The Economics Pioneers

Crypto Against Central Bank Digital Currencies

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Trying to Solve the Issues with Financial Inclusion

Understanding the Fiat Currency and Its Pitfalls

Anyone who at any point has ever been interested in understanding the craze that has been brewing around the world of crypto has to have a good grasp of how currency works.

It can be argued that for a currency to work at the most basic level it has to represent a means of value exchange, a means of measuring value, and a means of transferring value. The moment a currency fails to fulfill any of the previously mentioned roles is the moment it becomes virtually useless to its owner.

Historically, before any form of currency was established as a means of exchange, people would conduct their transactions by exchanging goods for other goods, via barter. The next step on the road to physical currency was a form of intermediary good that would act as a currency, with prices being commonly expressed in it. The goods used with this scope were of such nature that everyone would accept them, knowing that there is some sort of use or value in them that roughly equated to the good or service being exchanged. Moving on, throughout history money evolved taking up various shapes and forms. For a big chunk of the existence of currency, its value was tied to some sort of valuable good, most commonly precious metal, like gold or silver, an establishment currently known as the gold standard. This means that the owner of said currency had the assurance that what he owned equated to some amount of gold or silver. In other words, he was sure that if need be the currency he now had could be exchanged for something with actual, physical value.

This assurance stopped with the emergence of fiat money. The value of fiat money is guaranteed by the issuing bank. In using fiat money, individuals trust in the fact that a piece of paper with a number written on it can be exchanged for that arbitrary value. What makes this piece of paper special, is that it has the imprint of the issuing bank as a guarantee of the transaction.

Fiat money expanded the number of transactions possible considerably, with money being no longer tied to the gold standard and hence, no longer depending on the golden reserves of a bank. This essentially means that central banks, holding the monopoly over money printing, are able to issue as much money as needed to cover governmental expenses that would otherwise be impossible, due to lack of golden reserves. Consequently, this implies that the number of possible transactions is much bigger than before. Fiat money is what gives central banks a much higher degree of control over interest rates, inflation rates, liquidity, and other parameters as such. With growth of international trade and finance, central banks could no longer keep up, the amount of gold reserves coming out of mines being limited. Fiat money covered the increasing monetary needs of a booming economy (Chen, 2023).

Unfortunately, the very control that central banks gained over the monetary policy of a country became their pitfall. The biggest risk that comes with the overproduction of money is the inflation that follows when supply of money increases way beyond the actual demand. Certainly, a small rate of inflation is seen as healthy for the economy, as it encourages people to put their money to work by spending now, rather than later. Even so, the rise of fiat money created much more opportunities for the emergence of economic bubbles due to the unlimited monetary supply it allows for, and increased the instability of the respective currency.

The mortgage crisis of 2007 proved that central banks aren't necessarily able to prevent depressions or recessions by regulating the monetary supply (Kenton, 2022). As the housing bubble burst wide open, leading to one of the biggest recessions since the 1930s, the Federal Reserve Bank, along with other banks around the world, started implementing monetary policies like lowering key interest rates, providing banks with emergency funds via quantitative easing, and even promoting a massive injection of federal spending via the American Recovery and Reinvestment Act to kick-start the economy. All of these measures have been criticized for their expansive effect on the monetary supply. All of these wouldn't have been possible if it weren't for fiat currency and the ease of control it gives over monetary and fiscal policies (Investopedia team).

The Rise of Digital Currencies

The mention of the mortgage crisis of 2007 was important because it coincided with two major developments in the monetary world, and that is people losing trust in monetary authorities, and people losing trust in traditional currencies. Certainly, the depth of the consequences of the crisis that followed is much more complex, but such was the premise on which the first ever digital currency was launched.

As some may recall, in October 2008, a person or group under the pseudonym of Satoshi Nakamoto announced in a research paper that they've been working on a new peer-to-peer, electronic cash system that required no trusted third party to get involved in the transactions. The rise of skepticism and even distrust towards banks as designated third parties in each and any transaction, worsened by the additional costs implied and the mistakes that a third party might be prone to commit, made the launch of Bitcoin rather timely. Bitcoin promised no need for a central authority to control the transactions, a peer-to-peer network, access for every network participant to a copy of the ledger of transactions, open access to mining, which is the process of verifying transactions within the blockchain, highly secure transactions, anonymity and so on (Frankenfield, 2023).

The technology that Bitcoin uses in order to provide the aforementioned benefits is called a blockchain- a distributed ledger that contains the history of transactions. It collects the transaction information and stores it into a block, which is essentially the structural unit in which the transactions are organized within the blockchain. Once the block is full, it is run through an encryption algorithm, which produces a hexadecimal number called the hash. The specific encryption algorithm used in the Bitcoin blockchain is the SHA256. The resulting hash is then entered into the header of the next block and encrypted, which creates the chain of blocks talked about. Transactions are initiated via the cryptocurrency wallet, which is the interface of the blockchain. The transaction is sent to a memory pool, shared by a network of peer-to-peer computers, where it is stored until a miner or validator picks it up. The network of

computers goes on to solve equations to confirm the validity of the transactions. They work simultaneously trying to generate a valid hash. The first one to generate a valid hash receives a reward- a Bitcoin which he can use as he pleases. What follows is that the resulting hash becomes the header for the next block of transactions that are to be verified, as mentioned before (Hayes, 2023).

The decentralized manner in which the blockchain operates, allows for a certain redundancy of information which maintains the fidelity of the data. The transparency of the transaction is provided by the open access to the transactional history either by having a personal node within the blockchain or by accessing the blockchain explorer that allows users to see transactions occurring live. Simply put, if somebody were to say something false to cause a transaction to occur, there are hundreds of other copies of the blockchain that can verify the falsehood of the information and prevent the transaction from happening. This is also the reason why a block has to be followed by at least another five blocks to be confirmed as legitimate.

The technological benefits offered by cryptocurrency, with Bitcoin as its forerunner, seem to be the next step in the evolution of currency. Among such benefits are the ease with which transactions can be carried out, the lack of third parties and implicitly, the lack of additional costs implied by the transaction, the accessibility of the technology (one does not have to sign any contracts at any sort of institution to be able to own an electronic wallet and transact cryptocurrency through it). Moreover, cryptocurrency seems to be a promising solution to the accessibility gap in financial services. The most vulnerable category of people in terms of financial inclusion are people with disabilities. Closing that gap can potentially have a good effect on business, economic growth, reducing even the existent economic vulnerability among the disabled (Musiitwa).

As for the security of the transactions, worrying questions can be raised. Firstly, even though the people who have access to the history of transactions are able to trace the Bitcoins involved via the wallet address, the identity of the persons involved in the transaction remains protected by the encryption technology that is used. This creates premises for illegal transactions to be carried out via crypto currency, with no hope of identifying the source or the recipient of the money. According to the Crypto Crime Report published by the Chainalysis team, the total value of crypto received by illicit addresses in 2023 amounted to $24,2 billion, which, according to the same report, represents 0,34% of total on-chain transaction volume. The team of researchers made a point to specify the limitations of the research, that is that the numbers only include transactions received by addresses already identified as illicit. The numbers will be updated on a rolling basis as the respective identifications are made (Chainalysis team, 2024).

Even so, such numbers beg the question of how can a State counteract illicit activity without having any means of control over the market in which this activity is being carried out?

Central Bank Digital Currencies

Although starkly different from the previously mentioned digital currencies, the newly developed CBDCs come as an answer to the increasingly digital economy that the world has been facing, especially since the pandemic. According to research published by Statista, the increasing adoption of e-commerce and mobile payments, and the increased adoption of mobile payments made for a surge in

growth of the digital payments market. Mobile POS payments increased from 0,33 trillion US dollars in 2017 to 3,26 trillion US dollars in 2023. This increasing prominence of mobile payments, coupled with the increase of crypto currency market value, pushes for change in the banking system as we know it today, with Central Banks having become increasingly aware of it (Digital payments- Worldwide, 2024).

The new technology backing-up crypto currency markets introduced two undeniable factors. Firstly, crypto currency is much easier to use while also remaining anonymous in carrying out transactions. Secondly, how can traditional banks cater to the increasing needs of its customers for easier digital transactions, while also maintaining the integrity of the system and counteracting any illicit transactional activity.

This is where the discussion about CBDC arises, with research and experiments on this topic dating as far back as 2014. In 2014, the Central Bank of Ecuador launched the project called "Dinero Electronico", which allowed people to conduct digital transactions via a platform administered by the bank. The incapacity to draw a sufficient number of users rendered the project a failure by the year 2016. In 2016, the Central Bank of Canada launched project Jasper, in which a form of the distributed ledger technology was tried on major transactions between banks. Similar internal experiments have been conducted in the Netherlands, England, Singapore. The most successful one in drawing the attention of the public was the project conducted by the Peoples Bank of China, in which they implemented a form digital yuan to be used in four major Chinese cities (Raphael Auer, 2020).

As of mid-July 2020, at least 36 central banks have published retail or wholesale CBDC work, with at least three countries having completed a CBDC pilot. The central banks involved in the research of CBDCs are exploring a potential technological hybrid between the best of the Distributed Ledger Technology developed within the crypto market, while excluding the token-based, fully anonymous access that makes crypto so attractive to fraudulent actors ("BIS Annual Economic Report 2022").

Among the most highly regarded CBDC projects is the digital euro, currently in development by the European Central Bank.

As defined by the European Central Bank, a digital euro would essentially be a digital form of cash, an electronic form of payment issued by the bank. It would be universally accepted within the euro area, accessible free of charge, available offline, secure and private, and with a guaranteed value. The European Central Bank makes a point of distinguishing the digital euro from any other existing form of crypto currency, underlining that, unlike crypto currencies, the digital euro will be administered by a central authority, and will always be worth its face value, mitigating the risk associated with the crypto currency market that people have gotten used to. The digital euro would not be interest-bearing meaning that, like cash, it would be a retail means of payment and not an investment tool. The project provides for an online and offline mode for future use cases. The online mode is to be designed for remote payments, and would require validation by a PSP. It will cater to close proximity payments, requiring pre-funding and peer-to-peer validation. Consumer device access to the digital wallet would be enabled via a smartphone, a physical card or a web interface, with the respective consumer interface being provided by a digital euro app or a PSP app. The data exchange technology that would be used would be via online, NFC, or QR code (European Central Bank, 2024).

Concerning the privacy of the potential future users of the digital euro, the European Central Bank makes a clear commitment to protecting it, specifying that the Eurosystem would not be able to identify individual users behind transactions, while also making it clear that the existing AML/CFT rules, and the existing GDPR regulations would apply. With the offline model for the digital euro, access to transaction data by PSP would be minimal, limited to what is required to avoid forgery.

In balancing between the accessibility of digital funds and the stability of the financial system as a whole, the project proposes a limit on individual digital euro holding, with any excess being automatically directed to the linked account. There would be no need to prefund the digital euro account, if payments exceed the existing digital euro amount. The excess would be covered directly from the linked bank account.

As of November 2023, the digital euro entered the preparation phase, the scope of which is to prepare for the development of the currency, to initiate a search for providers, to further explore potential developments of the project and to support the adoption of the project, which is expected to happen in the fourth quarter of 2024. Use cases are expected to roll out as of November 2025.

What Does This Mean for Our Financial Future

In the previously cited paper by the Bank of International Settlements, the clear conclusion is that most CBDC projects do not aim to drive out existing means of digital payment. This is in line with the statement of purpose by the European Central Bank on the digital euro. The goal seems to be to design a digital means of payment that would combine the best technological advancements incorporated by crypto currencies while retaining the best qualities of the already existing fiat money. Crypto currencies, led by Bitcoin, seem to have increased the accessibility of financial services towards areas of society that had otherwise been lacking access to any such services. Even so, the volatility of the crypto market makes a crypto currency not as good of a means to exchange, transfer or measure value. Crypto has become an asset and its volatility is what makes it hard to trust as a currency. On the other hand, CBDCs seem to cater to the ever-increasing digitization needs of the current economy, while also retaining the trustworthy qualities of a fiat currency. What makes CBDCs hard to trust is the implicit step back to centralization, with banks gaining the role of authorizing transactions.

In the end, it is a matter of where we choose to put our trust. Should we give in to skepticism regarding the speculative nature of crypto? Or should we give in to the ever-anarchical voices that claim that central banks have way too much power as is, and implementation of a CBDC would only increase it.

The increasing digitization of our economy is undeniable, as well as the increasing need for modern payment methods that are both secure and accessible. Assuming that people lacking access to financial services were to concentrate their disposable income into the crypto market, we would probably be looking at a significant increase in the volatility of crypto, as well as an increase in the illicit transactional activity associated with it. With financial inclusion remaining one of the biggest shortcomings of the traditional monetary system, it is clear that a secure digital currency provided by a trustworthy institution, will assure a more positive economic development, pooling the respective disposable income to the right side of the economy. The promise of CBDCs is to combine digitization with centralization in a way that reduces crypto crime, while also making transactions easier and less costly.

As for the terms on which banks should be trusted to implement digital currencies, as well as the efficiency with which CBDCs will solve the issues regarding financial inclusion and drive out illicit transactional activity, it remains to be seen in practice.

Bibliography

Chainalysis team. (2024, January 18). *2024 Crypto Crime Trends*. Retrieved from Chainalysis: https://www.chainalysis.com/

Chen, J. (2023, July 5). *Fiat Money: What is it, How it works, Example Pros and Cons*. Retrieved from Investopedia: https://www.investopedia.com/

Digital payments- Worldwide. (2024). Retrieved from Statista: https://www.statista.com/

European Central Bank. (2024). *Home: Payments and markets: Digital euro: Features.* Retrieved from European Central Bank: https://www.ecb.europa.eu/

Frankenfield, J. (2023, October 13). *What is BItcoin? How to Mine,Buy, and Use it*. Retrieved from Investopedia: https://www.investopedia.com/

Hayes, A. (2023, December 15). *Blockchain Facts: What is It, How It Works and How It can be Used*. Retrieved from Investopedia: https://www.investopedia.com/

Kenton, W. (2022, April 16). *What Was the Subprime Meltdown? What happened and Consequences*. Retrieved from Investopedia: https://www.investopedia.com/

Raphael Auer, J. C. (2020, August 24). *Rise of central bank digital currencies: drivers, approaches, technogogies.* Retrieved from BIS: https://www.bis.org/

BIS Annual Economic Report 2022. (2022, June 21). Bank for International Settlements. Retrieved February 21, 2024, from https://www.bis.org/publ/arpdf/ar2022e3.pdf

Investopedia team (2023, December 18). *2008 Recession: What it Was and What Caused It*. Investopedia. Retrieved February 22, 2024, from https://www.investopedia.com/terms/g/great-recession.asp

Musiitwa, J. (2018, September 4). *Why the accessibility gap in financial services needs to be closed*. The World Economic Forum. Retrieved February 22, 2024, from https://www.weforum.org/agenda/2018/09/the-accessibility-gap-in-financial-services-needs to-be-closed/