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Central bank digital currencies: an age-defining shift in the monetary system?

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Contents

The fast view	1
The nature of money	2
Design features of digital currency	4
Architecture	5
Infrastructure	5
Access	5
Cross border payments	5
Other factors	5
Foundational design features	6
Potential effects	7
Case studies	
United States	8
China	10
Eurozone	14
Conclusion	16

The fast view

While central bankers have been researching central bank digital currencies (CBDCs) for several years, interest has picked up notably in recent months with many major countries bringing forward analysis and trials. Given the complexities involved and the potential seismic changes to the financial system their issuance could herald, why the rush?

We believe there are several factors forcing policy makers' hands. Firstly, the use of cash as a means of payment has been declining for several years, a trend that has been given a further boost by the COVID pandemic. Secondly, the emergence of Facebook's token based claim Diem (formerly Libra) has the potential to be rapidly and widely accepted, with the potential to shift large parts of the monetary system outside of central banks' sights. When it comes to money, moving fast and breaking things will not be welcomed. Thirdly, the technology underlying the digital currency – the distributed ledger – could provide potential enhancements to the safety and efficiency of the payment system. Finally, and somewhat opaquely, many central banks have referred to the advantages in 'the conduct of monetary and fiscal actions.'

Why does this matter? The implications of a new form of sovereign money that is quick and efficient to use are potentially massive. Design, however, is crucial to determining outcomes. A central bank digital currency could provide business and households with a new form of sovereign money and a new way to make payments. It would be as safe and credit-risk-free as physical cash but more convenient to use. Its introduction will likely lead to some substitution away from other forms of money. This threatens to disintermediate banks and be a direct competitor to other e-money payment systems. It could, in theory, be the mechanism by which 'People's QE' is implemented and the way in which the economic lower bound on interest rates is overcome. It would undermine the informal economy, improving tax receipts. It might also become a pro-cyclical defensive asset and undermine bank deposit bases. Finally, it could hasten the demise of the US dollar based international monetary and financial system and impair the ability of the US' sanctions regime¹.

As of July 2020, 36 central banks have published detailed CBDC work. Ecuador, Ukraine and Uruguay have completed retail pilots and six are ongoing in the Bahamas, Cambodia, China, Eastern Caribbean Currency Union, South Korea and Sweden according to the Bank of International Settlements. China is possibly the most advanced, given extensive trials at scale, for instance via handouts of digital currency to citizens. Outside of China, Sweden is seen as having made significant progress. The development of CBDCs is moving very quickly and mass rollout is within our investment horizon.

To truly appreciate the potential impact of CBDC rollout, it is necessary to understand the nature of money and the difference between sovereign and private sector liabilities.

1. <https://ninetyone.com/en/united-kingdom/how-we-think/insights/under-pressure-the-international-monetary-and-financial-system>

The nature of money

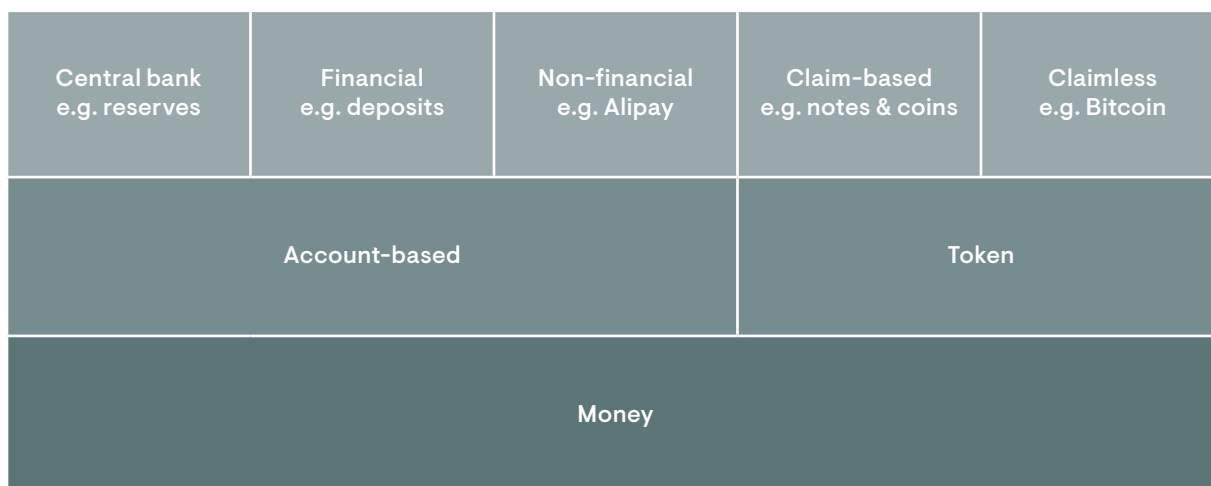
Money is defined by the functions it serves in society. The first of these is as a store of value, which enables the user to transfer spending power from today to the future. The second is as a medium of exchange, which enables the user to make payment in respect of goods and services. Finally, it is a unit of account, which measures the value of goods, services, debt or investment. However, it is also a social convention, in that acceptance requires confidence and faith, and as Adam Fergusson detailed in his book 'When Money Dies,' which details the German experience with hyperinflation in 1923, when the public loses that faith, society resorts to barter in order to survive and will literally offload money as quickly as they possibly can.

In its most basic form, there are two fundamental types of money. The first is **token-based money** which can be transferred between parties without need for an intermediary. It relies on the ability of a payee to verify the validity of the payment object and as such the key risk is counterfeiting of the token. Token-based money can be further split in into those based on a claim and those that are claimless, and so rely on the perception of value and the social convention detailed above. There are many examples of claimless tokens that have been used throughout history. Bitcoin is a modern example which, despite the hype and dematerialised form, is not really that different to the Palaeolithic shell

hoards that archaeologists believe are the earliest forms of token-based money. The most ancient form of token with an underlying claim can be traced back to 7th century China, where a form of promissory note was used for payment. In the modern era, banknotes and coins are a claim on the issuing central bank or country, while many wholesale money market instruments such as Certificates of Deposit, Commercial Paper and Banker's Acceptances are claims on the issuing commercial bank or corporation.

The second fundamental form of money is **account-based money** which relies on an intermediary to stand between payer and payee. The key risk here is the ability to verify the identity of the parties involved in the transaction. Traditionally deposits were made at trusted institutions, such as temples in Greece and Mesopotamia and recorded on clay tablets. In more modern times, account-based money evolved into three principal branches: central banks, financial institutions and non-financial institutions. Central bank money has restricted access, with only commercial banks being able to utilise reserve and settlement accounts. Commercial bank accounts, in contrast, are open to all households and companies that are able to access them, and in a similar fashion, non-financial institutions offer access to those with the required device, examples being Alipay or M-Pesa.

Figure 1: The building blocks of money



Source: Ninety One.

An appreciation of these building blocks of money will lead to the understanding that some forms of money are backed by the sovereign nation, some are backed by private sector institutions and some by trust in the object itself. Access also varies widely, with only commercial banks having access to sovereign backed money at a central bank, while the general public's only form of sovereign money takes the form of claim-based notes and coins. The vast amount of their deposits are actually private sector liabilities of commercial banks

and to a much lesser extent non-financial institutions. It also should then become apparent why central banks are so keen to explore CBDCs, as the public's access to sovereign backed notes and coins diminishes with declining cash utilisation, non-financial companies offer their own forms of money widely, potentially outside of regulatory oversight. Claimless tokens such as Bitcoin and other crypto currencies become more widespread.

Figure 2: The building blocks of money – who's liability?

Central bank Sovereign	Financial Private sector	Non financial Private sector	Claim based Sovereign	Claimless Nobodys
Account-based			Token	
Money				

Source: Ninety One.

It also illustrates the potential pitfalls in offering the public access to a sovereign backed digital currency that could potentially undermine and disintermediate the private sector deposit base and payment system. The design of this new form of money is therefore crucial in thinking about the possible impact.

If central banks do indeed decide to issue their own digital currencies, it is possible that three new forms of sovereign money are created on our taxonomy set out above, a notable increase on the two forms that exist already.

The three possibilities are:

1. Account-based central bank money that is widely available to the general public. The nearest existing proxy to this is the reserve and settlement accounts that commercial banks maintain at their central bank.
2. Claim-based digital tokens that are widely available to the general public, in essence a digital form of cash.
3. Claim-based digital tokens that have restricted utilisation, a form of money akin to wholesale cash.

Figure 3: New forms of money?

Central bank Sovereign	CBDC	Financial Private sector	Non financial Private sector	Claim-based Sovereign	CBDC- wide access	CBDC- limited access	Claimless Trust
Account-based				Token			
Money							

Source: Ninety One.

Design features of digital currency

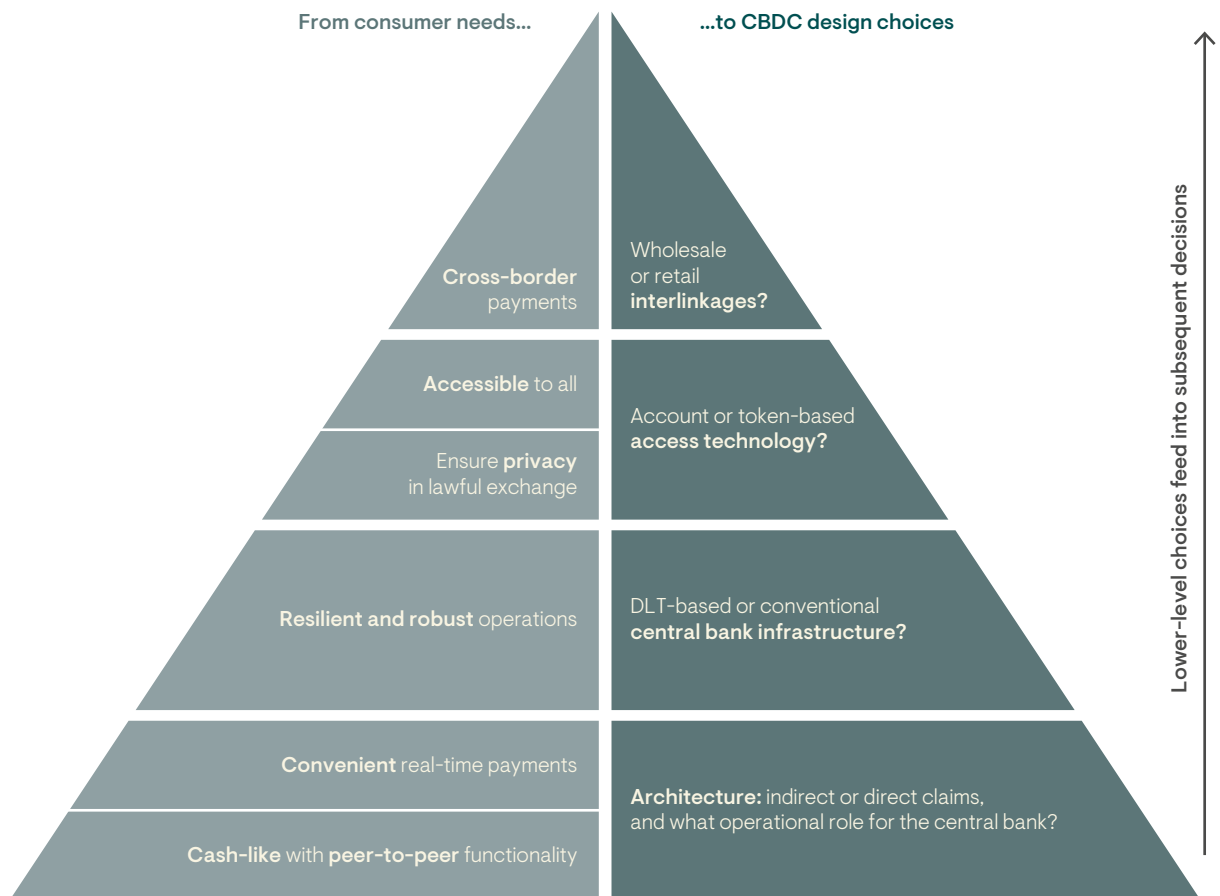
In their work on CBDCs the Bank for International Settlements used a pyramid graph to illustrate the possible design features and matched those to possible user needs. It identifies four principal choices that policy makers must take:

1. Architecture, given the need for cash-like functionality and real-time gross settlement.
2. Infrastructure, as payments must be resilient.

3. Account-based or token-based money, given need to be tied to an identity scheme but how to deal with the unbanked and those who still prefer cash?
4. Wholesale or retail, given need for international payments and so national versus international participants.

The pyramid is built from the bottom; each layer of choice feeds into the next layer up, as illustrated below.

Figure 3: The CBDC pyramid



The CBDC pyramid maps consumer needs onto the associated design choices for the central bank. The left-hand side of the CBDC pyramid sets out the consumer needs and associated features that would make a CBDC useful. The pyramid's right-hand side lays out the associated trade-off – forming a hierarchy in which the lower layers represent design choices that feed into subsequent, higher-level decisions.

Source: Bank of International Settlements Working Papers: Rise of the central bank digital currencies: drivers, approaches and technologies.

Architecture

First principals are what operational role central banks and private sector intermediaries take? The Bank for International Settlement's (BIS) working paper, which surveys current projects, identifies four distinct CBDC architectures. The first is the most controversial, being a direct claim on the central bank, and one in which that central bank operates both the payment system, offers retail services, and maintains a ledger of all transactions. The BIS believe the central banks of Iceland, the Bahamas, Denmark and Norway are all contemplating the direct model. The second model is more of a hybrid; while the CBDC still remains a direct claim on the central bank and it maintains a ledger of all transactions, the retail payment system is run by intermediaries. The final model is an intermediated version of the hybrid model and limited to wholesale payments only, implying no direct access for the general public. At the moment, it should come as no surprise that, outside of the four countries listed above, the vast majority of central banks have not decided what form their proposed CBDC should take. The consequences for disintermediation for the financial system are vast.

Infrastructure

Old fashioned cash works in power cuts, where there is no internet or phone signal and is accepted twenty-four seven. It is crucial that a CBDC replicate this resilience to all eventualities. This has led to two broad infrastructure models; a conventional centralised database or the utilisation of distributed ledger technology (DLT). Of those policy makers considering the latter, only permissioned variants of DLT – one in which the operators decide who is admitted to the network – will be contemplated. Permissionless DLT is largely anonymous, a characteristic viewed favourably by some but certainly not by central banks. Bitcoin, for example, is permissionless. The Swedish Riksbank, European Central Bank and the Banco do Brasil have all publicly opted for DLT, the remainder surveyed by the BIS are so far undecided.

Access

Account-based CBDCs using either permissioned DLTs or conventional systems are relatively straightforward to set up. But the unbanked and those who still prefer cash will be excluded, as such it might fail the 'widely acceptable' test of money's acceptance. An alternative is a central bank digital token which would be pre-paid and exchanged both for existing cash or digital payment. The BIS survey shows the majority of central banks are undecided while those who

have an opinion have favoured account-based. From an investment perspective, access is an important consideration in determining the impact on financial intermediaries. The consensus is, that given one of the stated objectives of a CBDC is to address the fall in cash usage, access needs to be wide and inclusive and so potentially far more disruptive to intermediation.

Cross border payments

Will CBDC be utilised for cross border payments? There is a clear consensus view among central banks that they should be national, although the digital EUR is mooted to be international. A token-based system, however, is presumably open to anybody. An international CBDC is potentially highly disruptive and was one of the routes that Mark Carney saw for reforming the international monetary financial system in his 2019 Jackson Hole speech. With 50% of US dollar cash being held outside of the US, it is possible to see how an attractive and internationally accessible CBDC could quickly replace this given network effects. Presumably the EU and China are well aware of this and is a clear path by which both could boost the internationalisation of their currencies.

Other factors

Cash is remunerated at zero. Holders can literally hoard it under their proverbial mattress and receive no return. However, when policy rates are negative, this is not unreasonable behaviour and is thus one of the limiting factors in establishing the economic lower bound on interest rates. A digital CBDC overcomes this issue as there are no physical notes and coins, only an entry on a digital ledger. This could be one route, therefore, in which deeply negative policy rates are implemented. The ECB have raised the prospect of variable remuneration on their CBDC, where interest rates could be adjusted over time in parallel with or even independent from their policy rate. It could also be tiered and used as an incentive to avoid hoarding or mitigating the risk of huge international investment flows – the latter being akin to what the Swiss National Bank effectively does now with their own tiering system.

A digital currency exists only in cyberspace so how do central banks manage transactions that are made offline? In their product specification, the ECB suggests 'specific user devices' which could be distributed through supervised intermediaries – a preloaded general purpose digital token. However, there would ultimately have to be an online interface at some stage in order to reload the device. The alternative is a web-based service.

Foundational design features

Despite the wide range of possible design components, seven major central banks have recently adopted three foundational principals which will guide the process, and which should serve as a bellweather for how central banks intend societies to use the new technology of a digital currency. As set out in the BIS working paper, these foundational principles are:

- Firstly, '**Do no harm.**' New forms of money supplied by the central bank should continue supporting the fulfilment of stated policy objectives and should not interfere with or impede a central bank's ability to carry out its mandate for monetary and financial stability. For example, a CBDC should maintain and reinforce the 'singleness' or uniformity of a currency, allowing the public to use different forms of money interchangeably.
- Secondly, '**Coexistence.**' Central banks have a mandate for stability and typically proceed cautiously in new territory. Different types of central bank money – new (CBDC) and existing (cash, reserve or settlement accounts) – should complement one another and coexist with robust private money (e.g., commercial bank accounts) to support public policy objectives. Central banks should continue providing and supporting cash for as long as there is sufficient public demand for it.
- Lastly, '**Innovation and efficiency.**' Without continued innovation and competition to drive efficiency in a jurisdiction's payment system, users may adopt other, less safe instruments or currencies. Ultimately this could lead to economic and consumer harm, potentially damaging monetary and financial stability. There should be a role for both the public and private sectors in the supply of payment services to create a safe, efficient and accessible system and households and companies should be free to decide which means of payment they use to conduct their transactions.

Potential effects

While the design of CBDCs are still on the drawing board, it is hard to determine what the effects might be. However, we can speculate in broad terms.

A central bank digital currency will be designed to be as safe and credit risk-free as physical cash but more convenient to use. As such, it becomes a clear competitor to existing forms of money and so risks seeing substitution away from other forms of money, undermining commercial banks' deposit base and other e-money payment systems such as Alipay in China.

If it were account-based, it could in theory, be the mechanism by which 'People's QE' is implemented and the way in which the zero lower bound on interest rates is overcome. Quite simply, if the general public have an account with the central bank, a government could simply instruct the bank to create reserves and credit all account holders. Equally, it would be very easy to charge negative interest rates by debiting accounts on a regular basis.

The paradox of cash is that while its use in payments is declining rapidly, the value of the stock in issue is not. In the UK, for example, it has risen to £77 billion compared to £49 billion 10 years ago. In the US, there is \$1.8 trillion outstanding, roughly half of which is held overseas. COVID has undoubtedly accelerated the trend away from cash payments – in July, sterling cash withdrawals were still running at circa 40% YoY. The answer to the paradox probably lies in two factors; hoarding of cash and the informal economy. By eventually doing away with cash and replacing it with a CBDC, the informal economy, and indeed criminal activities will clearly be undermined, with tax receipts likely to improve.

The public's only access to sovereign-backed money is through their holdings of notes and coins. It is fiat money – state-backed money denominated in the national currency. At times of stress, this makes it a defensive asset that is attractive to hold. A digital version, risks turbo charging this effect, potentially draining bank deposits and thereby accelerating market stress further.

Finally, it could hasten the demise of the US dollar-based International Monetary and Financial System². In an address to the Jackson Hole Symposium in 2019, Mark Carney, then Governor of the Bank of England, raised the prospect of a new Synthetic Hegemonic Currency (SHC) provided by the public sector, through a network of central bank digital currencies that could reduce the disruptive dominance of the US dollar-based International Monetary and Financial System. With 50% of all cross border loans and international debt securities being denominated in US dollars, an amount equivalent to 25% of global GDP, 80% of FX volume being US dollar-based and 60% of central bank reserves denominated in US dollars, the potential for an age-defining shift in the monetary system is enormous. In the short-term, central bank digital currencies may also have an impact on the dollar-based sanctions regime³.

2. <https://ninetyone.com/en/united-kingdom/how-we-think/insights/under-pressure-the-international-monetary-and-financial-system>

3. Mahtani, S.K. 'Carrie Lam's Problem—and Ours: China's State-Backed Digital Currency,' *American Affairs*, Spring 2021 / Volume V, Number 1. <https://americanaffairsjournal.org/2021/02/carrie-lams-problem-and-ours-chinas-state-backed-digital-currency/>

Case study: United States

Given the US might appear to have the most to lose, it may come as no surprise that the US appear to be well behind other central bank research agendas. On the four design choices outlined by the Bank for International Settlements (architecture, infrastructure, access and wholesale and retail) they are classified as 'undecided' in all categories. However, news flow has increased notably in recent weeks. Federal Open Market Committee Governor, Lael Brainard stated on 13 August 2020, that while "the Federal Reserve is active in conducting research" they have stepped up their game, with the Federal Reserve Bank of Boston entering into a multi-year collaboration with the Digital Currency Initiative at the Massachusetts Institute of Technology to perform technical research related to a central bank digital currency. The joint research project will explore the use of existing and new technologies to build and test a hypothetical digital currency platform.

However, Governor Brainard cautioned that "significant policy process would be required to consider issuance of CBDC, along with extensive deliberations and engagement with other parts of the federal government and a broad set of other stakeholders."

She concluded that the Fed has not yet made a decision to undertake this work but rather "we are taking the time and effort to understand the significant implications of digital currencies and CBDCs around the globe."

The objective of this research is to assess the safety and efficiency of systems, understand private sector arrangements (Diem?), understand the opportunities and limitations of issuing CBDC and ensure they have considered all potential risks and unintended consequences.

What does this mean for the US Banking System?

While US policy makers have been more hesitant than some of their counterparts in embracing a CBDC, 2021 has heralded a notable change in attitude, with steps being taken to integrate cryptocurrencies into the mainstream financial system. Evidence of this came in January 2021, when the OCC (Office of the Comptroller of the Currency) permitted banks and savings associations to participate in independent node verification networks (INVN) and use stablecoins to conduct payment activities and other bank-permissible functions such as custody and investments. Notably, JP Morgan launched its own JPM Coin last year for institutional clients and made its first cross border payment in October 2020, while other banks such as Morgan Stanley are opening up investment vehicles to wealthy investors. There have been significant shifts in the payments space too, with PayPal announcing that their 325 million customers worldwide will be able to convert crypto into fiat currency (at no incremental fees) to pay at PayPal's 26 million merchants around the globe.

On the face of things, these moves might suggest a sea change in policy maker attitudes, yet concerns around CBDC's and the mainstreaming of cryptocurrencies remain as deep rooted as ever, underscored by recent comments by Janet Yellen and Jerome Powell. At a recent testimony, Janet Yellen said that while cryptocurrencies are an 'extremely inefficient way of conducting transactions', that it 'makes sense to

consider a digital dollar to lead to faster, safer and cheaper payments'. Similarly at a March BIS summit, Jerome Powell echoed previous skepticism of CBDC's adding that the FED was in 'no rush' to issue a CBDC. That being said, both recognise the potential benefits of a CBDC to improve payment efficiency and more recently are highlighting the role that CBDC's could play in facilitating financial inclusion – which is important given the proportion of un/underbanked remains stubbornly high in some states.

So why have US policy makers been so skeptical? Perhaps the most revealing quote from the past year was from Michael Held of the NY Fed who quoted Mark Twain's 'History may not repeat itself, but it does rhyme.' Why? Because he sought to convey regulator concerns that today's cryptocurrencies have parallels to the bank notes issued in the 'wildcat' or free banking era during the 1800s. Like Weimar inflation in Germany, the scars of the 'free banking' banking era run deep in the US. This epoch in banking history, came about after Congress failed to renew the charter of the Second Bank of the United States (the Central Bank) in 1836, which led to widespread de-regulation across the states and to a rapid rise in commercial banks opening and issuing their own tender. The idea was that more funding would stoke greater growth, but like many rapid build ups in credit, it ended with a financial crash. Many banks set up during this 'free money' era went out of business, with stats varying by state; 25% in New York to 90% in Michigan. In whichever state however, the bottom line was the same; issued notes were worthless and losses significant – historians estimate the losses for noteholders were US\$4 million in Michigan, the equivalent of 45% of state GDP. At the same time 'Wildcat' banks also sprung up in remote parts of the country with the sole intention of issuing notes well beyond what they planned to redeem, but because redemption offices were in remote inaccessible areas, where only wildcats lived, it made it harder to redeem notes. Thus, this led to the name, which defined this 20 year period in US banking history.

As we have already outlined in this report, how CBDC's will impact the banking system will depend ultimately on their design. The enduring fear of US policy makers, particularly in the case of a retail CBDC is that the theoretical claim on the FED's balance sheet would be viewed as safer than Federal Deposit Insurance Corporate (FDIC) insured deposits at commercial banks, which could easily disintermediate banks, particularly in times of stress and hinder their ability to lend out to the wider economy, which in turn would put financial stability at risk. The Federal Reserve Bank of Philadelphia rather bluntly characterised this risk as CBDC's 'causing havoc' with the US system deposit base. Others have taken a more pragmatic view, and believe that CBDC's could actually lead to a more stable system and greater credit growth in the economy. The outcomes of CBDC's are still uncharted territory, even in China but what's striking in the US is the polarisation of opinion on the topic in comparison to other regions.

Jerome Powell's recent comments that CBDC's and cash must 'co-exist' would lend credence to a more wholesale type model in the US. In this construct there are clear advantages; more efficient payment systems, a better handle on know your client / anti-money laundering and the prospect of greater financial inclusion, which would enable greater efficacy of monetary and fiscal stimulus policy should it be required again in the future. Whatever the outcome though, any changes to bank regulation and the ability for the FED to issue CBDC's need to be debated and passed into law through congress, which as Jerome Powell has continued to underscore, will take time and will render US progress slower than global peers.

Case study: China

The People's Bank of China (PBOC) has been researching and working on a digital currency/electronic payment system (DCEP) since 2014. It has actually reached the stage of pilot testing in some provinces, with widespread roll out expected in the coming months. Leaked images of the digital renminbi have appeared online periodically. This image below, for instance, is the digital renminbi as intermediated through a platform of the Agricultural Bank of China.

Figure 4: Digital renminbi as intermediated through a platform of the Agricultural Bank of China



Source: A screenshot circulating online.

The PBOC is collaborating widely, chiefly with four banks, three telecommunications companies and two internet firms. The BIS have classified the proposed design attribute within their CBDC pyramid (see figure 5).

Figure 5 : Design characteristics of the People Bank of China’s digital currency

Design aspect	PBC DC/EP design choices	Details
Inter-linkages	Retail and wholesale linkages	Tourists and business travellers may be able to use CBDC domestically in China with a foreign cell phone number.
Account or token-based access?	Mostly account-based , allowing for smart money interfaces	Different levels of user identification. Balances and transaction limits increase with the strength of the KYC requirements.
DLT-based or conventional CB infrastructure?	PBC runs conventional infrastructure and DLT	PCB runs conventional infrastructure and DLT, private sector free to chose.
Architecture: indirect or direct claims, and what operational role for the central bank?	Hybrid CBDC	CBDC is a direct claim on the central bank, private sector intermediaries (“Authorised operators”) execute payments, central bank periodically receives a backup copy of holdings and transactions.

Source: Adapted from Auer and Böhme (2020) and conversations with PBC staff. <http://hdl.handle.net/10419/229473>

Its architecture appears to be hybrid, so while being a direct claim on the PBOC, commercial banks undertake the payments while keeping the central bank aware of all holdings and payments. The infrastructure is unfixed, but could involve blockchain/ distributed ledger technology (DLT), QR codes, near-field communication (NFC) and 4G technologies like LTE (long-term evolution). The BIS believe the Chinese CBDC will be account based, which means it could interface with other e-money platforms already in existence. Finally, it is possible that overseas visitors to China will be able to use the CBDC to make payments during their visit. Looking beyond this relatively limited international usage, eventually it would raise the efficiency of cross-border payments, promoting RMB internationalisation. Currently, most cross-border payments take place via the expensive and inefficient correspondent banking model. The CBDC offers the chance to redesign and upgrade many aspects of the settlement and regulatory framework, potentially paving the way for RMB transactions using cost-efficient peer-to-peer transfers not involving US dollars, an attractive proposition when currently over 60% of China’s cross border transactions occur in US dollars.

We believe a Chinese CBDC is also relatively attractive to the authorities as it would increase oversight of money flows, allowing the central bank to ‘see’ all transactions, which makes it a very powerful tool for combatting illegal activity and controlling the capital account. There is also likely to be a first-mover advantage for countries that pioneer e-money as that country could be at the forefront of the technology and so would be influential in setting international standards. It also creates an innovation-friendly environment in which fintechs can invent new financial technologies.

Case studies

It might also address the rapid decline of cash in China from mobile-app payments. While there should be no real macro prudential issue with the dominance of this given the reserve requirement was raised to 100% in January 2019 from 20% in January 2017, we wonder if the PBOC is thinking of the long-term dominance of TenPay and Alipay, which have accounted for over 80% of the payments market?

Global central banks will be taking note of the degree of engineering that has gone into the design of the DC/EP in order to limit the impact on the banking system. Although China is well ahead of the curve on implementation, it has still faced the same construction constraints and considerations as others when it comes to dovetailing the DC/EP into the overall banking system.

The end result centres on a two tier system, designed to circumvent the issues of concentration of risk on the PBOC balance sheet and bank disintermediation. Or put differently, because the DC/EP is designed to replace cash in circulation, commercial banks will have a role in distributing the digital currency to users, meaning that the PBOC will not disintermediate them for now. Moreover, banks must deposit exactly the same amount with the PBOC as the DC/EPs they distribute. So unlike alternative currencies, which can be volatile, the value of one DC/EP will always be one renminbi.

Though the DC/EP has been engineered with the banking system in mind, there are still potential consequences for system bank deposits and the intermediary businesses of banks, such as payments, settlement as well as custody services. Notwithstanding the two tier approach, retail depositors could view the DC/EP as fungible with cash and sight deposits, which could still serve to deplete deposit bases. Obviously the behaviour of the depositor is the big unknown here, but there are potential precedents that we can look at to gauge how DC/EP may substitute bank deposits. For instance, we could look to the advent of third-party payments in China during 2013-2015 which saw customer reserve funds rise circa three times to around RMB 300 billion, while commercial banks saw their deposit market share fall by 3% to 67% by end-2015.

In normal times, the impact of DC/EP on displacing bank deposits should in theory be limited given it is non-interest bearing. But in times of stress with default risk concerns, the DC/EP may become a superior substitute to bank deposits which inherently have bank failure risk. There could be a risk of liquidity contagion triggered by bank runs when households withdraw their money swiftly from their bank accounts in exchange for the safer DC/EP. The risk could be heightened due to the theoretically swifter conversion from bank deposits to digital currency (vs. to physical coins and banknotes).

This being said, there are still a number of design tweaks that the PBOC can make in order to further dampen the effects on the banking system; such as charging a handling fee, to imposing size limits on conversions and ensuring that the DC/EP remains non-interest bearing. Given that the current set up is aimed at small sized, high frequency retail transactions, the construct would imply limited impact, but the PBOC has been clear that it wishes to avoid material impacts on the banking system, thus any potential mitigating measures remain firmly in the toolkit for now.

Though much of the focus has centred around deposit disintermediation, banks are also at risk of seeing falling fee income from lower clearing and settlement fees. This becomes more of an issue should the system migrate away from the current high frequency retail transactions to a more wholesale large ticket transfer model under which the two repositories in the 'one coin, two repositories, and three centres' design will replace the banks' function in interbank clearing and settlement (i.e. banks can transfer funds directly with each other via the repositories), thus squeezing fee income.

The risks to the banking system are becoming well understood, but there are potential opportunities too. Banks can leverage their role as custodian of the digital wallet, which could lead to higher custody fees. Sitting in this central role gives them a view over changing habits and data patterns which could drive greater ancillary business from new cross sell opportunities across a range of products. This has been a perennial debate across the banking space in general, but with greater digital adoption particularly in China across the spectrum of financial and lifestyle products, there is a stronger chance of theory becoming reality in China than anywhere else globally.

Case study: Eurozone

The European Central Bank recently stated that, “we need to be ready to introduce a digital euro, should the need arise.” However, “we maintain the options open as to whether and when this should happen.” The ECB President, when speaking in November 2020 sounded more affirmative saying, “My hunch is that it will come, if it’s cheaper, faster, more secure for the users then we should explore it. If it’s going to contribute to a better monetary sovereignty, a better autonomy for the euro area, I think we should explore it.” She went on to explain that the timeline for launch is two to four years time, underlining our view that the rise of CBDC is well within our investment horizon.

The work has been advanced from previous plans. At this early stage, however, they are reluctant to commit to a specific design, but have set down some high level principals and requirements which include the understanding that a digital euro is just another way to issue euro and so trades at par with other cash. It will be a liability of the Eurosystem and so risk free central bank money and its issuance is under the control of the Eurosystem. It should be widely accessible to all users and supervised private intermediaries should have the opportunity to provide payment services. Its issuance should not crowd out or discourage private solutions for efficient digital payments in the euro area and crucially, it must be trusted from its inception. They deliberately swerve its impact on monetary policy stating that, “a possible role for the digital euro as a tool to strengthen monetary policy is not identified in this report, but could emerge in the future on the basis of further analysis or owing to developments in the IMFS.” They conclude by saying that the “Eurosystem will consider whether to start a digital euro project towards mid-2021, with the possible launch of an investigation phase aimed at developing a minimum viable product.” The BIS believe this product will be account-based and open to international investors while being based upon conventional technology and remaining open to the question of being direct access or intermediated.

How a potential digital euro dovetails with the banking system takes on a potentially wider meaning in comparison to other regions. Not only are there considerations of how it interacts with the deposit bases of banks, which could be more meaningful than we see elsewhere, but also how the ECB can enact more real time monetary policy in a zero interest rate policy environment and what that could entail for the economy at the macro level as well as deposit holders – both retail and commercial – at the micro level.

In a recent paper, the ECB struck a familiar tone when outlining the design considerations of a digital euro and how they might work in practice. In respect of the banking system, the message was clear; the design must avoid impacting the intermediation of banks and furthermore a digital euro intermediated by the private sector (i.e., banks) is preferred. For the Euro Area, concerns of deposit disintermediation are even more acute than in other regions, since the term structure of deposits is two thirds skewed to current accounts (compared to 20% in the US), which could make the system vulnerable to rapid shifts in CBDC demand.

Moreover, the European economy is structurally far more dependent on the banking system than say the US. To put this in context, European corporates rely on banks for about 80% of their financing, while this statistic is more like 20% in the US, which is far more reliant on public markets or private funding sources. If deposits were to be disintermediated, then the ability for banks to lend to the wider economy would be severely impaired and thus threaten financial stability. The ECB has proposed work arounds to this potential eventuality, with banks effectively taking long-term refinancing operations (LTRO) from the central bank in perpetuity. The question mark here is whether this would be enough to keep a lid on the cost of credit to the wider economy, since the need for banks to post collateral against the LTRO loans would likely put upward pressure on the yields of safe assets.

The banking system of Europe already faces many structural challenges. The lack of a fully formed banking union being core to this point of view. Though a digital euro could have potential advantages in enacting monetary policy in a zero interest rate policy environment, the still very fragmented make up of the banking system is probably at greater risk of disintermediation than other regions in the context of a CBDC, which will require strong policy support if implemented.

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