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CENTRAL BANK DIGITAL CURRENCIES AND STABLECOINS - HOW MIGHT THEY WORK IN PRACTICE?



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The payments landscape is changing rapidly. Central bank digital currencies (or CBDCs) and stablecoins have received growing attention, particularly around Facebook's announcement of its proposed global stablecoin "Libra" in 2019 and the resulting regulatory backlash. Advocates hail them as the future for payments - an unmatched tool for financial inclusion and limiting financial crime, by linking payments to identity - while critics have concerns around regulatory standards and financial stability (in the case of global stablecoins) and whether the improvements are as impressive or distinct as supporters argue.

In this report we consider how adoption of a global stablecoin or a retail CBDC would look in practice, and explore the legal structures that might be employed.

CRYPTO TERMINOLOGY

Blockchain

A type of distributed ledger technology (DLT), blockchain is a data storage structure which is maintained and replicated across a decentralised network of "nodes" such that an individual node cannot tamper with the information recorded in the ledger by rewriting the transaction history. This technology was first applied in the design of the cryptocurrency Bitcoin, but has the potential to revolutionise how many different types of transactions are conducted and assets are transferred.

Cryptocurrency

A digital or virtual currency that uses cryptography to control the creation and transfer of new "coins" or "units" and to secure transactions. In its broadest sense the term could incorporate everything from Bitcoin and Ether, to stablecoins and CBDCs, however, central banks tend to avoid the terminology seeking to distinguish CBDCs from coins and currencies not issued or administered by any central bank or authority.

Central bank digital currency or CBDC

A CBDC is a digital representation of fiat money issued by a central bank. CBDC are often associated with underlying blockchain or DLT infrastructure, however, other technology may be utilised to similar effect. CBDCs may either be wholesale (i.e. with access restricted to a limited group of commercial banks and clearing institutions) or retail (which would widen access to central bank money, perhaps to corporates and businesses or generally across the economy to all consumers). A recent survey from the Bank for International Settlements (BIS) reported that around 10% of the 66 central banks surveyed are likely to issue a CBDC for the general public in the short term.

Stablecoins

A privately issued type of cryptocurrency with a mechanism to minimise price fluctuations and 'stabilise' its value. Their aim is to provide an alternative form of risk-free digital unit which is not limited to commercial banks, but could be used directly by consumers.

Most common of the potential stabilisation options is the collateralised stablecoin model, where stability is achieved by linking the currency to a reserve of stable real assets such as fiat currencies or commodities. Alternatives include cryptocollateralised stablecoins (where a reserve is made of other cryptocurrencies) or non-collateralised stablecoins (which do not have any reserve but instead use central bank-like monetary policy to maintain a fixed price by controlling supply with algorithms which respond to market conditions).

Central banks and money – a primer

Central bank notes and coins are the paradigm of "money". However, in most major economies, notes and coins comprise a tiny fraction of the payments actually made. In practice, payment is effected by the exchange of credit claims on commercial banks (and sometimes other payment providers). One way of looking at this is to say that "money" is in fact provided to the real economy by commercial banks.

Commercial banks maintain accounts with central banks, and central banks tend to regard the balances on these accounts as "money". This gives rise to an optical illusion which makes it seem as if money is provided by the central bank through the commercial banks to the real economy. However, this is not the case central bank "money" in this sense is no more than a settlement mechanism provided by central banks to commercial banks to enable them to settle net balances between themselves.

Commercial banks settle their balances through central banks because a credit balance with a central bank in its own currency is a risk-free asset - a £10 balance with the Bank of England is the nearest thing there is to a £10 note. If Bank A is owed £100m by Bank B, it has a substantial credit exposure to Bank B. If Bank B instructs the Bank of England to transfer £100m in its account to Bank A, then in principle nothing has changed -Bank A is still owed £100m, and it is only the identity of the debtor which has changed. However, for Bank A, the £100m obligation from the Bank of England is literally "as good as cash", and its position is therefore significantly improved.

The reason that this matters is that by eliminating its credit exposure to Bank B through settlement, Bank A is able to take on further exposures and do more business. Private stablecoins are aimed at providing an alternative form of risk-free digital unit which is not limited to commercial banks, but could be used directly by consumers. Sufficiently widespread use of stablecoins would eliminate the function performed by the commercial banks themselves – if a buyer can transfer widely accepted, riskfree stablecoins immediately and directly to a seller, then the necessity for commercial banking as a payment service mechanism disappears.

What would a stablecoinbased system look like?

In principle, the concept of a stablecoinbased payment system is no different from a physical coin-based payment system. However, physical coins, in order to be useful, can only span a limited range of values. This means that there will be many transactions for which they are too small (for example, land purchases and wholesale business transactions), and others for which they are too large (in a world where the smallest coin in circulation is equal in value to a labourer's daily wage we can know that purchases of food and drink by that labourer cannot have been settled in coin). Consequently, physical coins have historically never been more than a part of a payment system which is account based, and this account basis requires what we might call "bank-like entities", ranging from temples in ancient times to goldsmiths in 17th-century London.

Cryptocoins or tokens do not suffer from this problem – a million cryptocoins can be transferred as easily as one. Thus it would be theoretically possible for such a system to displace account-based payment systems completely.¹ Also, since cryptoassets can in principle be held securely, the risk of holding large amounts of value in the form of coins is also solved – thus the crypto-equivalent of keeping banknotes under the mattress becomes a perfectly viable mechanism for the storage of value.

There is a confusion between the term "account-based" in the sense of meaning based on an underlying receivable and "account-based" in the sense of ownership of the instrument being recorded in a ledger – see for example https://libertystreeteconomics.newyorkfed.org/2020/08/token-or-account-based-adigital-currency-can-be-both.html#.XzPfGffNVPY.twitter. By account-based here we mean the first.

The problem which the existence of such stablecoins would create is to do with the operation of the economy. The financial resources of the banking system at any given time consist largely of cash deposits made by customers but not yet reclaimed - these are lent out to borrowers. In a stablecoin system, however, these resources are paid to the issuer of the stablecoin, who therefore becomes a single "megabank" to the economy as a whole.² In order for such a system to work, the stablecoins must be as nearly risk-free as possible. This means in practice that the issuer of the stablecoin must place the deposited amounts in investments which are as nearly risk-free as possible. Many stablecoin proposals - such as Facebook's Libra - therefore envisage that funds received in consideration of the issue of stablecoins should be invested in government bonds which match the currency concerned, since such bonds give almost the same degree of risk-free exposure as central bank deposits.

Private stablecoin issuers who adopt this model are therefore building almost exact replicas of the existing central bank model. The function of a central bank is to issue money in exchange for value and lend the value received to the government (or conversely, to take government debt and monetise it by turning it into money). Central banks looking at such proposals may well conclude that if such a model is to developed, it would be better if it were implemented by existing central banks rather than by private sector competitors.

The legal structure of money services

It would be prudent to base an assessment for the appropriate legal structure for CBDCs and stablecoins on applicable historical equivalents. For much of the history of the second millennium in Europe, payment involved the delivery of physical coins issued by various authorities from one person to another. The provision of services facilitating payments in such coins is a business as old as coins themselves, and its development has several fairly recognisable stages.

The first of these stages is the physical safequarding of the coins. This appears to have been a service provided by temples in ancient times, and goldsmiths and others in more recent ones. Early law had no particular difficulty with this idea a bailment for safekeeping of fungible goods was well understood for the warehousing of commodities such as grain and the bailment of money for safe keeping was easily accommodated within that structure. The difficulty arises from the fact that money is not there to be owned, or to be consumed, but to be transferred. The difference between warehousing money and warehousing grain was that whereas grain could reasonably be expected to be returned to the depositor, the whole purpose of a warehousing of money was to facilitate its transfer to a third party. It rapidly became clear that since the depositor never expected to see his money again, the obligation of the recipient was more in the nature of an obligation to repay debt than an obligation to return goods.

English law rapidly concluded that in practice there was no such thing as a "bailment of money", and that whenever one person deposited money with another, the result was that ownership of the money passed to that other and the original depositor was left with nothing more than a debt claim against the recipient. The reason for this was the legal presumption that physical money was always fungible, such that unless notes and coins had some special identifiable characteristic beyond the usual, any physical transfer of money necessarily transferred ownership with it.

This is not the case with cryptoassets generally – in theory, every cryptoasset has a separate identity which is capable of being traced through any number of hands. However, it should be noted that we are talking here about a legal rule as much as physical reality. In strict theory individual banknotes can be physically traced, since each one bears a unique identification number. However, the legal rule is that voluntary transfer destroys ownership, since this is an inherent characteristic of that which the law regards as "currency".

^{2.} There are historical precedents for such a system – the Bank of Amsterdam performed this function in the seventeenth century.

The key point here is that because the physical arrangements in respect of cryptoassets easily permit such identification, there are two different ways in which payment services in respect of such assets could develop. It would be possible to have a traditional banking or deposit model with a title transfer of each cryptocoin, but it would be equally possible to have a bailment (or "custody") model, where the service provider administers assets at all times owned by the customer.

This is not unprecedented. In the gold market, for example, most gold banks provide customers with a choice between allocated gold (custody) and unallocated gold (deposit) accounts, leaving it to the customer to decide whether the extra expense of the allocated account is worthwhile in order to eliminate the credit risk exposure to the custodian inherent in an unallocated account. It seems clear that both services could be provided in respect of tokens.

The difference between the two arrangements in practice is that a warehouse provider derives no benefit from his possession of the assets which he holds in the custody model, and is therefore obliged to recover all costs plus profit from fees charged to customers. Deposit -taking, by contrast, permits the deposit-taker to use the amounts deposited with it in order to finance its own business, which in practice means being able to lend them out. In considering how users in the real economy are likely to employ stablecoins or CBDCs, this is likely to be the most significant factor.

The customer's perspective

How does the experience differ for customers between the custody and the deposit model? It may be objected that in principle distributed ledger based approaches make either service unnecessary, since the ultimate owners can enter themselves on the relevant blockchain as the owner without involving any intermediary. This is true, but overlooks the primary function of money, which is to be transferred. An owner of money who expects to spend it in the relatively near future is unlikely to want to manage such entries directly. Consequently it seems highly likely that the average user of any cryptocoin (whether a stablecoin, CBDC or otherwise) will in practice utilise the services of some form of "wallet provider" to that end.

If we assume that the coin owner is using a wallet service which - to his eyes, at any rate - closely resembles the payment services which he currently receives from his current bank, he is unlikely to perceive any significant distinction in operation between the two (excluding differences in look and feel between apps, for example). In particular, he is very likely to envisage his stablecoin/CBDC account as operating in much the same way as his cash account - i.e., that it is based on the idea that he has a claim on the bank (or wallet provider) for the redelivery of the things recorded as being in the account. This is particularly true since most users of bank accounts do not have a clear idea as to what property rights (if any) they have in "their" money, and indeed would find the question slightly puzzling.

This would suggest that confronted with two apparently identical offerings from the same bank, one charging higher fees than the other, most customers will opt for the cheaper option.

The service provider's perspective

Banks are based on a hybrid product model in which they offer account customers two different services. These are value storage and access to payment services. In many markets including the UK, customers are generally not charged for these services, because the customer depositing money with a bank enables the bank to invest that money and earn a return on it, and that return is used to reduce or eliminate the cost of provision of the payment services. The existence of a stablecoin creates the possibility of separating these two services. In effect, the issuer of the stablecoin offers to provide the value storage, leaving to others the provision of the payment service. The issuer of the stablecoin or CBDC will therefore receive the money of customers, but will not pay them for that deposit. The appeal of a stablecoin over a bank deposit to its holder is simply that it

is a better credit – indeed, if it is a CBDC, it is a perfect credit.

The problem that arises here is that the profits on lending deposited money were traditionally used to subsidise the cost of the payment services provided to the deposit customer. If a customer uses his surplus funds to purchase stablecoins or CBDC rather than depositing the money in a bank, the bank will no longer generate a return from using that deposited money. This means that if the bank continues to provide payment services to the deposit customer, it will have to charge for them. More importantly, if it provides a service of "custodying" the stablecoins or CBDC, it will have to charge for that service as well.

It should be noted in passing that charging for payment services could also create other inefficiencies. For example, one of the drivers for the development of the "free banking" model in the UK seems to have been the fact that if interest was paid to depositors, that income would be taxable in the depositors' hands, whereas if the depositor received a lower rate of return plus free banking services, the tax liability was reduced (an important point in the days of the 98% top rate of tax). Separation of deposit-taking and payment service provision on a fee-paid basis would revive this problem.

There is a way out of this problem, which takes us back to the goldsmiths. If a customer delivers stablecoins or CBDC to the bank on the basis that the bank can lend them out at a profit, then the existing position is restored and the profits on the lending will finance the provision of the payment services. However, what is happening here the customer pays money to a stablecoin provider, buys stablecoins, and delivers them to the bank on a full title transfer basis. The effect of this transaction is that having bought the stablecoins from the stablecoin seller, the customer promptly sells them to the bank again ending up with the same balance that he would have had had he simply deposited the money in the bank in the first place. The introduction of the stablecoin or CBDC into this process is therefore economically redundant.

There is another issue here which is likely to be significant. If a customer deposits money with a bank, his deposit will be covered by the local deposit protection scheme. Deposit protection schemes generally only apply to deposits of money - if you deposit government bonds with your bank, that deposit will not be covered by the scheme. What is the position as regards a deposit of stablecoins or CBDC? Clearly if the deposit were on a pure "custody" basis, there would in principle be no protection. However, what would the position be if the deposit were on the basis that the bank could use the stablecoins or CBDC as its own? Given the rules as they currently stand, such an arrangement would generally be regarded as "not a deposit", and therefore outside the scope of the scheme. A customer who purchased stablecoins and deposited them with a bank on this basis would therefore have made his own position substantially worse than it would have been had he simply deposited the money with the bank. It would be possible to extend the scope of deposit protection schemes to such arrangements as discussed further below. If not and customers appreciate that deposits of money with banks are protected by government whilst deposits of stablecoins or CBDC are not, then the argument for stablecoins or CBDC over deposits based on credit quality largely disappears.

Taking all of this together, it is clear that the only logical reason for consumers to use stablecoins or CBDC rather than bank credit would be if the quality of service which they received was substantially improved. This is entirely possible payment services - and in particular cross-border payment services - are generally regarded even by payment banks as being susceptible to significant improvement in terms of the cost, speed and information available to customers, and it is clearly the case that in certain parts of the world customers may be prepared to pay a significant premium for fast, effective cross-border payment services. However, in most developed markets there are already initiatives from the existing payment service providers to upgrade existing payment mechanisms -Pay. UK's New Payments Architecture project is only one example of this. In

recent years a plethora of cross-border payments firms have also positioned themselves as faster, cheaper and much simpler alternatives to banks. It is not therefore certain that the quality of service that stablecoins or CBDC will provide will of itself be sufficient to drive a wholesale adoption. The role of hype or loyalty by a large existing customer to a platform operated by a private firm (such as Facebook's Libra) will also be relevant, but again is unlikely to drive widespread adoption alone.

Financial stability deposit protection and stablecoins

While we have touched on deposit protection above from a consumer protection perspective, its primary, and more important role, is as a macroeconomic financial stability tool. The collapse in value of a mechanism in widespread use across an economy as a payment mechanism (such as claims on a commercial bank) would have a significant social and economic impact. The reason is that there is all the difference in the world between the collapse in value of a monetary instrument and the collapse in value of an investment (or class of investments). A money collapse undermines the unit of account, such that the ability to enter into transactions is itself undermined. If there is a risk that the pound that you have today will not be accepted as a pound tomorrow, the mechanism of exchange itself is undermined.

This is the logical basis for deposit protection. In the real economy, transactions are not effected in central bank money, but in commercial bank money - when a customer of a bank speaks of "his money", what he means is the credit balance on his bank account. The risk of that bank defaulting has the effect of undermining the value of that money in the same way that the risk of a sovereign defaulting has the effect of undermining the value of its currency. This is, of course, the reason why bank failure is regarded as a different type of problem from the failure of other large corporations. Bank failure does not merely create a loss of wealth, but undermines the mechanism upon which economic activity relies. However, if a

non-bank mechanism emerges that performs the same function as commercial bank money, we need to be aware that a failure of that mechanism (or, to be more accurate, a sudden failure of confidence in that mechanism) would have the same systemic and economic effect as a bank collapse.

The policy response to the threat of a money crisis arising from bank failure is the creation of deposit protection schemes. The logic of a deposit protection scheme is precisely to try and ensure that even if a commercial bank fails, the money which it provides to the economy will continue to be available and to be reliable. It is therefore difficult to see how, if stablecoins were to become widely circulated, it would be possible to resist the creation of protection schemes. However, the creation of such schemes would almost certainly have the effect of promoting the use of those cryptocoins covered by the scheme - not least because of the element of regulatory and government "kitemarking" that such a scheme would create. This is another key reason for central banks to move quickly and be the driver for adoption of digital currencies in their jurisdiction.



CONCLUSIONS

The following conclusions can be drawn from this:

- 1. Banks and other payment service providers have a number of legal options in the way in which they structure the services which they provide to customers in respect of CBDCs or stablecoins. These do not differ between privately-originated or central-bank originated coins. However product providers will wish to avoid creating apparently similar products with different fee structures. We therefore expect an industry consensus to develop fairly rapidly around a particular legal structure. Since a legal structure involving direct ownership of the coin by the customer would be the most expensive offering for that customer, this seems unlikely to be the preferred model. However, a structure involving a transfer of ownership of the coins to the bank would seem to have no benefits over the existing bank account offerings.
- 2. There may be advantages for banks in employing CBDCs in settlement of balances amongst themselves, but it is difficult to see how this is superior to account settlement on the books of the central bank of the currency concerned. CBDCs could, however, provide a valuable tool for institutions who wish to settle large balances in a particular currency but do not have direct access to an account with the relevant central bank concerned.

- 3. Money paid to a central bank or stablecoin provider in exchange for cryptocoins is in practice returned to the relevant government, and is withdrawn from the national economy. Since these balances will not be available to commercial banks to lend out, governments following this model will have to develop a mechanism for returning such balances to the real economy, either by direct lending on their own account or by lending to commercial banks to finance on-lending^s.
- An important driver of the development of stablecoins will be their treatment for the purposes of deposit protection schemes.
 Decisions on this matter will require policymakers to make choices about how they think the deposit-taking and payments aspects of their economies should develop.
- 5. There is currently no clear rationale for existing end-users of payment services to adopt stablecoins or CBDCs except in regions where existing payment (and particularly cross-border payment) services are exceptionally inefficient. There is currently a race between stablecoin providers and operators of existing payment systems to improve the quality of existing payment services, and this will continue.

There is nothing unprecedented about central banks acting as commercial lenders – the Bank of England was active in commercial finance until the 1970s (Forrest Capie, The Bank of England CUP 2010 pp. 318-26).

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