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# Is Digital the Future of Money?

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*Crypto currencies are the product of innovations in digital and financial technologies. They can improve speed transparency, and reduce costs, but cannot eliminate national currencies. A discussion of the promises, potential and uncertainties.*

William Stanley Jevons, the 19th century British economist, started his career testing the quality of precious metals in a mint in Sydney. In 1855, Jevons, sending money to his father, wrote:

I must say the money has given me very little satisfaction, except that of sending it home. Whether in the bank or in your pocket I find £100 like a very disagreeable weight on the mind, so I shall be very glad when it is off my hands, though I hope safe in yours.

In 1875, as a professor of 'political economy', Jevons laid down the functions of money in *Money and the Mechanism of Exchange*: a unit of account, a store of value, and a medium of exchange. Eswar Prasad in his new book uses Jevons's framework of the three functions of money to evaluate crypto assets.

## Crypto mania

After paper currency (8th century) and fiat currency (13th century), money is now facing a third major makeover. Private players are combining digital technology and cryptography to create cryptocurrencies, virtual currencies, or generically as cryptos or 'Bitcoin'. Stablecoins are a subset whose values are linked to a basket of currencies. Central banks prefer to call these collectively 'crypto assets'.

The fintech revolution promises to improve financial inclusion, make government receipts and payments easier, and cross-border transfers cheaper. Fintech facilitates unbundling the different functions of a bank and reassembling them into different products. These products pose their own challenges to financial stability. Cryptos, a product of the fintech revolution, are an innovation in money aimed at making its three functions more efficient.

The popularity of Bitcoin, introduced in 2009, has spawned a phenomenal growth in cryptos. From less than 100 cryptocurrencies in 2013 (when this author was a member of the Reserve Bank of India's first internal group on virtual currency), the number of crypto assets recently crossed 10,000. Their benefits include transaction ease, high security, low costs, anonymity, and a decentralised structure. The transactions are real-time, transparent, verifiable, and immutable. They facilitate ownership and exchange without a trusted body such as a government or central bank. Data in blockchains are also less vulnerable to fraud.

> The volatility of cryptos makes them a poor performer in all three functions of money.

For Prasad, the biggest weakness of cryptos is their volatility. From around $800 five years back, Bitcoin's value in 2021 ranged from $18,279 to $67,582. This volatility of cryptos makes them a poor performer in all three functions of money. First, such volatility impairs their function as a store of value. Second, slow validation means they fail as a medium of exchange. Bitcoin handles about seven transactions per second as against thousands that take place through digital payment gateways. Third, as a unit of account there is no real advantage that cryptos enjoy over reserve currencies. Stablecoins address these issues to some extent.

There are other failings of cryptos. They remain vulnerable to hacking. Governments could misuse cryptos for surveillance and anonymity remains a chimera as transactions have been traced when they intersect with regulated financial institutions for exchange. There is no fix when payment goes to the wrong digital address, or the digital wallet gets locked up, or the private key is lost.

Cryptos also harm the environment. The electricity consumed every year in just the mining of Bitcoin is ahead of consumption in 150 countries. Another important issue is the links of cryptos with the online black market. The share of shady transactions in cryptos is several times that in the dollar. That explains their popularity in countries wanting to circumvent global rules and US sanctions. Prasad calls Bitcoin "a libertarian or crook's dream."

Whatever the negatives, the disruptive effects of the underlying distributed ledger technology (DLT) will change money forever.

## Central bank concerns

Will cryptos render official currency and central banks redundant? The effect of cryptos on monetary policy transmission is not clear. But it could make managing the economy increasingly difficult as various economic indicators, such as electricity consumption (a good part of which would go into Bitcoin mining), would also reflect an activity with no real economic purpose. There are also issues of privacy, money laundering, consumer protection, monetary policy, and foreign exchange risks.

A globally accepted crypto could weaken the control of capital flows through unregulated channels. This could increase the spillover effects of major central bank policies. The consequent exchange rate volatility and dollarisation could threaten Emerging Market Economies (EMEs). Cryptos could challenge local currencies of weaker EMEs for their store of value and medium of exchange functions.

## National responses

Agustin Carstens of the Bank for International Settlements (BIS) described Bitcoin as "a combination of a bubble, a Ponzi scheme and an environmental disaster." Mark Carney, former Governor of the Bank of England, has said that cryptos exhibit classic hallmarks of bubbles. The national responses have ranged from a benign wait and watch attitude to enforcing an outright ban, with a progressive tightening as cryptos slowly improve the efficiency with which they perform the three functions of money. The announcement in 2019 by Facebook of its stablecoin, leveraging three billion users, shook central banks into action.

While the first response was a call for a ban, some have suggested regulation instead. But nobody has the mandate or resources to regulate an unproductive activity that causes more harm than good. A ban could be considered part of a larger regulation of currency and finance.

The second kind of response is the introduction of Central Bank Digital Currencies (CBDC).

## Central Bank Digital Currency

Governments need to provide low cost, secure, convenient, and resilient digital alternatives before a ban on cryptos can gain legitimacy. This is where a CBDC would come in. Other arguments for a CBDC include that it will lead to a reduced cash dependence, increase transactional efficiency, provide a backstop to private payment systems, increase the ability to fight financial crime, and more. It would be cheaper as the cost would be borne by the central bank out of seigniorage. CBDC's digital trail can mitigate tax evasion, corruption, and money laundering. But experience shows that this may only change the nature of crime.

> The claims that cryptos and CBDCs can aid financial inclusion could turn out to have been myths.

Prasad argues that a CBDC can help carry out central bank functions of monetary policy and being a lender of last resort. Firstly, he feels that a negative interest rate, can be easily applied by periodically reducing the CBDC balance of an account holder at preannounced rates. However, the account holder may choose to withdraw the balance or convert CBDC into cash (called 'flight to cash'), instead of keeping the money in a CBDC and suffering periodical cuts. Secondly, Prasad suggests that a CBDC can facilitate direct credit in times of distress, a digital version of 'helicopter money'. During the pandemic such transfers were done in India to existing accounts. This presumes that all needy households will have CBDC accounts and that such transfers will be equitable. But they may benefit only those with the knowledge and ability to open such accounts. For the same reason, the claims that cryptos and CBDCs can aid financial inclusion could turn out to have been myths.

## Critique

Critics argue that in times of stress, 'flight to CBDC' could aggravate financial instability. However, if CBDC is a digital equivalent of cash, flight to CBDC is just another name for 'flight to cash,' or conversion of bank deposits into cash. Moreover, such conversions to CBDC can be restricted, as done in the past, through bank-specific moratoria or system-wide bank holidays, weakening the argument about CBDCs aggravating instability during the time of stress.

A second criticism is that central banks by introducing CBDCs should not do what private cryptos are doing. Third, technological weaknesses in a CBDC could affect public confidence and trust in central banks. Fourth, depending on the design of the CBDC, a direct interface with the public will require central banks to deal with KYC compliance issues. In India, retail payments are increasingly

digital. So, the question of what further value CBDC can add remains unanswered.

The success of CBDC in EMEs could be constrained by the relatively lower credibility of central banks, large informal sector, lower levels of technology and limited digital and financial literacy.

## CBDCs and EMEs

A CBDC could be wholesale, which is inter-institutional, or retail. In India, wholesale transactions are already digital for institutions, mostly central and state governments, and banks, having accounts with the central bank. A CBDC with distributed ledger technology and centralised governance could make these wholesale transactions more secure and efficient. In particular, government receipts and payments, without intermediating banks, would become smoother and cheaper.

The form of money in use is culture- and demography-driven. Cash usage is high in Switzerland and Japan. In Japan, this is due to an ageing population, desire for privacy, low crime rate, high population density, and because they are just used to cash. At the other extreme, some hotels in Norway do not accept cash. Shutting out cash marginalises the disadvantaged. When the law is amended to provide for CBDC, it should provide for making receipt of cash and coins an obligation as in the US. Also, just as the use of the words ‘bank’, ‘banker’ and ‘banking’ by unlicensed entities is prohibited, private use of the words ‘coin’ and ‘currency’ to suggest any of the three basic functions of money also needs to be banned.

> The perception of a CBDC as a government tool for implementing economic and social policies could compromise central bank independence...

People value privacy more than safety or other CBDC features. While not obligated to guarantee privacy, the government should combine some identity privacy (about who is transacting) with transaction privacy (the nature and amount). Different levels of privacy, with higher privacy being associated with lower balances and lower transaction limits could be thought of.

The perception of a CBDC as a government tool for implementing economic and social policies could compromise central bank independence, detracting from central bank effectiveness in its core functions. This is all the more reason why central banks must issue retail CBDCs through other institutions.

A successful strategy in EMEs balances the unforeseen and unhedged risks in being too early to introduce CBDCs with the losses in being late. EMEs can benefit when central banks take the initiative, the success depending on central bank reputation and soundness of economic policies. Even without central bank independence and sound economic policies, CBDCs could improve financial inclusion and payment system efficiency. To manage the transition, Prasad suggests an initial linking of the CBDC to a reserve currency. He also suggests that EMEs take a collective and coordinated approach on a regional basis to promote innovation and financial stability.

## Current status and lessons

In *The Future of Money*, Prasad rightly says that CBDCs cannot mask weaknesses in central bank credibility and be more credible and successful than the underlying paper currency. But a few small countries have already introduced or piloted CBDC. And China has piloted its e-CNY as a digital replacement for cash with a few additional features/functionalities. The four major central banks and most others are in different stages of planning and piloting a CBDC. Based on the experience so far, Prasad draws various lessons.

One, an efficient digital payment system needs to have the following attributes: security, resiliency, low latency, and high throughput. The first two relate to technological integrity. Latency relates to the time taken for validation and settlement, and throughput to volume handled. A decentralised consensus structure results in low throughput as in Bitcoin. Given its likely huge volumes, the CBDC, even if on a blockchain, cannot be decentralised.

Two, a ceiling on CBDC balance, as in the Bahamas, limits flight to CBDCs. But this can also be achieved by a preannounced negative interest rate.

Three, technology should balance legitimate privacy and auditability. Central banks are under no obligation to guarantee anonymity, which does not anyway exist for large value transactions including in India. In any case, while providing anonymity, central banks should avoid private cryptos and associated technologies.

## Impact on cash and the dollar

While cash is exiting different countries for different reasons, some prohibit a refusal to deal with cash. Prasad defends cash on the grounds of freedom and liberty. Continued use of cash is also critical to avoiding overspending resulting from the separation of purchase and payment inherent in digital equivalents. This choice of thriftiness should remain with the public. Cash is also required to avoid financial exclusion. The answer is thus not 'cash or digital', but 'cash and digital.'

The US dollar's pre-eminence in global finance since Bretton Woods continued even after it came off convertibility into gold in 1971. The 'exorbitant privilege' of being the global currency of choice for all functions of money enables the US to borrow cheap, fund its current account deficits, and maintain hegemony in global affairs. This continued dominance even in the absence of convertibility has only strengthened the dollar's position. According to Prasad, it is not clear that cryptos will succeed where the Euro and the Renminbi failed. But competition, changing landscape of cross-border payments, and abuse of dollar dominance to meet global political objectives, could trim its continued dominance as a medium of exchange. The unit of account function of the dollar would take time to dislodge as global comparison of prices require an anchor currency.

> Prasad defends cash on the grounds of freedom and liberty…[t]he answer is thus not 'cash or digital', but 'cash and digital.'

The store of value function requires a strong existing reserve currency with depth and liquidity in the markets. It also requires the backing of a powerful institutional framework including the rule of law, checks and balances, and a trusted central bank. The dollar's position here will remain unassailable for much longer even though Benoît Cœuré, head of BIS's Innovation Hub, argues that private digital forms of money could challenge dollar supremacy.

## CBDC in India

With a digital Rupee announced in the union budget for 2022-23, discussions on the design of a CBDC are on. Digital payments have been the norm for large value payments. Now digitalisation has been gaining ground in retail. It is therefore not clear that a case for a CBDC has really been made out and that the benefits outweigh the costs and risks.

> Digital trails are no substitute for the trust that is implied in government backing and central bank oversight.

A specious argument put forward for a CBDC is the saving on currency printing costs and logistics. Most of these are fixed costs and will not come down proportionately with a decline in cash. These arguments overlook the significant investment required for infrastructure and maintenance of CBDC.

Design choices are critical, with course correction unduly risky and costly, if not impossible. Further, most big central banks are still learning. With even the US FED (2022) searching for answers, there is merit in being prudent to reap leapfrogging benefits later. Paraphrasing the poet, Alexander Pope, why rush in where angels fear to tread.

## Conclusions

Cryptos resulted from mutually reinforcing innovations in digital and financial technologies. They can improve speed and transparency, and reduce costs, but cannot eliminate multiple currencies or the need for exchange rates and related risks. A currency requires trust to be credible and accepted, especially as a medium of exchange and store of value. Digital trails are no substitute for the trust that is implied in government backing and central bank oversight. Central banks can issue currency almost at will, making its supply elastic and making it the natural choice as a medium of exchange.

Prasad predicts a separation of the functions of money with central bank currencies remaining the store of value. In this scenario, CBDCs would perform the medium of exchange function, but with increasing challenge from the private issuers of crypto as entry barriers become lower. Those enjoying network benefits could become more dominant. While the dollar will remain dominant as a global store of value and unit of account, it could lose traction as a medium of exchange.

After reading Prasad's heavily researched and brilliantly written book, one still has many questions:

Are global banks and payment companies making central banks fight their turf war with the private cryptos?

Technology provides speed and transparency, but at what cost to privacy and freedom? How can a balance be achieved?

Faced with the force of technology, will new monetary unions emerge outside Europe?

Financial inclusion will improve but will it deepen the divide between the digital haves and have nots?

Whatever be the shape of the evolving currency landscape, we are witnessing the slow and sure demise of metallic coins and banknotes. What will be the character of financial intermediation? In what way will central bank functions and their policies and instruments evolve further?

Prasad ends thus: “Problems such as corruption, government ineptitude, the rapaciousness of the economic and political elites, and inequality within and between countries will continue to fester… Technology, after all, is no match for human nature.”

*G. Sreekumar writes on central banking, banking, and its regulation, and whatever interests him. He aggregates his blogs at gsreekumar.substack.com*