



## Central Bank Digital Currency – the Cryptic Future of Money

The Crypto Currency and Regulation of Official Digital Currency Bill 2021 is to be introduced in the parliament heralding a new era for the monetary system in India and reflecting the tectonic shifts that have happened in monetary economics. This bill is to be introduced for regulation of the privately issued digital currencies and issuance of a Central Bank Digital Currency (CBDC). Money is a central bank liability and a CBDC is no different. The debate around the world regarding the issuance of digital currencies by multiple central banks has sparked off a variety of arguments both in favor of and against digital currencies, with renewed discussions happening on age old topics like the nature of money and the financial system.

This paper is a brief introduction to the arcane and volatile world of digital currencies in general and CBDCs in particular. In fact, the advent of the digital currency in the form of the central bank deposits is not a new concept and is extant in the way the central banks provide deposits to commercial banks in today's banking systems all over the world. The access to that money is restricted to the commercial banks and to some non-monetary financial institutions that hold accounts with the central bank for access to liquidity and FX reserves.

**Hayek Money:** Among the many radical ideas which emerged in the early 20<sup>th</sup> century one was that of the denationalisation of currencies propounded by the economist Frederick August Von Hayek. The influence of Hayek's thoughts on money is so crucial to understanding the nature of crypto currencies like Bitcoin, that some prefer to call crypto currencies as "Hayek Money"<sup>1</sup>. The radical thought process that lies at the centre of his argument rests on the fact that, to quote Hayek himself : "*The past instability of the market economy is the consequence of the exclusion of the most important regulator of the market mechanism, money from itself being regulated by the market process*"<sup>2</sup>. The central tenet in the proposed scheme by Hayek would entail full competition between private issuers of currency. This idea is similar to the present experience with crypto currencies like Bitcoin and Ethereum which have automatically become competitors and have naturally established exchange rates amongst them and simultaneously with other sovereign issued currencies like the US Dollar, much in accordance with the price changes associated with Hayek's theory of price signals and markets.

Privately issued currency in the physical form had existed long before the onset of the two-tier banking system that is prevalent today with the central bank and the

<sup>1</sup> Hayek Money: the Cryptocurrency Price Stability Solution: Ferdinando M. Ametrano

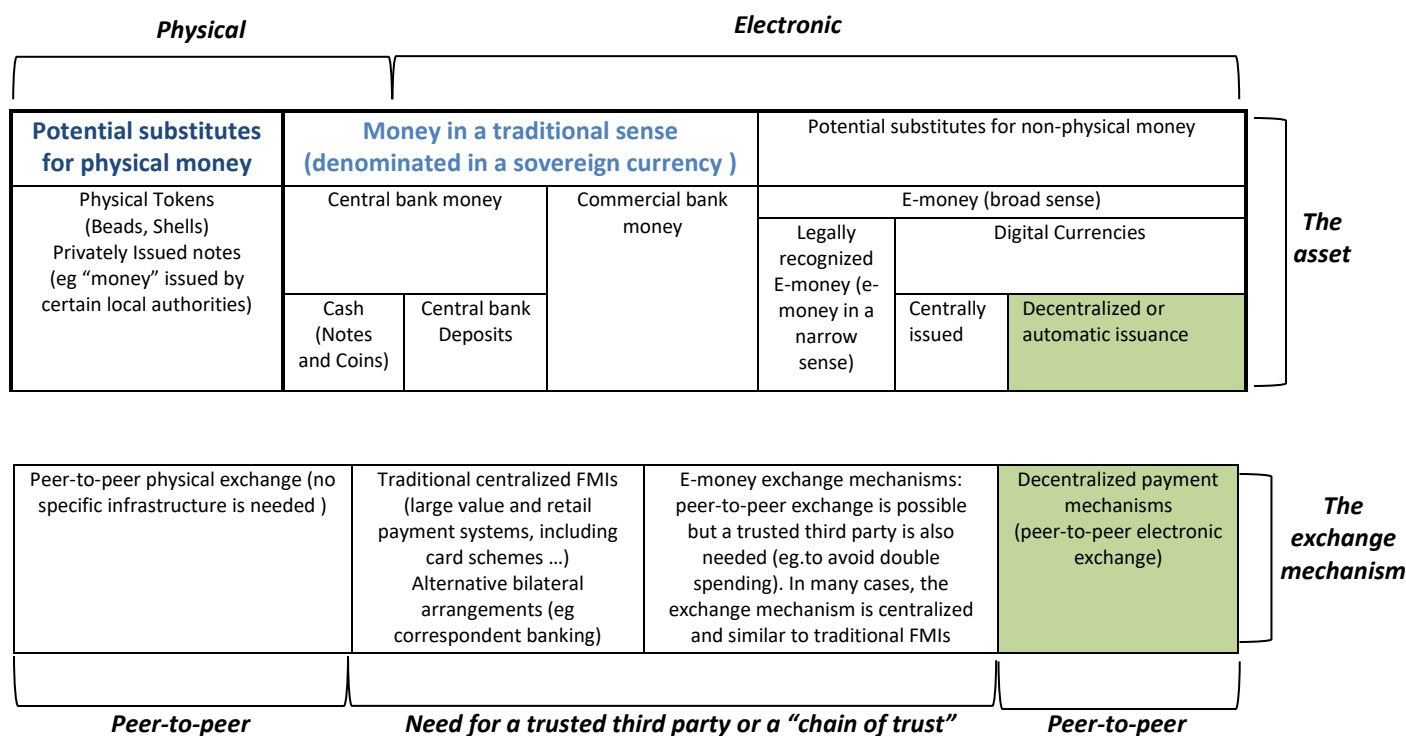
<sup>2</sup> Denationalization of Money – F.A.Hayek (Italics in the original)



commercial banks as the two layers that make up the banking system. The experience with the private issuance of physical currency brought economies to the threshold of the two-tier system due to the frequent run on the banks because of the inherent credit risk in such a model. The monopoly of issuing currency by a sovereign-backed institution like the central bank eliminates the credit risk. The origins of the Central Bank Digital Currencies can also be traced to the Nobel Laureate James Tobin, an American economist who suggested in 1980s that the general public should be able to hold deposit accounts directly with the central banks, and the central bank should provide the public with a widely accessible medium with the convenience of deposits and the safety of currency<sup>3</sup>.

**The Taxonomy of Money:** The evolution of money and the resultant taxonomy of money are depicted in the diagram below. It can be seen that economies have moved from a physical peer-to-peer exchange in terms of the exchange mechanism to an electronic peer-to-peer exchange which is an important feature of a crypto currency like Bitcoin. To ascertain the taxonomical place of each type of money it is necessary to ascertain the features of money by some criteria.

**Figure 1: Taxonomy of Money and Exchange Mechanisms**



Source : Digital Currencies: CPMI, BIS November 2015

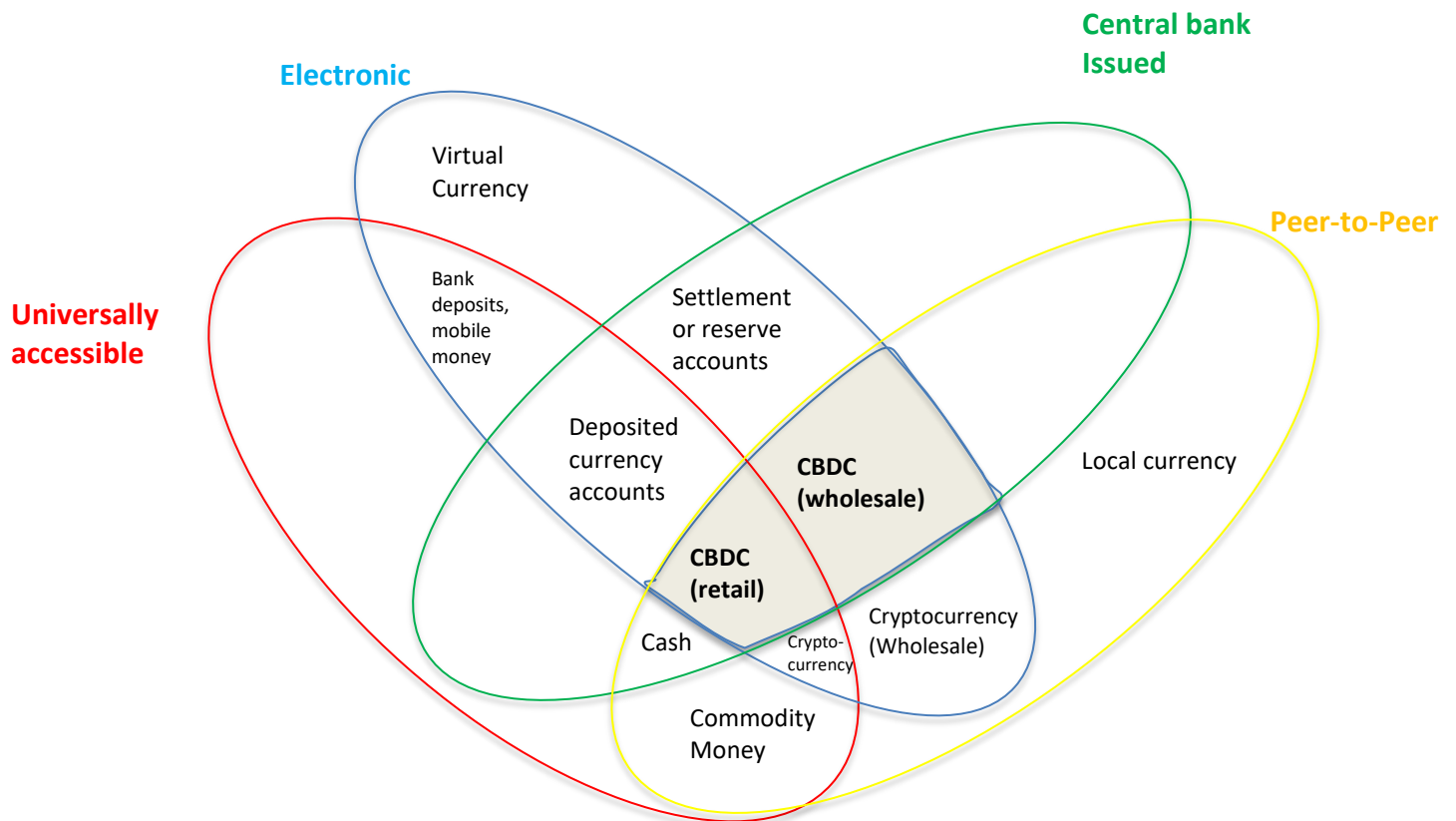
<sup>3</sup> Central Bank Digital Currency-is this the Future of Money –Keynote address delivered by T Rabi Shankar, Deputy Governor, Reserve Bank of India, on 22<sup>nd</sup> July 2021 at the webinar organised by the Vidhi Centre for Legal Policy, New Delhi.



The Report on Digital Currencies by the Committee on Payments and Market Infrastructures (CPMI) 2015 identified three features of crypto currencies that these currencies are *electronic*; they are not the *liability of anyone* and feature *peer-to-peer exchange*. It becomes vital to classify and have a clear definition in this context of the type of money being used. The four criteria on which money is classified are:

1. Issuer (central bank or other)
2. Form (electronic or physical)
3. Accessibility (universal or limited)
4. Transfer mechanism (centralised or decentralised)

**The CBDC defined in the Money Flower<sup>4</sup>** : According to the above given criteria, the Central Bank Digital Currency is an electronic currency which is issued by a central bank with universal accessibility and which can be exchanged in a decentralized manner known as peer-to-peer. The money flower as it is termed indicates the classification of various types of money by specific characteristics.

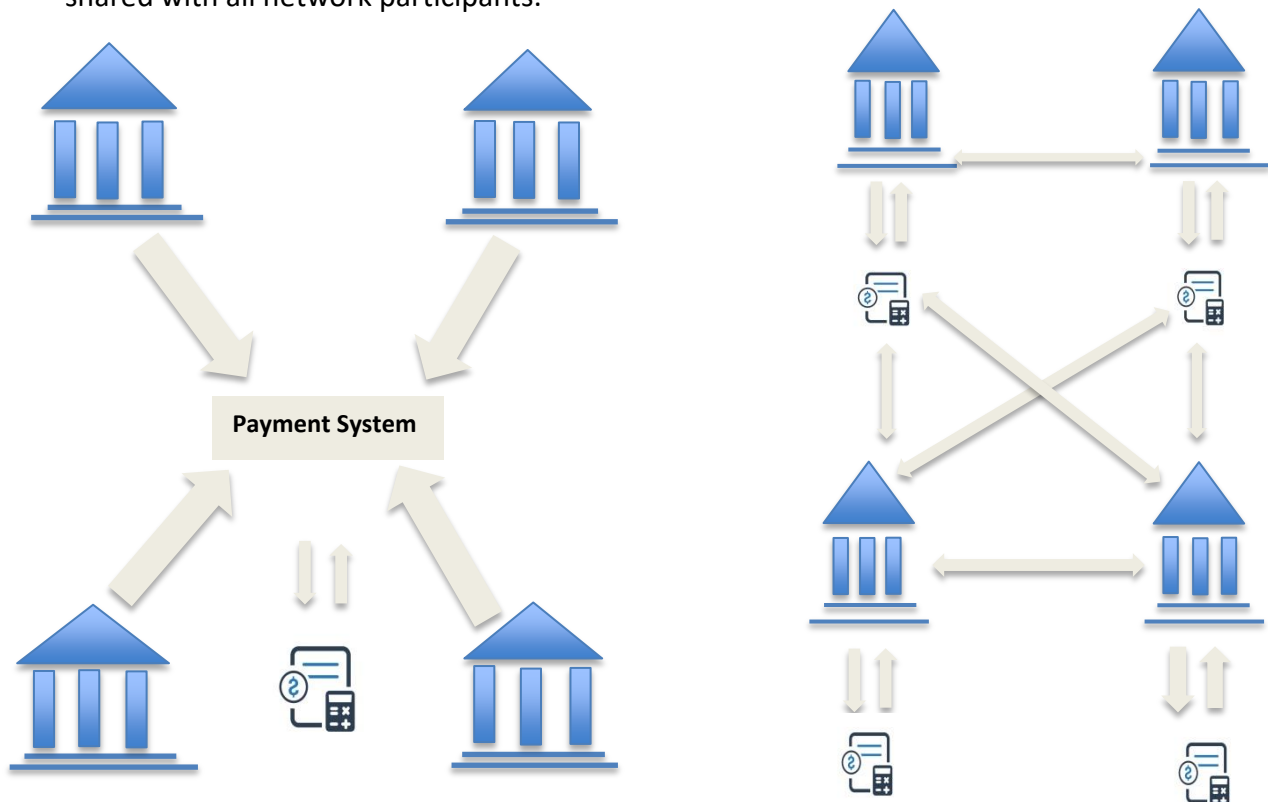


<sup>4</sup> Central Bank cryptocurrencies: Morten Bech and Rodney Garrat, Bank of International Settlements Quarterly Review (September 2017)

The technology which facilitates the decentralizing of the issuance and one which is most commonly used is the Distributed Ledger Technology or DLT, which has eliminated the need for trust, a primary factor between two contracting parties, whether central bank issued or not, and attempted to solve the double spending problem. The most recognizable form of peer to peer exchange presently in use is cash which is issued by the central bank and is a central bank liability but its form is physical.

### **Distributed Ledger Technology:**

The technology that has made the issuance and trading of crypto currencies ubiquitous is the Distributed Ledger Technology (DLT). This is not an entirely new technology and has been in use by organizations with branch networks across different geographical locations, or even multinational corporations. The idea driving the technology being that, in a traditional distributed database the central system administrator plays the role of maintaining consistency across the *multiple copies* of the ledger. The system administrator maintains a master copy of the ledger which is periodically updated and shared with all network participants.



A. Centralized Ledger

Source: Santa Innoventures (2015)

B. Distributed Ledger Technology

The only difference in the Distributed Ledger Technology and its usage in crypto



currency is the implementation of the “Block Chain”. DLT has been on the radar for many central banks like Bank of Canada under Project Jasper and the Monetary Authority of Singapore under Project Ubin, a joint project between the Bank of Japan and ECB named Project Stella, and Bank of Thailand under Project Inathanon.

**Block Chain:** This system is used in most of the crypto currencies of which, the more popular ones are Bitcoin and Ethereum. The pioneering concept of Satoshi Nakamoto (true identity unknown) the pioneer of Bitcoin, was to design the system to function without a central authority. This resulted in developing the peer-to-peer version of electronic cash which can be then used to transact online without the intermediation of any banking authority or trusted third party. These systems, particularly in the case of Bitcoin, maintain a distributed database by using a consensus-based validation procedure and cryptographic signatures to avoid the problem of double spending. Transactions are conducted in a peer-to-peer mode and broadcast to the entire set of participants who work to validate them in batches known as “blocks”. Since the ledger of activity is organized into separate but connected blocks, this type of DLT is called “Blockchain Technology”<sup>5</sup>.

The block chain technology itself is not without its drawbacks such as the need for immense amounts of computing power to complete validation or what is known in DLT as “proof-of-work” computations in addition to probabilistic finality of transaction settlement and making all the transactions public. As a result, these features render the crypto currencies less amenable to many types of financial market transactions, especially wholesale payments. Hence, the attempt is to now move back to a notary structure bringing the trusted third party back into the network. For example, in the Corda network, the notary design uses trusted authority and allows consensus to be reached on an individual transaction basis, rather than in blocks, with limited information sharing. This is also being tested by various central banks.

**Impact of CBDC issuance on the Central Bank’s Balance Sheet:** The issuance of a Central Bank Digital currency will be the same as issuance of cash as the CBDC will be nothing but a non-interest bearing liability of the central bank in digital form, similar to cash. In the current format of the banking framework where the RBI is using a corridor system (Liquidity Adjustment Facility corridor, LAF) the central bank balance sheet will transition from A to B

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<sup>5</sup> Central Bank cryptocurrencies: Morten Bech and Rodney Garrat, Bank of International Settlements Quarterly Review (September 2017).


**A – Central Bank Balance Sheet without CBDC:**

Assets	Liabilities
Monetary outright Holdings	Required Reserves
	Non-monetary Deposits
Liquidity-providing repos	Banknotes
Non-monetary assets (FX Reserves, Gold, IMF Credits)	

**B- Central Bank Balance Sheet with CBDC:**

Assets	Liabilities
Monetary Outright Holdings	Required Reserves
	Central Bank Digital Currency (CBDC)
Liquidity-providing repos	Banknotes
Non-monetary assets (FX reserves, gold, IMF credit)	

Source: Digital Currencies: CPMI, BIS 2018

To the extent that CBDC is supplied by the central bank, the demand for physical cash by households should decline in response. Also, due to the low costs of issuance of CBDC, the seigniorage income for the RBI should be on the higher side.

**RBI's outlook towards CBDC's and Crypto currencies :** Multiple central banks have toyed with the idea of issuing a CBDC, and projects like the eKrona undertaken by the Swiss Riksbank have been in the offing for some time. China was the first major economy to issue a digital Renminbi on a pilot project basis, which is legal tender and has the equivalent value of other forms of CNY. In practice, this would amount to an application of James Tobin's idea that the general public should be able to create direct checking accounts with the central bank, instead of having access only to commercial banking accounts. In India, the idea of issuing a CBDC has gathered steam over the past year, and the RBI has proposed to the Government to widen the definition of bank notes to include this new form of digital currency which shall have all the attributes of money as legal tender, store of value and medium of exchange.



**Conclusion:** Other central banks like the Bank of Canada and Bank of Sweden and recently the PBoC have embarked on pilot projects to launch their version of CBDC like the e-CNY, which shall create new regulatory issues for other nations as the CBDC can possibly circumvent existing payment channels. The Chinese CPC has already stated that the e-CNY was ready for cross-border use. This would mean that as the acceptance of such a CBDC gains more ground, these currencies will trickle into India and other nations, increasingly creating risks for domestic financial stability. Hence, to some extent it becomes imperative for the government and the RBI to float a CBDC. RBI has proposed to the government to include digital form of currency in the definition of bank notes. Recently the government has also launched an electronic trading platform, called the Retail Direct which will enable the general public to invest and trade in Government bonds. This coupled with the launch of the CBDC will lead to revolutionary changes in the way financial markets function in the future.

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