

The evolution of DeFi has led to the emergence of the so-called decentralized exchanges (DEX), as opposed to the more traditional CEX to which we referred earlier. In DEX, it is possible to exchange one cryptocurrency for another without the need for someone to be in the middle and carry out the exchange, all via smart contracts execution (Qin et al., 2021).

Other main services that can be used via DeFi include credit/debit services (staking), exchange services (DEX), margin trading (i.e., leveraged trading), asset management, and hedging positions towards commodities.

While, on the one hand, the development of DeFi could lead to an increase in the efficiency of certain services, in transparency, and, above all, to greater accessibility to these services, thanks above all to the composability of the system on which it is based, a whole series of risks emerges on the other side of the coin. First of all, there are the technological ones, linked, for example, to a poorly implemented smart contract, which could affect and have consequences

on the applications connected to it, or the scalability difficulties that these platforms still encounter (Schär, 2021).[21]

There are also more specific economic-financial problems. DeFi seems to have the potential to be complementary to traditional finance but, to date, this potential has not been fully realized. The actual applications of these services still seem to be very limited, both because of the lack of dissemination and because of the practical difficulty of using them. Among the negative economic-financial implications that are associated with DeFi, those referring to the use of leverage are of considerable relevance; in fact, the striking fragmentation of the crypto universe stands in stark contrast to the network effects that take root in traditional payment networks. Traditional payment networks are characterized by a "winner takes all" property, whereby more users flocking to a particular platform beget even more users. Such network effects stand at the heart of the virtuous circle of lower costs and enhanced trust in traditional platforms. In contrast, crypto's tendency towards fragmentation and high fees is a fundamental structural flaw that disqualifies it as the foundation for the future monetary system. So high leverage in crypto markets exacerbates procyclicality, and this creates increasing difficulties in a market as volatile as crypto (Aramonte et al., 2021). Another aspect of particular importance concerns the total absence of regulations concerning the provision of these decentralized financial services, with the risk of shadow-banking, a phenomenon already known in traditional finance.

To conclude, we can say that one of the main difficulties altcoins face is precisely the fragmentation of this crypto category. The best perspective that is possible to have with regard to altcoins is one in which only the best projects, from a technological and application point of view, will manage to survive and find their role in the future economic-financial system; all the others seem destined to fail, as already happened to thousands of projects born with the ICO (initial coin offering) 'bubble' between 2016 and 2018 (Stolbov, 2019).

2.4. Central bank digital currencies

Although it is not feasible to substitute fiat currencies for private virtual currencies, their growing use has led central banks to examine their regulation and the feasibility of launching digital currencies of their own. For instance, the adoption of non-sovereign money could undermine the efficacy of monetary policy (Brunnermeier et al., 2021).

As mentioned earlier, the possibility of a private entity issuing a digital currency of national or supranational scope has elicited much criticism, particularly in terms of the potential clash it could have with the monetary policy executed by the central bank. On the other hand, numerous studies in the literature have emphasized the potential benefits of introducing a central bank digital currency, while also underscoring the potential risks that could arise.[22]

Prior to examining the potential risks and benefits that may arise from the introduction of a central bank digital currency (CBDC) into an economic system, it is important to clarify the nature of such CBDCs. As stated by Bindseil (2020), once implemented, the CBDC would

[21] Scalability refers to how well a system can manage increasing amounts of data. Blockchain scalability is how well it can handle an increasing number of transactions: https://blog.liquid.com/blockchain-scalability#:~:text=Scalability%20refers%20to%20how%20well,on%20the%20validity%20of%20transactions

[22] Four papers have recently been published on CBDC, written by four global economic institutions: BIS (2020), ECB (2020), Federal Reserve (2022) and the International Monetary Fund (Soderberg et al., 2022).

constitute a third form of the monetary base in addition to the overnight deposits held by banks at the central bank and banknotes, thereby making it a type of money that is accessible to everyone.

A critical aspect in the development of a CBDC pertains to the "flexibility" in designing it. Shah et al. (2020) highlight that, with the technologies available today, especially the blockchain technology, the choice of a CBDC design is solely a political matter. Bjerg (2017) shares that view, contending that incorporating an instrument like a CBDC into monetary policy is a political decision. Such a policy decision must consider that only two out of three objectives can be accomplished, what he refers to as "The Policy Trilemma of CBDC": i) unhindered convertibility between CBDC and bank money, ii) parity between CBDC and bank money, and iii) the authority of the monetary policymakers to utilise CBDC not just as a monetary policy instrument to support commercial bank credit creation, but also as a fiscal policy instrument to stimulate the broader economy. Neglecting the last goal, and thus "surrendering" monetary sovereignty, would result in commercial banks becoming the primary drivers of money creation.

It is important to emphasise that most contributions in the literature are of a theoretical nature. This is because, except for China, no developed economy has yet implemented its own CBDC.

The Chinese project was initiated in 2014 and, despite the challenges posed by the Covid-19 pandemic, was completed in early 2022; indeed, during the Winter Olympics held in Beijing the e-Yuan (or e-CNY) was made available for specific areas of the country. The development of the e-CNY is aimed at achieving three primary objectives: i) diversifying the forms of cash provided to the citizens; ii) supporting the fair competition, efficiency, and safety of retail payment services; and iii) echoing the international initiative and exploring the improvement of cross-border payments (People's Bank of China, 2021; Allen et al., 2022). Within the debate surrounding the emergence of the e-Yuan, some authors argue that the primary objectives of the People's Bank of China (PBoC) include expanding the influence of the Chinese currency in the world, with the aim of undermining the hegemony of the US dollar (Bhattacharya, 2022; Fantacci and Gobbi, 2021). On the other hand, some contend that this objective is not part of the Chinese government's plans, but rather its goals they seekre to increase financial inclusion, prevent the illicit use of the currency, and counter the spread and use of private digital currencies (Auer et al., 2020; Jiang and Lucero, 2021; Allen et al., 2022). Moreover, these authors highlight the PBoC's objective of limiting the use of mobile payment systems currently operated mainly by the two firms Alibaba and Tencent (which control 55% and 39%, respectively, of mobile transactions in the country).[23]

In terms of the progress of other CBDC projects around the world, it is worth mentioning the projects of the Eastern Caribbean Central Bank and the Sveriges Riksbank, while the Central Bank of the Bahamas has already succeeded in implementing its own CBDC (Sodeberg et al., 2022).[24]

[23] For more detail, see Jones (2020).

[24] An analytical study by Nánez Alonso et al. (2021) attempts to identify the next countries that could implement a CBDC and concludes that the Baltic Sea area (Lithuania, Estonia, and Finland) emerges within Europe as an optimal area for the implementation of a CBDC. In South America, Uruguay (already included in the comparison) and Brazil show very positive results. In the case of Asia, along with China, Malaysia shows a high correlation with the three pioneer countries. Finally, on the African continent, South Africa stands out as the most optimal area for implementing a CBDC.

Discussing the design of CBDCs, it is important to mention the critical points highlighted by the literature. Firstly, there is a need to decide whether to design a CBDC – one issued directly by the central bank – or a "synthetic CBDC" – one issued by a third institution in accordance with the central bank's decisions (BIS, 2020; Adrian and Mancini-Griffoli, 2019). Secondly, there is a need to determine whether such a CBDC should be a "retail CBDC", issued by the central bank directly on the household and firm accounts that the central bank can open in their names, or a wholesale CBDC, which is exclusively targeted at specific sectors or industries (Bech and Garrat, 2017). The third crucial point in constructing a CBDC concerns its nature, i.e., whether it should be cash-like (zero coupon) or deposit-like (with the possibility of an interest rate, positive or negative – which has implications for monetary policy (ECB, 2020; IMF, 2022; Bordo and Levin, 2017). The fourth aspect concerns the infrastructure on which this CBDC should run and the characteristics that this technological infrastructure should have (ECB, 2020; Cantù et al., 2021). Finally, a critical point for both European and American institutions concerns the level of privacy that users will have when using the CBDC (ECB, 2020; Federal Reserve, 2022).

A delicate and controversial aspect that emerges from the literature concerns cross-border payments made by a CBDC; on the one hand, these would certainly be facilitated (Cantù et al., 2021; Federal Reserve, 2022) but, on the other hand, could cause problems if a "hard" and more solid currency were to be adopted by economically "weaker" or developing countries (Brunnermeier et al., 2021; Cantù et al., 2021). Moreover, one of the main concerns that has emerged regarding a CBDC refers to the possible effects that the introduction of a monetary instrument like a CBDC could have on the commercial banking sector and consequently on the financial stability of the entire economic system, in particular the commercial bank financing channel and its profits (ECB, 2020; Panetta, 2021; Federal Reserve, 2022). In this view, it should be specified that, albeit recognising the possible benefits of a CBDC, in the particular context of the Eurozone and to safeguard the commercial bank sector from the negative scenario above mentioned, there is a proposal to limit the amount of a CBDC that an individual (households and/or firms) can hold to between 3000 and 4000 euros.[25] As we said before, the sense of this proposal has to be seen in a broader context of financial stability.

Other potential benefits that emerge in the literature mainly relate to the possibility of counteracting and/or replacing the decline in the use of cash (ECB, 2020; Cesaratto and Febrero, 2022; Federal Reserve, 2022), a phenomenon that is already taking place in some Western economies and has been accentuated by the pandemic crisis (Engert et al., 2019). Buetzer (2022) also suggests that a CBDC can have a positive impact on the effectiveness of monetary policy and its ease of transmission. On the other hand, the ECB (2020) and the Federal Reserve (2022) take the opposite view and consider that the introduction of a CBDC could jeopardise the effectiveness of monetary policy.

Strictly about our topic of analysis, many contributions in the literature consider financial inclusion as one of the most achievable objectives through the direct issuance of a CBDC by the central bank (BIS, 2020; ECB, 2020). Another noteworthy aspect that emerges in the literature concerns the possibility that, thanks to a CBDC, it would be possible to extend, potentially universally, access to secure central bank money (Meaning et al., 2018; Cantù et al., 2021; Andolfatto, 2021; Federal Reserve, 2022).

[25] We are referring to the introductory statement by Fabio Panetta, member of the Executive Board of the ECB, at the Committee on Economic and Monetary Affairs of the European Parliament, in Brussels, 15 June 2022 (Panetta, 2022a).

Consistent with the definition of democratization that we have adopted, we believe that CBDCs may be the only category of cryptocurrency that can facilitate the democratization process. In particular, since CBDCs would, by their very nature, be part of the monetary base and thus de facto a public currency, we believe that there are possible designs of CBDCs that, once implemented, would universally guarantee access to credit and other services that are currently offered exclusively by private entities. Furthermore, we believe that, if a CBDC were to be implemented and disseminated in pursuit of the above objectives, we would witness, rather than a process of democratization of money, a process of democratization of the role played by the central bank, the benefits of which, in our view, would extend to the entire population.

3. Conclusions

This article was conceived with the aim of exploring the potential impact of the emergence of cryptocurrencies on the democratization of money, which we consider a crucial aspect of contemporary economic systems. To this end, we first present a few possible interpretations of the term "democratization" within socio-political-economic discourse. Next, we specify the meaning we adopt in this article, which refers to the process of expanding access to credit channels and financial services currently managed and regulated by private institutions, as a means of promoting the democratization of money. Furthermore, we briefly introduce and contextualize other financial instruments that have been proposed in the literature as a means to achieve greater inclusiveness in financial services and access to credit.

We then provide an overview of the diverse cryptocurrency ecosystem, focusing on the technological features underlying these instruments, as these features have a significant impact on the type of currency that eventually emerges.

For simplicity's sake, we have divided the cryptocurrency world into four groups: Bitcoin, stablecoins, altcoins and central bank digital currencies (CBDCs).

In the cryptocurrency landscape, we believe that CBDCs, digital currencies issued directly by central banks, are the only useful tool to pursue the goal of increased accessibility of credit. CBDCs could be constructed in such a way that everyone within the economic system has an account with the central bank and the latter, using CBDCs, can decide whether and how much to disburse to each individual according to parameters and characteristics at the discretion of the central bank.

It is clear that, even in the case of a CBDC so constructed, we would not have a popular currency or a "bottom-up" approach, as some have argued and as seemed possible with Bitcoin in its initial phase. Instead, we would have a "top-down" monetary instrument with a marked focus on the people, born out of the debate on the need for a more democratic currency. Therefore, it might not be necessary to make the currency more democratic, but it might be sufficient to make the role played by the central bank more democratic and people oriented.

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