

Cryptocurrencies – An assessment¹

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Let me begin by congratulating the winners of the IBA Banking Technology Awards. It is indeed a privilege to be among so august an audience and so learned a gathering and be able to talk about an issue of momentous significance – how to deal with cryptocurrencies. Crypto technology and Web 3.0 is dominating the mind-space not just among the technology community but the financial industry as well. Cryptocurrencies, as per their proponents, have the potential to play a critical role in how finance pans out in the future; indeed, there is open speculation about whether finance as we know it and banking as we know it can survive the rise of cryptocurrencies. In this talk I will try and give you my assessment of cryptocurrencies and what they mean for our financial system.

Introduction

2. As many of you would already know, cryptocurrencies and other crypto products (like non-fungible tokens or NFTs) are being hailed as the innovations that would usher in decentralized finance or DeFi, which are blockchain applications geared to disrupt the traditional financial system. The basic purpose of blockchain, or more generally the distributed ledger, the technology on which these crypto-products run, is to make financial intermediation, and therefore banks, redundant.
3. What might have escaped the attention of the common man, is that cryptos might be more than just a technology, they appear to embody an ideology as well. A Financial Times video characterizes the success of Bitcoin, the first and most popular cryptocurrency, to “healthy dissent, base greed, lofty idealism, and sheer fear of missing out”². The same FT video also says “Cryptos embody a core tenet of anarchism, co-operation in the absence of centralised authority”. The class of crypto products are fundamentally designed to bypass the established financial system, and on a larger scale Government itself. Some enthusiasts even claim that cryptocurrencies can usher in a separation of money and State, like separation of Church and State. Some refer to it as ‘freedom’ money. Or, as Nassim Nicholas Taleb is quoted to have written in the Time³ magazine, bitcoin is an insurance policy

¹ Keynote address delivered by Shri T Rabi Sankar, Deputy Governor, Reserve Bank of India, on February 14th, 2022 at the Indian Banks Association 17th Annual Banking Technology Conference and Awards.

² <https://www.ft.com/video/ccb48782-82f9-44ef-97c7-dcfa02431123>

³ <https://time.com/5486673/bitcoin-venezuela-authoritarian/>

against an Orwellian future. It may thus not be adequate, from a regulatory point of view, to treat cryptos as just another type of currency or asset or commodity but also as a potential social movement.

Cryptocurrency Basics

4. Let us briefly, and in very general terms, understand the basics of cryptocurrencies.
5. When a transaction is made using paper currency, all that the receiver needs to check is that the currency is not counterfeit. Thus, it is the receiver who authenticates the instrument of payment. This arrangement generally works, except for those few instances when the receiver fails to detect a counterfeit currency. In the case of digital transactions, the authentication of the payment is done by an intermediary like a bank, because almost all electronic transactions are transfer of money from one bank account to another. This arrangement also works as the bank certifies that the sender has adequate balance in her account to cover the transaction.
6. Some people felt that intermediation by banks is avoidable. Either they felt that banks are not trustworthy, or they considered that the cost charged by banks is excessive, or they were not comfortable with their transactions being tracked. Guided by the idea that cash remains one of the best ways to exercise free speech (refer footnote 3), their solution was to create their own private currency and a transaction arrangement or network that bypassed banks or any other financial or social institution. The basic problem they had to get over was as follows – since electronic money (just some lines of code) can be easily replicated, in the absence of a trust institution like a bank, how does the network ensure that the same currency is not spent again, and again. This was called the ‘double spending problem’.
7. The first ‘person’ to effectively solve this problem was one Satoshi Nakamoto, a fictional person or persons or corporate or any other entity, no one knows as yet. And bitcoin was born. He did this by creating the blockchain. On a blockchain, when a transaction occurs, it is broadcast to all computers on the network. A set of new transactions, called a block, are authenticated by an agreed consensus mechanism, and then the validated transaction block is added to the previous chain of blocks. Every block is linked to the previous block, making double spending difficult because it would involve changing every subsequent block. Bitcoin was followed by many others, like ether, cardano, dogecoin, tether, stellar etc. Collectively they are called cryptocurrencies. The prefix ‘crypto-’ refers to the fact that cryptography is used to generate or authenticate transactions.

8. The defining characteristics of cryptocurrencies are: -
 - a. That cryptocurrencies are decentralized systems where transactions are authenticated by participants themselves by consensus. They are designed to bypass the financial system and all its controls. They cannot be traced or confiscated or frozen by Governments.
 - b. They are anonymous – transactions are verified, but not the purposes or counterparties of transactions.
 - c. They are borderless – that is, they work over the internet without any physical existence.
9. While Bitcoin started more than a decade back in 2008, until 5 years ago, total market capitalisation of all cryptocurrencies was only \$20 billion (February 2017). This went up to \$289 billion in February 2020 and thereafter exploded to reach a peak of \$2.9 trillion in November 2021. Currently (Feb 09, 2022) it stands at \$1.98 trillion. Bitcoin accounts for 42% of this market capitalisation, the top two cryptocurrencies account for 61% while the top five account for 71%. The total number of cryptocurrencies is at 17,436 and the total number of crypto exchanges is 458.⁴

A critical assessment of cryptocurrencies

10. With that brief, and somewhat simplistic, introduction to cryptocurrencies, we will now take a deeper look at the exact nature of cryptocurrencies and their implications, particularly in the context of the current debate in India on the topic. The starting point is to get a clear understanding on (a) What precisely is a cryptocurrency, (b) What useful economic role does a cryptocurrency play, and (c) What, if any, are the risks it poses to the society and economy?

(i) What precisely is a cryptocurrency?

11. A cryptocurrency is designed to be a currency, but does it really function like a currency as we understand it. Firstly, currency always has an issuer, usually a trusted entity like the sovereign. Even when gold is used as a currency, the gold coins had to be issued by a sovereign entity. Secondly, historically, a currency has always been either a commodity with intrinsic value or a debt instrument. Cryptocurrencies do not conform to this understanding of a currency as they do not have an issuer, they are not an instrument of debt, or commodities nor do they have any intrinsic value. Currency needs trust, not everything that can be trusted is a currency. So even if technology (as in a blockchain) provides the trust for cryptocurrencies, they can at best perform the

⁴ The source for this information is <https://coinmarketcap.com> as on 09 February 2022.

- role of a currency within the private and closed environment of that cryptocurrency. They do not, and should not, automatically become a currency for the larger society.
12. Some countries tend to treat cryptocurrencies as a financial asset. This is also problematic because all financial assets have underlying cash flows and need to be some person's liability. Cryptocurrencies are neither any person's liability nor do they have any underlying cash flows. They are not financial assets, by definition.
 13. There is also an effort to treat cryptocurrencies as a commodity. But commodities are tangible and have utility; cryptocurrencies have neither. There is this somewhat awkward attempt to equate some of them with gold, hence limiting their supply like natural resources, or creating them through mining. Limiting supply by design is not the same thing as limited supply in nature (like gold) because (a) design can always be modified and hence such limitation is artificial, and (b) even if one cryptocurrency has limited supply, that limitation does not work for all cryptocurrencies taken together. Further the fact that gold is mined does not in itself make it money, it has to be stamped and issued by a sovereign to make it money.
 14. If cryptocurrencies are neither a currency in the usual sense of the term, nor a financial asset nor a physical asset what are they? The proponents have improvised to call them as digital assets. Even that is doubtful as cryptocurrencies do not have any underlying use, like for instance car hiring softwares or a core banking systems, or, for that matter, smartphones. That basically leads to the conclusion that it is an electronic code (with no practical use) which has created enough hype such that people are willing to pay money to buy ownership rights to that electronic code, seemingly on the hope that someone else would buy it at a higher price in future. What started off as a medium of exchange has appeal similar to that of a speculative asset.
 15. As a store of value, cryptocurrencies like bitcoin have given impressive returns so far, but so did tulips in 17th century Netherlands. Cryptocurrencies are very much like a speculative or gambling contract working like a Ponzi scheme. In fact, it has been argued that the original scheme devised by Charles Ponzi in 1920 is better than cryptocurrencies from a social perspective⁵. Even Ponzi schemes invest in income earning assets. A bitcoin is akin to a zero-coupon perpetual; it's like you paid money to buy a bond which pays no interest and which will never pay back the principal. A bond with similar cash flows would be valued at zero, which, in fact, can be argued as the fundamental value of a cryptocurrency. If everything eventually returns to its

⁵ <https://www.ft.com/content/83a14261-598d-4601-87fc-5dde528b33d0>

equilibrium value, then the prognosis for investors in cryptocurrencies is not a happy one.

(ii) What useful social or economic role does a cryptocurrency play?

16. If cryptocurrencies are actually intended to revolutionize finance, we need to understand what precise role they play in finance. An equity share enables a business to mobilize risk capital, a bond enables a company/Government to borrow money, a mutual fund enables retail investors to diversify their portfolio, derivatives enable users to manage their risk and so on. Every financial instrument exists to serve a basic purpose quite distinct from its use as an investment asset. What is the basic role played by cryptocurrencies? Since it claims to be a currency, does it perform the functions of a currency? The answer is that the volatility of many cryptocurrencies precludes them as an efficient medium of exchange. Besides, *a priori* there is no ground to believe that people place the same trust in them as they do in legal tender currencies. While there is anecdotal evidence of businesses using bitcoins, there really is no reliable data available; by all indications their use as a currency appears to be negligible.
17. Are cryptocurrencies useful as a store of value? Given the surge in value of some cryptocurrencies, it has been argued that they are. A closer look exposes that argument. Think of any store of value – they are either currencies, or financial assets or commodities which are tangible and have intrinsic value (works of art like paintings also have historical, aesthetic and scarcity value). We have seen that cryptocurrencies are none of these. Notwithstanding their current valuations, if a threshold number of people decide to opt out, the entire values can easily collapse to nothing.
18. For all the hype about a revolutionary innovation, cryptocurrencies themselves do not appear to be designed to meet any need in the finance space that is currently not being met or to meet existing needs more efficiently. The innovation, if at all, is of distributed ledger, which, contrary to the claims of proponents, can flourish even if cryptocurrencies themselves are banned across the world.

(iii) What, if any, are the risks posed to a society or an economy?

19. The fundamental risks of cryptocurrencies are two - they are intended to be private currencies and they are structured to evade Government control with respect to financial integrity standards such as KYC, AML/CFT etc. Let us examine each of these two points in a little more detail.

Impact of private currencies or currency like products on the economy

20. Historically, private currencies have resulted in instability and therefore have evolved into fiat currencies over centuries. The retrograde step back to private currencies cannot be taken simply because technology allows it (it always did, actually) without any consideration for the dislocation it causes to the legal, social and economic fabric of society. Every private currency will eventually replace the Rupee to some extent. Consequently, the role of the Rupee as a currency will be undermined. With one or more private currencies being allowed, there would be parallel currency system(s) in the country. Thus, increased acceptance of cryptocurrencies would result in effective 'Dollarization' of our economy⁶. Dollarization, it is well understood, would undermine the ability of authorities to control money supply or interest rates, as monetary policy would not have any impact on the non-Rupee currencies or payment instruments. When that happens, India loses not just its currency, a defining feature of its sovereignty, but its policy control of the economy. With loss of traction for monetary policy, the ability to control inflation would be materially weakened.
21. Given a choice, people may like to hold at least a part of their deposits in convertible currencies like the US Dollar or Euro. Cryptocurrencies priced in these convertible currencies would provide such an opportunity. If private currencies are permitted, the banking system's ability to mobilise deposits in Rupees, and consequently, the ability to create credit, would be diminished. Credit creation in convertible currencies would be impervious to monetary policy. In the extreme case where a major part of deposits and credit shift to cryptocurrencies, the result would be a weakened, even crumbling, banking system, impairing financial stability.
22. There are already indications that private cross-border flows are taking place in cryptocurrencies. If this trend is legitimised, a part of the flows related to trade payments, personal remittances or cross border investments would be made in these cryptocurrencies. As they are non-reserve currencies, this could have adverse implications for India's foreign exchange reserves, which lend stability to the external sector. Besides, such cryptocurrency payments can take place outside the ambit of capital account regulations. This would adversely affect the integrity of the capital account regime, as policy control on capital flows would be eroded. The consequence of this on foreign exchange reserve accretion and exchange rate management raises serious macroeconomic stability issues.

⁶ This could be actual dollarization if stablecoins linked to the US Dollar become widely used, and there is good reason to believe that that they would be popular if permitted.

23. It is important to appreciate that the concern with private currencies is not limited to bitcoin or just cryptocurrencies. The concern extends to any private currency, whether digital or physical, whether crypto-based or not. Stablecoins (which are simply cryptocurrencies that are less volatile) are being promoted globally, presumably because they are more stable than, say, bitcoin. We should in fact be more concerned about stablecoins because they would be more effective as currency than volatile cryptocurrencies. As the FT video cited above says “Stablecoins pegged to official currencies would increase, rather than dampen risks, if assets and liabilities were mismatched.”

Impact on global financial integrity standards

24. The very *raison d’être* of cryptocurrencies is that they bypass established intermediation and control arrangements⁷ that ensure integrity of financial transactions, such as Know-Your-Customer regimes, Anti-Money Laundering (AML) and Combating the Financing of Terrorism (CFT) rules etc. The fact that they are anonymous, decentralized systems that operate purely virtually makes cryptocurrencies particularly attractive to illegal/illegitimate transactions which have been largely filtered out of the formal financial system. Total crimes using cryptocurrencies in 2021 was estimated to be \$14 billion (Wall Street Journal, January 06, 2022). The amount itself is not much but the implications for the AML/CFT framework built painstakingly over the last two decades is rather substantial.
25. There are other important negative consequences of allowing cryptocurrencies into the formal financial system. We have already noted that there is no basis for valuation of cryptocurrencies. Since valuation is largely based on beliefs, and not on underlying value, it is bound to have a destabilizing effect on monetary stability of a country through large-scale wealth loss to investors (if it is adopted widely), even if it not allowed to be used as a currency.
26. The socially wasteful energy use of crypto infrastructure has been a subject of widespread discussion. About 900 new bitcoin a day require electricity worth \$45m a day (refer footnote 5). By some estimates electricity use of bitcoins equaled that of the entire country of Switzerland⁸, in 2019.
27. From what we have seen so far, there does not appear to be any case to allow cryptocurrencies to be legitimized in India. Nonetheless various arguments have been

⁷ The only justification appears to be “to allow online payments... without going through a financial institution” as noted by Satoshi Nakamoto, the creator of Bitcoin, in his paper.

(<https://bitcoin.org/bitcoin.pdf>)

⁸ <https://www.bbc.com/news/technology-48853230>

extended to permit cryptocurrencies and subject them to close regulations. In the next section, we would examine the validity of these arguments.

Should cryptocurrencies be permitted and regulated in India

28. The basic arguments being made for regulating cryptocurrencies are as follows:
- d. Blockchain or Distributed Ledger Technology is a promising technology where Indians might have a global edge. Banning cryptocurrencies would affect the absorption of DLT technology in India.
 - e. Most major countries are not banning cryptocurrencies, but are considering some kind of regulation.
 - f. Many Indians have already invested in cryptocurrencies and banning it may lead to wealth loss for them.
 - g. Banning in any case is unlikely to be effective because by its very nature cryptocurrencies can be acquired and traded in an anonymous manner.
29. Cryptocurrencies are typically native to a blockchain. For instance, bitcoin is the native coin (or token) of the Bitcoin blockchain, or, ether is the native currency of the Ethereum blockchain. They can be used as units of account to settle transactions or they can be used as tokens to reward work done in the blockchain, say, for mining. Either of these two functions do not appear to be essential to the basic function of a blockchain. It should be possible to maintain a blockchain without any native cryptocurrency if transactions are authenticated centrally. Even in case of private authentication through consensus mechanisms, accounts can be kept and rewards can be given in any legal tender currency. In other words, creating native cryptocurrencies is just one way of implementing a blockchain; it can be viewed as just one use case of the blockchain technology. To argue that banning cryptocurrencies would stunt the absorption of blockchain technology is therefore akin to saying that banning human cloning would kill innovations in biotechnology or banning nuclear weapons would hurt nuclear physics as a discipline. There are many other uses of blockchain technology or more generally, distributed ledger technology, that do not involve creation of a virtual currency. Thus, claims that cryptocurrencies must be permitted for blockchain technology to thrive are not sustainable.
30. An argument often advanced against banning cryptocurrencies is that advanced economies (AEs) are not resorting to such bans. While replicating the practices followed in AEs is often an acceptable route to reforms, as far as cryptocurrencies are concerned, it has to be noted that India is not similarly placed as AEs. We should particularly be alert to the possibility that these private currencies can be used for global strategic control. If, for example, some private currency substantially replaces

the Rupee, the corporate which manages that cryptocurrency (or the country which has control of that corporate) can practically control India's economic policy. There are a number of other reasons why it might be in the interest of AEs to not ban them, as below.

- a. Almost all cryptocurrencies are priced in terms of Dollars (or potentially any of the freely convertible currencies). Wider adoption would actually result in wider use of these currencies. So cryptocurrencies are not a threat to convertible currencies as they are to the Rupee, which is not an international currency. Following the example of AEs in the matter of cryptocurrencies would effectively amount to working against the interest of the national currency.
 - b. Most cryptocurrencies are owned by businesses of AEs; therefore, better adoption of cryptocurrencies would add to their growth and employment. Significantly, it might be of advantage to the AEs if cryptocurrencies replace emerging market (EM) currencies as that would give AEs a better strategic control on the EMEs.
 - c. AEs have more mature markets which can withstand the potential disruption from cryptocurrencies. They are, therefore, in a better position to wait and watch.
 - d. AEs have quicker legal systems and hence concerns of misuse of cryptos can be addressed through the legal systems. In India, on the other hand none of the major instances of consumer exploitation have been redressed legally (e.g., the mis-selling of derivatives in mid 2000s).
 - e. AEs have the political power to control the crypto companies. The recent instance where the US recovered bitcoins from the hackers of the oil pipeline in US, is an example that notwithstanding claims of non-traceability of cryptocurrencies, AE Governments wield enough power to access the records. India or most other countries would lack such advantages.
31. Another argument often advanced is that so many Indians have already invested in cryptocurrencies and banning cryptocurrencies would lead to a loss of wealth for them. There are three reasons such arguments do not appear justified. One, banning in India does not mean investors would lose money, because they can be provided with a reasonable exit. Two, persons who have invested in these instruments are fully aware of the risks involved. Reserve Bank has been warning investors of the risks for nearly a decade. That an Inter-Ministerial Committee of the Government has recommended banning cryptocurrencies was widely known for the last three years, as was the fact that cryptocurrencies are not regulated products and there are no investor protection norms in place. Investors who have acquired these instruments have done so with their

eyes wide open, at their own risk and do not warrant any regulatory dispensation. Three, there is no data to justify how many investors have invested in these instruments and what is the amount of investment. Data informally gathered in November seems to indicate that crypto investments by Indians is nowhere near to being significant (although the pace of growth could make it a concern in future). This data showed⁹ that four out of five investor accounts¹⁰ held investments of less than Rs.10,000, with an average holding size of Rs.1,566. Wealth loss, if at all it is a possibility, is likely to affect only a small fraction of these investors.

32. Interestingly, concentrated ownership appears to be characteristic of cryptocurrencies. As a January 2021 report published in The Telegraph¹¹ points out: "According to industry data, around 13% of all Bitcoin sits in the hands of just over 100 individual accounts." They are referred to "crypto whales". Such concentrated ownership, usually by creators or initial investors, in what is touted to be (or at least hoped to be) the alternative monetary system, would make that system prone to manipulation.
33. That cryptocurrencies should not be banned because a ban is unlikely to be effective is a superficial argument. One might as well argue that drug trafficking is a rampant phenomenon despite a ban, and therefore drug trafficking should be legalised and regulated. If cryptocurrencies are banned, the vast majority of investors who are law abiding would desist from investing. Those few elements who would continue to invest will essentially be carrying out an illegal activity. Such exceptions should reinforce the need for a ban, rather than invalidate it.
34. It has also been argued by some that the concerns raised in allowing private currencies as a 'medium exchange' are valid. Therefore, they may not be allowed as legal tender but should be allowed as an investment asset. This argument appears to be made more with hope than with any real conviction. Not allowing them as currency would still amount to cryptocurrencies being used as store of value. 'Store of value' demand is a more substantial source of demand for a currency than transaction demand. One only needs to compare the volume of time deposits with transactional deposits to understand this. If a cryptocurrency is used as a store of value the same concerns arise again. Also, unlike the value of Rupee, which is anchored by monetary policy and its status as legal tender, the value of crypto assets rests solely on the expectation that

⁹ The Reserve Bank does not vouch for the reliability of this data as it was collected informally and has not been validated. These conclusions may only be taken as indicative, subject to correction if better data is made available.

¹⁰ An investor might have multiple accounts. So the number of investors is likely to be less than the number of accounts.

¹¹ <https://www.telegraph.co.uk/technology/2021/01/22/weird-world-bitcoin-whales-2500-people-control-40pc-market/>

others will also value and use them. Since valuation is largely based on beliefs that are not well anchored, it is bound to have a de-stabilising effect on the monetary and fiscal stability of a country, even while it is not permitted to operate as a legal tender.

35. There are other reasons why it would be futile to regulate cryptocurrencies. As discussed, cryptocurrencies are not currencies, or financial assets or real assets or even digital assets. Therefore, it cannot be regulated by any financial sector regulator. It is not possible to regulate something that one cannot define.
36. Cryptocurrencies are typically global products whose defining characteristic is that they are outside official control and they cannot be regulated by country-specific regulators. The Financial Stability Institute of the Bank for International Settlements identifies difficulties in regulating cryptos – such as the international nature of crypto transactions, absence of technological solutions to ensuring FATF's 'Travel Rule', the problem of 'unhosted wallets', the fact that P2P transactions do not involve any entity subject to AML-CFT regulations, etc. Let us suppose India decides to regulate cryptocurrencies. How would it regulate and redress a case of mis-selling as it has no access to the ledger, nor to any audit trail. As it is not always possible to know of the persons who are the management for cryptocurrencies (e.g., bitcoin), at whom would the regulatory action be directed? If for any reason the entire system collapses what possible regulatory redressal exists for investors? These are questions with very uncomfortable implications that do not have satisfactory solutions.

Conclusion

37. We have seen that crypto-technology is underpinned by a philosophy to evade Government controls. Cryptocurrencies have specifically been developed to bypass the regulated financial system. These should be reason enough to treat them with caution. We have also seen that cryptocurrencies are not amenable to definition as a currency, asset or commodity; they have no underlying cash flows, they have no intrinsic value; that they are akin to Ponzi Schemes, and may even be worse. These should be reason enough to keep them away from the formal financial system. Additionally, they undermine financial integrity, especially the KYC regime and AML/CFT regulations and at least potentially facilitate anti-social activities. More substantially, they can (and if allowed most likely will) wreck the currency system, the monetary authority, the banking system, and in general Government's ability to control the economy. They threaten the financial sovereignty of a country and make it susceptible to strategic manipulation by private corporates creating these currencies or Governments that control them. All these factors lead to the conclusion that banning cryptocurrency is perhaps the most advisable choice open to India. We have examined

the arguments proffered by those advocating that cryptocurrencies should be regulated and found that none of them stand up to basic scrutiny.

38. Writing in the New York Times¹² Adrian Chen noted as far back as 2013 that Bitcoin is built on a weird mix of speculative greed bolstered by a utopian cyberlibertarian ideology and likened it to a digital gold rush. Indeed, hyperbole continues to characterise all aspects of the crypto world. Crypto messaging does not appear to be directed at the rational or sensible. Global advertisements with themes such as the 'fortune favours the brave'¹³ is reflected somewhat in our very own 'lag ja re...kuch to badlega'. It would serve us well if the understanding about cryptocurrencies goes beyond the hype and gets rooted in reason and pragmatism.

¹² Much Ado About Bitcoin, op-ed, New York Times, November 26, 2013)

¹³ Jody Rosen (New York Times, February 02, 2022)