CBDCs Vs Cryptocurrencies

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What is CBDC?

There exist thousands of private cryptocurrencies, namely, Binance Coin, Bitcoin, Cardano, Dogecoin, Ether, Litecoin, Ripple, Solano, Terra, and Tether, among others. The inevitable introduction of Central Bank Digital Currencies (CBDCs) would result in transformational change to the global financial system since Bretton Woods. Each country will have its own CBDC, owing to its different economy, financial stability and paramount privacy, and adopting an equilibrium between developments on the policy front and on the design front. CBDC would be considered as a virtual currency backed by the sovereign guarantee of the country issuing it.

With the rising popularity of cryptocurrencies, it is time for the world's central banks to come out with an alternative for private cryptocurrency. While the launch of digital currency would mean - money entering a new era - yet countries are considering preserving key aspects of traditional monetary and financial systems.

CBDC launch status

The Atlantic Council Research, Bank of International Settlements, and International Monetary Fund, in its latest report, stated that - 9 countries have already launched CBDCs, 15 countries were in a pilot stage, 16 were under the development stage, and 40 countries were in the exploratory stage of research.

The smaller countries have already launched CBDCs for domestic use. These are Antigua and Barbuda (Dcash), Bahama (Sand dollar), Dominica (Dcash), Grenada (Dcash), Montserrat (Dcash), St Kitts and Nevis (Dcash), St Lucia (Dcash), and Nigeria (e-Naira). As regards bigger countries - China has reached an advanced stage of the pilot launch, whereas the Bank of England, Bank of Japan, European Central Bank, and the US Federal Reserve are still in the exploratory stage. Reserve Bank of India is contemplating its digital currency launch in early 2023.

Digital currency infrastructure

Though the CBDC decentralised technology might be similar to that of private cryptocurrencies, the permissioned access, if any, will make the former different. CBDCs permissioned approach might allow multiple financial entities, which is also called the indirect approach, to maintain financial records under the overall control and supervision of the central bank. The central bank would control the access to the blockchain having financial records, but these might also be accessible to permissioned entities.

Benefits outweighing challenges

The key areas under evaluation phase by the central banks include a scope of retail and wholesale payments; direct approach vs indirect approach; adoption of blockchain technology, centralised ledger or distributed ledger technology (DLT); validation mechanism to be token-based or account-based; besides distribution architecture between central bank issuance and indirect one.

The launch of CBDCs might lead to a reduction in transaction costs owing to its centralised and regulatory framework. The payment and settlement mechanism might undergo radical change as DLTs might provide a complete record of the transactions. CBDC is likely to provide an impetus to financial inclusion, enhance transparency, and restrict illegitimate activities.

Private cryptocurrency investors would have the option of getting protection from the volatility risk prevalent in the crypto market.

What is Cryptocurrency

A cryptocurrency is defined as an encrypted data string representing a unit of currency. The cryptocurrency, also called crypto-currency or crypto, is decentralised digital money based on blockchain technology and uses cryptography to secure transactions. It's also a digital payment system that doesn't use intermediaries like banks, governments or regulators to verify transactions. It also functions as a peer-to-peer (P2P) system, enabling the transfer or receipt of funds anywhere and to anyone having a digital wallet. It is essential to know about the three terminologies used - decentralisation, blockchain, and cryptography to better understand cryptocurrency.

Decentralisation

It means no centralised or regulating authority is monitoring rise or fall of cryptocurrency prices. The price movement is determined entirely by demand and supply forces. Since its supply is not evenly distributed, the possibility of volatile price movement is not ruled out.

Blockchain

This term refers to distributed ledger technology, which is a digital and secure ledger accessible by authorised users. It also serves the purpose of recording transactions such as buying, selling, and transferring.

Cryptography

This technique secures data from unauthorised access using encryption methodologies. The privacy, security and anonymity features claimed made by blockchain are enabled through cryptography.

The first cryptocurrency history

The origin of cryptocurrency technology dates back to the year 1980, when blinding algorithms were invented. These algorithms are all about secure and unvarying digital transactions. In 2008, a group of people, including Satoshi Nakamoto, formulated guiding principles of the first and most popular cryptocurrency, Bitcoin.

Bitcoin was formally launched to the world in the year 2009; however, it took more than 3 years to be accepted as means of payment by the leading merchants. The modern blockchain technology is currently used in banking, insurance and other industries.

Cryptocurrency working

Several cryptocurrencies are generally created through a complex process of a method called mining. The mining process is a virtuous circle - the miners secure and maintain the blockchain, the blockchain reward the miners with coins, and the rewarded coins act as an incentive for the miners to maintain the blockchain.

The Bitcoin mining process involves solving mathematical puzzles over specially equipped computer systems involving large energy consumption, and miners are rewarded with bitcoins in exchange.

Users could buy or sell crypto through crypto exchanges, brokerage houses, P2P exchanges, and payment processing platforms. Cryptocurrency so bought could be stored in hot or cold digital wallets. A hot wallet is connected to the Internet, where there is a huge possibility of hacking or stealing coins, making it vulnerable but convenient for a speedier trade. A cold wallet is generally not connected to the Internet, which makes it more secure, but not convenient to make the trade quicker. Cryptocurrencies could be seamlessly transferred from one wallet to another one. An investor could invest in cryptocurrency or transact using acceptable cryptocurrency for buying goods or services, trading purposes, and can convert them into cash.

Classification of cryptocurrencies

The cryptos could be broadly categorised into four types based on their utility. These are DeFi, NFT, utility tokens, and yield farming. Let's understand each one of them.

Decentralised Finance (DeFi)

DeFi makes use of emerging technology without the involvement of intermediaries in financial transactions. The constituents of DeFi are hardware, software, and stable coins, which facilitate the development of applications (dApp). The infrastructure support for DeFi and regulations governing virtual digital assets (VDAs) are in the process of getting formulated post discussion with the stakeholders.

Non-fungible Tokens (NFTs)

The cryptocurrencies are interchangeable or fungible, serving as a medium for commercial transactions. NFTs are unique tokens, using cryptography, that are held on a blockchain and can't be replicated. NFTs constitute real-world articles viz., artefacts, real estate, personalities, etc. It's a way of tokenising real-world tangible assets, making their buying, selling, and trading seamless while mitigating fraud risk.

NFTs could be issued for establishing identities of well-known personalities, property rights, etc.

Utility Token

These tokens provide holders access to a product, service or both through a network or platform. Utility tokens can't be mined, rather pre-mined all at once and distributed in a way decided by the project team. These tokens are generally unregulated and aid in the creation of an internal economy within the blockchain of a specific project. Examples of utility tokens are Basic Attention Token (BAT), Filecoin, Golem (GNT), and Siacoin.

Yield Farming

The term specific to crypto means cryptocurrency owners could earn guaranteed and steady returns. Yield is nothing but interest earned or dividends received on an investment over a period of time. To farm yields, a crypto owner has to invest its holding in a specific DeFi platform or product to get rewards in the form of interest or dividends.

With the rising popularity of cryptocurrencies, a variety of coins have emerged as crypto investment avenues. It's important to understand the different types of coins in a brief description.

Bitcoin: The first one is Bitcoin, which is the most valued one, and popular also, in cryptocurrency trading. One of the limitations of Bitcoin is the mathematical process involved in the mining process to create new blocks that consume a lot of energy, time and effort. The mining process has a consensus mechanism of proof-of-work. Bitcoin has a maximum supply of 21 million coins, the last of which is likely to be mined in the year 2140 - under the assumption that the mining rate gets halved after every 4 years.

Altcoins: The need for an alternative to Bitcoin led to the emergence of Altcoins. Altcoins is the name derived from an alternative to Bitcoins. The top 3 Altcoins in terms of market capitalisation are Ether, Binance and Ripple. There are thousands of such coins in the world. Though Altcoins are also based on the same blockchain technology and require a digital wallet to trade and store Altcoins, the process of mining differs, which is called proof-of-stake. There is no cap on Ethereum supply; Binance has a maximum supply of 200 million, and Ripple has an upper cap of 100 billion XRP tokens.

Stable coins: These are the third most popular ones. The name is derived from price stability. These coins provide security and privacy as they possess blended properties of cryptocurrency and fiat currency. The prices of fiat currencies are pegged to fiat money like USD, Euro or INR, or to exchange-traded commodities like precious metals. Tether (USDT), USD Coin (USDC) and Binance USD (BUSD) are examples of Stable coins. Stable coins are considered a long-term investment avenue as these are pegged to an external asset like legal tender.

Meme coins: are meme-image inspired cryptocurrencies. These types of coins are highly volatile in nature as compared to major cryptocurrencies, namely, Bitcoin and Ethereum, when it comes to price movement. Meme coins are backed by communities, which create a lot of hype, leading to volatility in the prices.

A couple of Meme coins, namely, Dogecoin (DOGE) and Shiba Inu (SHIB) registered historic gains to the extent of 80 times and 60k times, respectively during 2021. Since all cryptocurrencies are issued in fractions up to 8 decimal places, such kind of gains or losses are possible owing to very high volatility.

Table 1. CBDCs vs Cryptocurrencies

Parameter	CBDCs	Cryptocurrencies
Acceptance	Wide and Global	Limited acceptance
Authority	Regulated by the Central Bank	Decentralised system and unregulated (regulations not in place)
Encryption	Passwords or biometric authentication	Digital wallet protects from cyber attack
Intrinsic value	Legal tender or Fiat currency has a sovereign guarantee	No underlying asset
Mining	Issuance by the Central Bank	New coin production is energy-intensive
Price	Stable	Highly Volatile
Taxation	Tax neutral	Flat Tax @30% in India
Transaction costs	Not known yet	Varies from cryptocurrency-to-cryptocurrency
Transparency	Known to sender, receiver, and the bank	Publicly available in a decentralised ledger, but the privacy of ownership is maintained

Table 2. Price movement of Bitcoin and Altcoins in terms of Market Cap (in USD)

Name of the Crypto	Price as on 31.12.2020	Price as on 31.03.2021	Price as on 30.06.2021	Price as on 30.09.2021	Price as on 31.12.2021	Price as on 19.03.2022
Bitcoin	29.001.72	58,918.83	35,040.84	43,790.90	46,306.45	42,190.65
Ethereum	737.80	1,918.36	2,274.55	3001.68	3,682.63	2,946.26
Binance Coin	37.38	302.06	303.90	387.06	511.71	399.85
Ripple	0.2198	0.5739	0.7064	0.9526	0.8312	0.8194
Terra	0.6525	18.70	6.52	38.60	85.47	91.22

Indian context

The GoI Union Budget 2022-23 had cleared doubts on the future of cryptocurrency in India to a great extent when a flat tax rate of 30 percent was introduced by FM on the transfer of virtual digital assets (VDA). This budget proposal has brought in much-needed relief for cryptocurrency investors who were sceptical about the crypto's future in India. The tax rate of 30 percent on earnings from virtual digital assets is at par with gains from lottery and gambling winnings.

Introduction of a tax on earnings and applicability TDS at 1 percent on virtual digital assets (VDA) transactions carried out on cryptocurrency exchanges virtually mean credence to cryptocurrency, though FM subsequently denied its legality. The ever-increasing popularity of cryptocurrency could be gauged by the fact that millions of investors are getting into the crypto trade in an unregulated environment. The Reserve Bank of India is expected to come out with its own Central Bank Digital Currency (CBDC) in early 2023.

Both CBDCs and Cryptocurrencies have their own unique features and characteristics when it comes to looking at them in the finance industry. Table 1 compares different aspects of CBDCs and Cryptocurrencies.

Cryptocurrencies price analysis

Without carrying out an analysis of cryptocurrencies price movement, ever since it has gained popularity, it would be difficult to understand the role of demand-supply forces during the last 15 months. It would be interesting to study the volatility in the prices at the end of each quarter beginning 31st December 2020.

However, it's not possible to study the price movements of thousands of cryptocurrencies. Hence, for the purpose of this analysis, tracking the price movement of Bitcoin and the top four Altcoins (Stable coins, Tether and USDC excluded) by way of market capitalisation would provide an idea about the volatility in the prices - though rankings might undergo change owing to price volatility. Table 2 shows price variation for the top four cryptocurrencies over the period of December 2020 through the latest March 2022.

On a perusal of Table 2, it's observed that prices of leading cryptocurrencies are quite volatile, where prices more than

Chart 1. Price movement in the top four cryptocurrencies

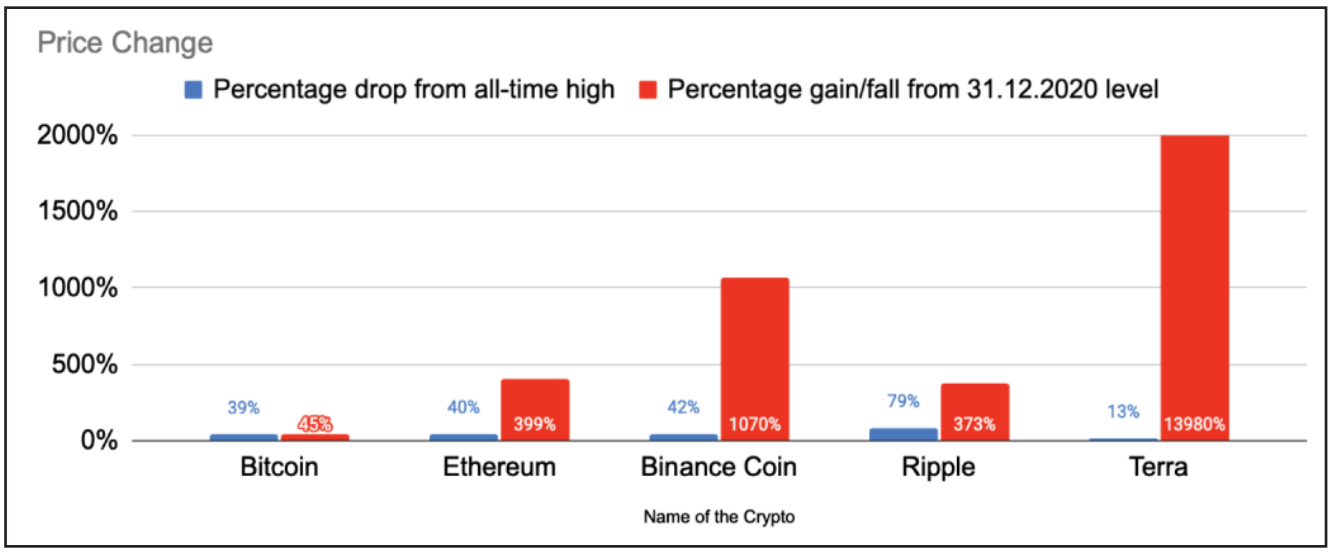

Table 3. Valuation statistics for Bitcoin and top four Altcoins **(in USD)**

Name of the Crypto	Market Cap as on 19.03.2022 (in billion)	All-time High	Drop from all-time high (in percent)	Gain/Fall from 31.12.2020 level (in percent)	Market Cap Ranking
Bitcoin	795.689	68,742.00	38.62	+45.48	1
Ethereum	350.784	4,891.70	39.77	+399.33	2
Binance Coin	65.191	690.93	42.13	+1,069.69	4
Ripple	39.12	3.84	78.66	+372.79	6
Terra	33.48	104.58	12.77	+13,980.08	7

doubled during the quarter of March 2021. Another observation is price movement of these cryptocurrencies varies, where a couple of them moved up by 10 times or more during March 2021. Even after noticing a high level of volatility in the prices of top cryptocurrencies, all of them recorded a substantial rise in a 15-month period over the 31st December 2020 level. The graphical representation of the price movement is furnished in Chart 1 to have better clarity.

There is a high variance in the market cap range for leading cryptocurrencies, from USD 33 to USD 795 billion. The all-time high of leading cryptocurrencies is higher than current levels, barring Terra. Their prices have dropped from an all-time high level in the varying range of 13 percent to 78 percent. A couple of leading cryptocurrencies prices have gained over 1000 percent during 15 months period under consideration.

The gain and fall in the prices are shown in Chart 2, where the depiction of the prices is evident from the different bars. In fact, Terra bar could not be accommodated in the given range of the bar chart, as its price has grown, which has been phenomenal. Table 3 shows a statistical representation of the market cap for the leading cryptocurrencies, showing the high variance range from all-time high and drop from all-time high percent wise with the market cap ranking.

Future of cryptocurrency

The digital assets experts expect the worldwide crypto market to triple in the coming 8 years. That means crypto is becoming one big trend in every household. Irrespective of buying interest in cryptocurrencies by the investors, businesses, institutions, and brands - it is hard to ignore the rising popularity of crypto for long. It could very well be said that the crypto industry is in its nascent stage and ever-evolving. The rise and fall in crypto markets could be attributed to an uneven supply or distribution of cryptocurrencies in the crypto markets, where cryptocurrency prices reach new highs followed by a sudden and substantial fall. While uncertainty might prevail in the coming days, a theme-based approach in the form of regulations to institutional adoption would pave the way for crypto markets - according to crypto analysts. The major challenge encountered is the energy consumption in designated coins going through mining activity and the high carbon footprint affecting eco-conscious communities.

The most recent mixed effect of cryptocurrency on financial transactions came into the light in the Russia-Ukraine war. The cryptocurrencies are acting as a saviour to the war-affected Ukraine, and it has received donations worth more than US $56 million ever since the war broke out. On the other hand, Russia might evade financial sanctions imposed by western countries by routing its financial transactions through the cryptocurrency route though western countries have asked all the cryptocurrency exchanges to block accounts of Russian users / entities or beneficiaries.

El Salvador has become the world's first country to accept Bitcoin as a legal tender by promulgating a law to that effect in Parliament in June 2021. The market capitalisation of cryptocurrencies had crossed the US $3 trillion mark at its peak. Thereafter, it has corrected by 40+ percent, which currently stands at the US $1.7 trillion.

Crypto regulation status

Throughout the world, the governments and the central banks are contemplating a regulated cryptocurrency or virtual digital assets market. Investors would welcome the formulation of the crypto regulations to tide over the prevalent uncertainty in the coming days. If stricter regulations are not put in place, then retail or small or gullible investors are likely to fall prey to the volatility in prices of crypto trades or investments. The announcement of unequivocal regulations would bring much-needed cheers to the world of cryptocurrency investors.

Conclusion

While the governments and the central banks world over mulling the proposal for CBDC launch, it has reached various stages in the different countries. Smaller countries have taken the lead in launching their own CBDC, but bigger ones are in the exploratory, development and pilot phase of launch. The various aspects under consideration of the central bank's cover are the scope of retail and wholesale payments; direct vs indirect; adoption of blockchain technology, centralised ledger, validation mechanism to be token-based or account-based; impact on commercial banks; the plight of money from the country; besides distribution architecture. CBDC is likely to provide momentum to financial inclusion, enhance transparency, protect investors from volatility in crypto markets, and restrict illegitimate activities. In other words, CBDC is likely to bring the entire payment system under an umbrella.

Cryptocurrency has always been volatile, where volatility is witnessed frequently in prices as well as investor perception. While the future of the cryptocurrency would be decided by the regulators when crypto regulations are in place, it could also be influenced by the brands. Fintech companies are considering allowing crypto trades on their platforms in a seamless and safer environment for crypto newbies and imparting education, updates and resources to crypto curious investors.

Whatever could be in the store for the future of the cryptocurrency, balancing risk with rewards would be a significant step, and ample opportunity exists for the brands and investors who are willing to make an entry into the world of crypto investing.

CBDCs, though seen as anti-crypto, will use the permissioned side of blockchain technology. The concept of programmable instruments via smart contracts, transactional protection, and speedier payments, among others, will also be possible. In all probabilities, both CBDC and the Cryptocurrencies are likely to co-exist in the new era.

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