

The next shape of money: From banknotes to blockchain-based digital currency

Central banks are considering issuing their own digital currency, using distributed ledger technology. Is this a good move? How is this different from bitcoin and other cryptocurrencies issued by private institutions?

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I would contend that within a decade, many of us will routinely deal in digital currencies, given the strength and intensity of the economic forces unleashed by digital technologies.

Money, a medium of exchange, was a necessity-driven human invention long before the advent of written history. Imagine how inconvenient it would have been if you still had to barter for my horse with your grains.

The form of money has evolved over millennia, from cowrie shells in ancient times, to coins to banknotes, in response to the technology of the time. It should hardly be surprising that the banknotes and coins of today will be phased out in due course.

Digital currencies have already arrived on the scene, generating much hype. Bitcoin and other cryptocurrencies, for example, have attracted much attention from investors and risen to record prices – and sunk to dismal lows.

But in my view, the only sustainable digital currencies will be those that fall exclusively in the domain of digital fiat monies – such as the Singapore dollar, Chinese yuan, and others.

Such digital fiat currencies will work alongside various familiar electronic forms of fiat money like the ones in your DBS bank accounts or in mobile payment devices like Grab.

Blockchains or, more generally, distributed ledgers are the enablers, providing the technology that drive such fiat currencies – but it is economics that will determine a digital currency's destiny.

My view, while perhaps provocative and unwelcoming, is that all cryptocurrencies backed by either a loosely structured community of enthusiasts, say, bitcoin, or by private enterprise such as Facebook-promoted Libra, will fade away and become inconsequential in due course and be viewed by historians as passing hype that had once upon a time stirred up varying degrees of enthusiasm.

But digital currencies issued by central banks will, I believe, be the way of the future.

A PRIMER ON DIGITAL CURRENCIES

But first, some background information on digital currencies.

Many of us already routinely use electronic forms of money, whether in our bank accounts when we transfer funds electronically, or when we top up our PayLah! or Grab accounts.

These are electronic versions of fiat money – money that has value because the government decrees it as a legal tender and people view it as guaranteed by the sovereign.

Digital or cryptocurrencies differ from these familiar electronic forms of fiat money.

Digital or cryptocurrencies are secured and presumably inalterable digital records stored in a distributed database over the Internet and recognised by consensus as a medium of exchange in a network of individuals and/or institutions.

Many central banks have recently said they are planning to issue digital currencies. Called central bank digital currencies (CBDCs), these are digital versions of fiat money, and should be distinguished from the digital currencies, like bitcoin, issued by private institutions.

With electronic fiat monies (like those dollars in your Grab account) widely in use, one may wonder why central banks still need to digitise their fiat monies, and whether such monies are any different from privately issued cryptocurrencies.

To answer this question, we first need to understand two critical concepts – credit expansion and centralised digitisation technology.

CREDIT EXPANSION

Credit expansion refers to the production of fiat money by a private financial institution, which fundamentally differs from printing banknotes by a central bank.

This manufactured fiat money by a private institution typically resides in electronically recorded accounts these days. This electronic fiat money is a contractual liability of the issuing institution – but it is not fully backed up dollar for dollar by the underlying fiat money in the form of physical banknotes.

A private financial institution may create electronic fiat money to raise funds for itself. But because a private institution may be made bankrupt, the electronic form of fiat money created by it should therefore not be viewed as equivalent in stability or reliability to central bank-issued banknotes.

In short, private financial institutions through credit expansion can generate all the electronic fiat monies up to the limit



permissible under the banking regulations, but people may not trust that money, knowing that the private institutions can go bankrupt.

Central banks that issue digital currencies are more likely to be trusted because people should rightly place the same level of confidence in them as in physical banknotes.

DIGITISATION TECHNOLOGY

The second dimension is on the digitisation technology, or the technology used to digitise the issuing and tracking of money and its myriad transactions. (Think of the technology that drives your personal finances – salary credited into bank accounts, payments to credit cards, deposits in bank accounts and so on. Now imagine that network for a country's business transactions.)

A centralised database that tracks all the various incomings and outgoings can be highly efficient and work to the advantage of the controlling party, but a distributed ledger is inherently more operationally robust.

This becomes obvious when one sees an institution's website go down while other organisations' sites are still working.

Were a central bank to adopt a centralised digitisation technology, that economy might run the risk of its entire financial system frozen for a period of time, even though that chance is tiny.

The CBDC being contemplated around the world at this moment is a digital fiat money utilising some distributed ledger technology.

THE PROBLEMS WITH PRIVATE CRYPTOCURRENCIES

Digital or cryptocurrencies have been proliferating in recent years. However, I am pessimistic of those brought forward by private parties for four reasons.

First, trust/credibility is essential to any sustainable financial practice, and there is no reason to expect an exception for digital currencies. Even among central banks, some have not earned the credibility of running responsible monetary policies.

Why should we then place the same level of trust in the responsible running of bitcoin, ethereum or Libra as we have on, say, the Monetary Authority of Singapore?

The second is to recognise that transactional speed and convenience are essential to a medium of exchange. Taking 10-plus minutes to transact with bitcoin is certainly impractical. Bitcoin and alike require mining, which is an activity involving heavy computation to solve a man-made mathematical problem solely for the purpose of ensuring the security and integrity of a permissionless blockchain.

Mining is incentivised with rewards that demand good

computing equipment and consumes a significant quantity of electricity. So, mining as it is structured generates what economists will call negative externalities to society, which are negative effects that society bears the cost of.

Speeding up transactions for a permissionless blockchain requires compromises on its security.

Alternatively, things can be sped up through a permissioned blockchain by placing trust in a small community like the Libra Association. The trade-off of trust and speed will, however, remain a dilemma for digital currencies issued by private entities.

Third, money serves as a store of value. To be desirable, money needs to maintain stable value for acquiring goods and services or for exchanging to another stable currency. Bitcoin and others' wide swings in value when measured against, say, the US dollar renders them speculative instruments instead of reliable stores of value.

Efforts to peg a digital currency to a basket of stable currencies or precious metals in a way acknowledge the essential role of central banking.

The inescapable question of trust, legitimacy and legality will surface when a privately organised community attempts to act like a central bank without due accountability.

Finally, the concern over financial

stability motivates and legitimises various banking regulations. A complementary currency, in a digital form or not, is a potentially destabilising factor, and its success must invite rightful scrutiny from the affected sovereigns.

THE ADVANTAGES OF CENTRAL BANK DIGITAL CURRENCIES

In contrast, the economics for CBDCs to replace banknotes and coins is compelling.

Minting and printing costs are quite substantial, and fears of receiving counterfeit banknotes are ever present in our minds. Having armed guards to transport cash in armoured vehicles imply high costs of handling cash.

The trust-speed dilemma mentioned earlier can be naturally solved by CBDCs because the regulated banking network overseen by a central bank is a trusted community already in place for implementing an efficient digital fiat currency.

I have learnt from media reports and private conversations that some CBDCs already stand ready to advance beyond the testing stage.

The beginning of the gradual phasing out of banknotes and coins can be initiated by a central bank, but acceptance by people will ultimately determine the pace of change.

Also inevitable is that the current distributed ledger technology for CBDCs will eventually be updated with new innovations, just as paper banknotes were replaced with polymer notes in Singapore and other jurisdictions.

Thanks to digital technologies, CBDCs will likely emerge as a modern form of money equivalent to banknotes and minted coins.

The day is on the horizon when our mobile devices loaded with digital wallets allow us to directly pay and receive digital Singapore dollars, Chinese yuan and British pounds.

At the same time, many of our daily transactions will likely continue to be in electronic fiat money like now. Even with CBDCs widespread, my prediction is that each of us, driven by convenience or necessity, will continue to regularly use various payment channels like PayNow, Alipay or bank accounts to electronically settle transactions in fiat monies intermediated through financial institutions.

Will physical banknotes disappear to be replaced by digital fiat monies? The answer is affirmative. Think of how Singapore disabled the 2G mobile network in 2017.

It is only a matter of time.

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