RESEARCH BRIEF

Central Bank Digital Currencies (CBDCs)

What They Are, What They Might Become, and What They Mean for Credit Unions

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OVERVIEW

Today, most central bank digital currencies (CBDCs) exist only as proposals, prototypes, or trials, and there is little consensus on questions around efficiency, surveillance, and financial inclusion. However, with countries around the world beginning to issue their own versions of CBDCs and the United States Federal Reserve publishing a long-anticipated report on CBDCs earlier this year, there is a growing recognition that CBDCs will have an important role to play in the digital landscape of the future. As central banks begin their journey in considering and implementing CBDCs, understanding the variety of forms CBDCs can take, as well as their associated risks and opportunities, becomes crucial.

INTRODUCTION

In the past several years, interest in central bank digital currencies (CBDCs) has taken off around the world.[1] By 2021, close to 86% of central banks have initiated plans to launch their own version of a central bank digital currency.[2] While no central bank has yet formally adopted a CBDC directly available to the public, several are in the midst of experiments at different stages namely China's digital yuan or e-CNY (2020), the Bahamas' sand dollar (2020), the Swedish e-Krona (2020-2026), and Nigeria's e-Naira (2021).[3] Each of these has taken different forms and design features guided by specific objectives and policy contexts of the different countries.[4] These experiments have not resulted in a consensus about the function, technology, and definition of CBDCs; rather the rapidly changing landscape has only fueled more questions about efficiency, surveillance, and financial inclusion. Indeed, such questions were the centerpiece of the United States Federal Reserve's much-anticipated first report on CBDCs, released in late January 2022.

The effect of a CBDC on credit unions depends on the answers to these questions. While CBDCs can present a risk to credit unions, they also offer opportunities to play a complementary role with central banks to broaden financial inclusion. This six-part brief provides definitions and contextual background on CBDCs to facilitate further reflection on the Fed's report and to identify potential ramifications of CBDCs for financial institutions such as credit unions and their members. The first section explores the conceptual framework of CBDCs and distinguishes CBDCs from traditional currency, reserves, electronic/book money, cryptocurrency, and stablecoins. The second provides a brief account of how CBDCs have evolved out of larger trends in fintech, alternative currency, and monetary policy. Notably, the discussion in the US gathered momentum with the advent of proposed platform currencies (such as Facebook's Libra), and advocacy for financial inclusion and access particularly in the wake of difficulties surrounding pandemic-related stimulus disbursals. The third section considers the potential benefits of CBDCs in terms of efficiency, security, monetary policy, and financial inclusion. The fourth takes a deeper dive into possible designs for CBDCs, including design strategies to mitigate the possibility of bank runs and financial instability. The fifth section discusses features of some select international CBDC

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experiments and draws inferences for the United States in light of the Fed's CBDC report. The final section analyzes potential implications for credit unions and their clients.

PART 1: OVERVIEW & STATE OF PLAY

What exactly are CBDCs? How are they different from existing forms of electronic money, cryptocurrencies, and stablecoins?

Because CBDCs, at least for the time being, exist only as proposals, prototypes, or trials, they can be difficult conclusively to define; as the Committee on Payment and Market Infrastructures notes, "CBDC is not a well-defined term. It is used to refer to a number of concepts."[5] As the name suggests, a CBDC is a new variant of state-issued currency that is digital in form and issued by a central bank. In this section, we begin by introducing the key types of CBDCs. We then examine how they differ from and resemble other forms of money and currency in form, issuance, liability, and availability.

Wholesale, Retail, and Indirect CBDCs

Current CBDC design focuses on three broad pathways for wholesale and retail use:

Limited Wholesale CBDCs

Wholesale CBDCs are conceptualized as additional electronic money that is only accessible to credit unions, commercial banks, and non-banking financial intermediaries. They would perform similar functions to central bank reserves but, in theory, provide greater efficiency in interbank settlements of obligations and cross-border transactions. Namely, wholesale CBDCs that use a distributed ledger technology (DLT) or blockchain would allow for instantaneous transactions rather than time-delayed clearance and settlement among credit unions or banks. Such wholesale CBDCs are also prominent in discussions on cross-border global payment platforms. For example, the Bank of International Settlements is set to undertake a multi-country experiment named "Project Dunbar'' to develop a prototype platform for facilitating transactions in CBDCs between Australia, Malaysia, Singapore and South Africa.[6]

CENTRAL BANK DIGITAL CURRENCIES

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Indirect CBDCs are a type of retail CBDC that do not involve direct interaction between the central bank and customers.

Another model for wholesale CBDCs is similar to this interbank system, but also allows non-banking financial institutions to make wholesale business-to-business payments through bank intermediaries with accounts in CBDCs at the central bank. In this model, CBDCs might also leverage the benefits of blockchain DLTs to provide more efficient transactions among financial institutions. Here, wholesale CBDCs would be analogous to faster payments systems or communications systems such as SWIFT for cross-border payments.[7]

Direct Retail CBDCs

Retail CBDCs would be more akin to a digital denomination issued by the central bank, much as the central bank orders new paper money to be issued in different physical denominations. Right now, cash and coin are the only central bank currencies held directly by the public, but a retail CBDC would allow consumers to hold central bank liabilities in digital form that is separate from cash. The central bank would maintain full parity and convertibility among the currencies. A consumer would simply hold an account at the central bank, denominated in the CBDC, for use in settling all kinds of payments. Such a model would permit low-cost or free accounts to the unbanked; it would also provide a mechanism for direct deposit of relief or other payments into people's CBDC accounts. The idea of retail CBDCs has sparked debate about their potential to give consumers better value, to further financial inclusion, and to allow for more direct transfer of government benefits via the central bank to consumer accounts. These prospects in turn raise important questions about the relationship between central banks, credit unions, commercial banks, and non-banking financial intermediaries. Would a direct retail CBDC create competition with credit unions or banks, and would there be a flight to the "government option?" How would credit unions and banks have to respond, from the point of view of product design, delivery, and pricing, to compete?

Indirect Retail CBDCs

Indirect CBDCs are a type of retail CBDC that do not involve direct interaction between the central bank and customers. Customers can access indirect CBDCs via accounts through intermediaries, which could include credit unions, commercial banks, dedicated narrow banks (termed CBDC banks), or even other government entities such as the Postal Service. This two-tier system is similar to the existing system in that there is no direct interaction between the central bank and retail clients. While customers do not have direct access to the CBDC, their account holding credit union or bank is required to back their CBDC claims.

One simple example of a potential indirect retail CBDC is e-money that can be downloaded to a mobile device by designated financial institutions from the central bank, and then offered to users in exchange for cash or transfers from their credit union or bank account. This resembles the tiered model that China has pursued, where commercial banks manage the distribution of digital currency to consumers who can access eCNY (digital yuan) through The People's Bank of China (PBOC) authorized mobile wallet application. The user would then have CBDC e-money in a digital wallet; some models assume offline use, too, with transfers of e-money from device to device without the transfer having to be cleared by the financial institution that issued it. The existing financial institutions act as distribution channels for CBDC e-money. Most models, such as the e-krona, assume transaction limits or low-value thresholds to mitigate Know Your Customer (KYC) concerns.

FIGURE 1: Accessibility Across Types of CBDCs

	WHOLESALE CBDCs	DIRECT RETAIL CBDCs	INDIRECT RETAIL CBDCs
ACCESS	Limited to use by credit unions and commercial banks only OR Limited to use by credit unions, commercial banks, and non-banking financial institutions	Accessible to the public (all agents in the economy) Credit unions and commercial bank access to reserves remains the same	Accessible to the public through credit unions, commercial banks, or other dedicated financial institutions Central banks do not directly deal with retail accounts
FORM	Electronic, central bank book money	Electronic, account-based & token-based*	Electronic
QUALITIES	Not accessible to the public No new effect on consumer privacy and surveillance Lower concern about credit union or bank disintermediation or financial instability	Creates potential privacy and surveillance problems for the public Credit unions, commercial banks, and non-banking financial institutions are concerned about disintermediation, implications for institution functions, relation to clients and customers, and balance sheet and money creation Central banks will have centralized control over the balances in CBDC accounts and could directly push interest rates below zero by deducting from CBDC account balances Governments could also directly push relief or other payments to account holders	Public access resembles present electronic money use Depending on policy legislation, could mean different roles for credit unions and commercial banks

*We discuss the conceptual difference in Part 4. The technical difference remains uncertain.

CBDCs in Relation to Existing Forms of Money

Central banks have traditionally not offered digital currency. Within the existing banking framework, central banks issue only two forms of money—currency and reserves—and do not have the mandate to hold individual customer accounts.[8] The first of these, currency in the form of banknotes and coins, represents the central bank's connection to the general public.[9] Currency is a liability of the central bank and serves as the official monetary unit and legal tender for meeting tax and debt obligations.[10] The second, reserves, relates to the central banks' function as a banker for credit unions and commercial banks. In this capacity, the central bank extends what are known as "reserves" to the credit unions and commercial banks who hold accounts at the central bank. These central bank electronic money reserves function to settle wholesale payments among credit unions and commercial banks only. This version of central bank electronic money has existed for a long time in the form of Real Time Gross Settlement (RTGS) systems. Essentially, reserves exist as electronic records of the debit and credit of credit unions and commercial banks in their accounts with the central banks. Reserves do not involve any direct connection with retail transactions of individual customers.

CBDCs are meant to be money in electronic form issued directly by central banks for general use within the economy. This means that they would be similar to state fiat currency such as notes and coins.

Most people's experience with digital money is not central bank reserves, but the bank accounts and mobile apps linked to our accounts or credit cards. This everyday digital money is issued by credit unions or commercial banks in the form of consumer loans and consumer deposits or is issued by non-bank e-money providers (such as Venmo or PayPal) that themselves have accounts at commercial banks. Bank deposits created in the private sector function as liabilities on a credit union's or commercial bank's balance sheet. They are not issued by central banks and therefore do not count as a liability of the central bank even though there may be some legal provisions for protection of limited amount of funds such as the National Credit Union Share Insurance Fund and the Federal Deposit Insurance Corporation Fund.[11] In contrast, CBDCs are meant to be money in electronic form issued directly by central banks for general use within the economy. This means that they would be similar to state fiat currency such as notes and coins.

Given their electronic form, CBDCs may appear similar to bank deposits or e-wallets. But CBDCs are liabilities to the central bank, not to a credit union or commercial bank. CBDCs, such as the cash, coin, and reserve accounts at the central bank, are "outside" money, that is, money created outside the private sector at the central bank. In summary, CBDC is a distinct form of money that is different from:

1. Physical traditional currency (notes and coins) issued by the central bank.
2. Electronic credit unions' or commercial banks' book money, which are not liabilities of the central bank.
3. Reserves, which are commercial bank settlement accounts not accessible to the public.

Legal Currency Status of CBDC

Attributing "currency" status to anything other than notes and coins, however, requires legislative changes to monetary and banking laws in most states or monetary unions.[12] To count as a currency or the official means of payment of a state or monetary union, a CBDC would have to be ratified by the monetary law of the country or monetary union. The Fed's report on CBDCs recognizes such a change to monetary policy as crucial to the creation of any CBDC, noting "The Federal Reserve does not intend to proceed with issuance of a CBDC without clear support from the executive branch and from Congress, ideally in the form of a specific authorizing law."[13] Thus, with adjustments in the monetary law or depending on the powers of the specific central bank, a CBDC would be denominated in the official currency unit and have a legal tender status that entitles a debtor to settle and a creditor to accept monetary obligations.

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FIGURE 2: Difference Between CBDC and Other Money Forms

	CURRENCY	ELECTRONIC MONEY/ BOOK MONEY	RESERVES	CBDCs
ISSUED BY	Central Bank	Credit Unions or Commercial Banks	Central Bank	Central Bank
FORMS	Physical	Digital account in credit unions or commercial banks	Digital account in central bank	Digital In theory can be token based or account based.*
AVAILABLE TO	Public and available for wide range retail purposes. General access by possession. In the US, notes are liabilities of the central bank, while coins are purchased by the central bank from the US Mint and are assets of the central bank.	Public for wide and general retail purposes. General access through credit union or bank accounts and identification.	Only credit union and commercial bank use, also known as wholesale purpose.	Depends on the design: a) **Wholesale:** limited to credit unions and commercial banks b) **Retail:** potentially available to the public for retail transactions

*See Part 4 for design implications and differences between account-based vs token-based CBDCs.

CBDCs & Distributed Ledger Technology Cryptocurrencies

CBDCs tend to get bundled or confused with developments in digital ledger technologies (DLT) and the growing number of cryptocurrencies being created around the world.[14] However, CBDCs are not cryptocurrencies. Digital ledger technologies such as blockchain, though frequently invoked, have not been central to exploratory frameworks of CBDCs.

Bitcoin and Ethereum are popular examples of non-central-bank digital currencies (cryptocurrencies) based on blockchain or other distributed ledger systems. In a DLT system (in theory), all participants hold a copy of the ledger of all transactions. Participants in a DLT system post proposed transactions to the network, a process of transaction verification takes place (which varies depending on the kind of blockchain), and when the consensus of nodes or participants agrees a transaction is valid, all copies of the ledger are

simultaneously updated. The system is designed so that there is no need for a central, validating authority. DLTs typically allow pseudonymous transactions that provide greater privacy than other types of electronic account transactions. But fully independent and public blockchain systems are at present costly and inefficient to operate at scale. Moreover, a fully independent distributed currency design such as Bitcoin, which has no centralized regulatory authority, is unlikely to be adopted for a CBDC as it would impinge on the function of the central bank to maintain control over the money supply.

Some financial institutions are exploring modified DLTs, known as "permissioned distributed ledgers," which give central banks a higher degree of control. For example, Corda and Hyperledger Fabric are digital infrastructures being explored by central banks (notably, Sweden) to create CBDCs. Corda replaces blockchain with a "notary" architecture that has a consensus authority and limited information sharing.[15] The Bank of International Settlements Innovation Hub has a number of ongoing experiments that are exploring integration of private distributed ledger systems.[16] The anonymity and privacy of transactions in all such modified systems remains uncertain as the central authority would be able to collect this information. What they are able to do with the information remains a central question that hinges not only on technology but also concerns around policy and public function of money.

In the US, the Federal Reserve Bank of Boston (Boston Fed) and Massachusetts Institute of Technology's Digital Currency Initiative (MIT DCI) concluded in their preliminary exploration of potential CBDC technology that a distributed ledger would not suit the needs of CBDC design, noting that it would create unnecessary bottlenecks and would not "match the trust assumptions" of a CBDC, which by definition is controlled by a central authority.[17]

WHAT'S A BLOCKCHAIN?[18]

A blockchain is a digital ledger. Ledgers are accounting techniques that represent or record the financial situation of a reporting entity. They can represent an asset, a liability, an income, or an expense. In themselves ledger accounts do not create a legal or contractual relationship. Unlike a credit union or bank ledger, the Bitcoin blockchain ledger is not held and maintained by any one entity, such as a credit union, commercial bank, or a central bank. Rather, many copies of the ledger exist. They are held and updated by process of consensus among the participants in the system. When one entity posts a transaction to the network of participants, they engage in a process of checking the validity of the transaction (these specifics vary depending on the type of blockchain). Once they agree, everyone's copy of the ledger is updated simultaneously. Instead of messages back and forth, as in ACH or SWIFT, the process of verification occurs among all parties at the same time, and the ledgers are all updated at the same time. This has the potential to introduce greater efficiency—so long as the process of transaction verification is itself efficient. But does a CBDC need to be based on blockchain? Probably not! In fact, it's quite doubtful a central bank would decide to use a system of transaction verification based on consensus of multiple participants in the ecosystem, nor is there any compelling reason to do so.

CBDCs and Stablecoins

Stablecoins are digital assets that, unlike independent cryptocurrencies, are pegged to a national currency or a basket of national currencies to maintain a stable value.[19] Unlike CBDCs, they are not regulated by central banks, but they have the advantage of being able to utilize existing networks of users and platforms.[20] Stablecoins are gaining popularity and the President's Working Group on Financial Market's 2021 Report on Stablecoins emphasizes the need to have clear regulations to circumvent the risks of stablecoin runs, illicit transactions, and payment system risks.

FIGURE 3: Overview of Cryptocurrency, CBDC, & Stablecoins

	INDEPENDENT CRYPTOCURRENCIES	CBDCs	STABLECOINS
TECHNOLOGY	DLT	Digital (Could be DLT but is not required to be)	DLT
ISSUING/REGULATORY AUTHORITY	None (decentralized)	Central Bank	Independent but pegged to sovereign currency to stabilize value and control volatility
USERS/SECTORS OF ACCESS	Functions more like an asset. Problems of scalability and efficiency.	Depending on the design a) Wholesale b) Retail i) token-based ii) account-based	Depends on the kind. Most are used for investment and not retail transactions.

PART 2: WHY CBDCs—HOW DID CBDCs GET ON THE AGENDA?

CBDCs are not a sudden, revolutionary innovation, but rather they exist in a broader ecology and historical context. The latter half of 2010s witnessed a range of innovation and experimentation in the sphere of fintech, which prompted central banks to consider developing CBDCs more seriously. Relevant to our discussion is the advent of cryptocurrency, which is traced to an early 2009 white paper, released under the pseudonym Satoshi Nakamoto, describing an electronic currency system that came to be known as bitcoin.[22] From their very inception, cryptocurrencies have held special appeal for adherents who saw the distributed ledger technology as a way to advance libertarian ideals of decentralization and freedom from government regulation. The discursive appeal of this idea gained traction after the 2009 financial crisis, when leading central bank actions were seen as favoring corporate interests instead of prioritizing public accountability and social welfare.[23] Notably, between 2011 and 2013 Bitcoin gained notoriety as the preferred currency on Silk Road, the first darknet market, which trafficked extensively in illicit drugs and other illegal activities including money laundering.[24] Crypto assets such as Bitcoin and Ethereum were also becoming regular items of financial news mainly due to the dramatic volatility and fluctuations in their value.[25] They were, however, yet to attract the interest of central banks given their negligible and niche share of global trade and transactions. A 2018 survey conducted by the Bank of International Settlements (BIS) showed that most of the 63 participating central banks had no plans in the next one to three years to establish a CBDC.[26] Only a year later, a rerun of the survey with a similar set of questions and additional participants revealed that a large number of banks had already initiated experiments on CBDCs while the majority of others showed increased motivation to research viable CBDCs. The most recent 2021 BIS survey shows that more than 86% of the Central Banks have initiated research and close to 66% have operationalized pilot projects.

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Meta/Facebook's move to create its own digital currency spurred central banks around the world to seriously consider CBDCs and foreground concerns about surveillance, data privacy and security, and the balance between corporate profit and public good.

What led to this sudden interest? A catalytic event was Facebook's 2019 announcement of its own proposed digital currency, Libra. Facebook's whitepaper introduced Libra as a "simple global currency" capable of facilitating transactions and delivering financial inclusion without the need for bank accounts. The announcement of Libra highlighted the potential of disrupting global currency because of the sheer scale of potential transactions among Facebook's 2.6 billion users and the potential for cross-border payments among the more than 70 countries where these users resided.[27] Observers raised concerns about security, stability, and surveillance; global financial institutions and central banks took note. Facebook by then was also fending off routine charges of having violated its customers' privacy. Central bank leaders expressed concerns about the potential for Libra to further illicit trading, money laundering, and financing of terrorist activities. But Libra itself was more a concept than an actual product, and it was rapidly shelved. Since then, Facebook became Meta, and Meta revamped the concept, rebranding it as Diem, initially with an expected launch sometime in late 2021. Similar to Libra, Diem was to have been a type of stablecoin, a prepaid digital token that is pegged to a basket of reserve currencies.[28] But in November 2021, Meta's head of cryptocurrency resigned, and by 2022, Diem was (permanently?) shelved. Nonetheless, Meta/Facebook's move to create its own digital currency spurred central banks around the world to seriously consider CBDCs and foreground concerns about surveillance, data privacy and security, and the balance between corporate profit and public good.

Notably, the discussion around CBDC has involved existing financial infrastructure companies that have vied to establish themselves as central to the development and infrastructure of CBDCs. Indeed, most proposed CBDCs involve contracts between central banks and private companies. In September 2020, Mastercard announced a proprietary testing bed for central banks to build CBDC experiments.[29] This was followed by Visa's whitepaper on the possibility of offline digital transactions of a CBDC in December 2020. The Visa model allows users to send money from device to device, replicating the experience of passing cash from hand to hand.[30] Collectively, these announcements portend a future in which the introduction of any kind of CBDC will likely depend upon existing financial infrastructures wherein legacy players such as credit card companies, big banks, and corporations are poised to shape both the motivation

and operationalization of CBDCs in different countries.[31] In other words, announcements such as MasterCard's and Visa's are staking a claim to future distribution channels for CBDCs, and trying to get in on the planning of the infrastructure layer, before central banks have even tried to roll them out. They may have not only legacy advantages but also greater trust with the public; regulators are also familiar with them and may imagine that they know what to expect when dealing with them.

In the United States, the idea of CBDCs gained national attention during Congressional debate over coronavirus relief, which led to the passage of the Coronavirus Aid, Relief, and Economic Security (CARES) Act.[32] During negotiations over the act, several proposals were floated for "digital dollars" that would be accessible to all residents through mechanisms such as pass-through accounts at commercial banks, or at retail banking facilities offered by the Postal Service. These formed the basis of the never-passed Banking for All Act.[33] The Act sought to solve the problem of disbursing relief payments (during the coronavirus pandemic or in the future) to the millions of people living in the United States without bank accounts.[34] At the time, Jerome Powell, the chairman of the Federal Reserve, discredited the idea out of the concern that it would lead to a flight from credit unions and commercial banks to the Fed on the part of consumers. In one respect, however, this was precisely the point: if traditional providers are not providing adequate services at fair rates, why should people continue to bank with them? At a time of both historically low interest rates on savings and predatory lending for poorer consumers deemed a high credit risk, why should people bank with a bank, anyway?

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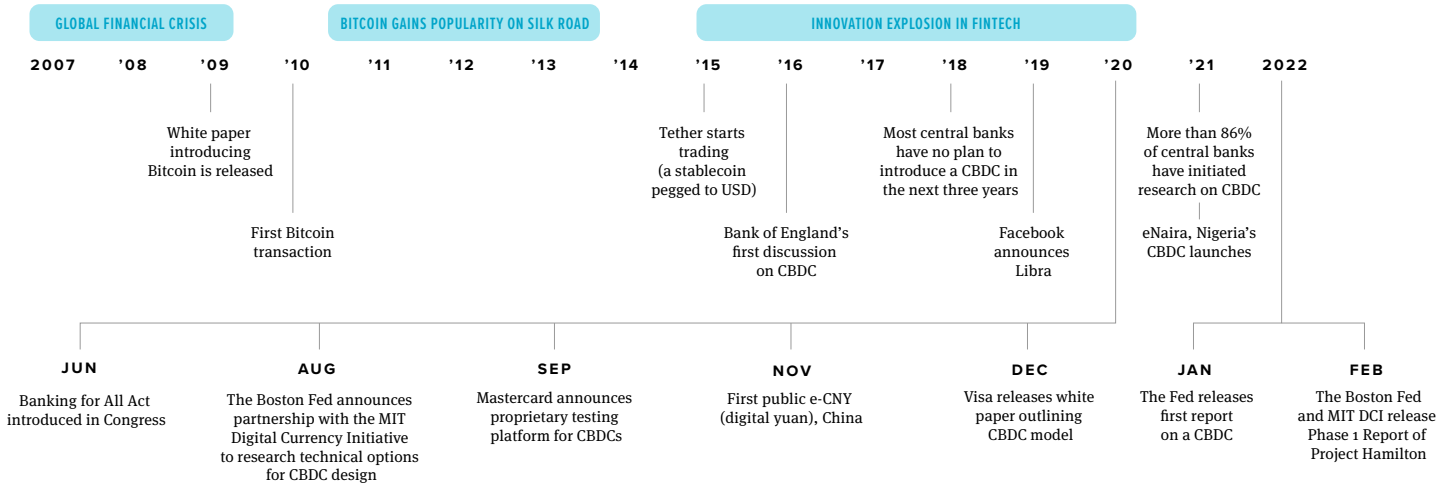
The recent Fed Report (2022)[35] does not provide any solutions to these concerns, but it does address the potential of a CBDC to provide more equitable access to financial services, noting that "further study would be helpful to assess the potential for CBDC to expand financial inclusion, including cases targeted to underserved and lower income households."[36] Reflecting Powell's concern, the report also indicates the Fed's desire to mitigate the possibility that a CBDC would encroach on the market share of commercial banks (p. 17). We will return to these points in the fifth and sixth sections, where we discuss the primary value

proposition of CBDCs for credit unions and credit union members: access to digital wallets or pass-through accounts denominated in CBDCs for the distribution of relief funds in times of crisis, and for the provision of basic digital financial services to credit union members of modest means.

FIGURE 4: Growing Interest in CBDCs: A Partial Timeline



PART 3: EXAMINING THE PROPOSED BENEFITS OF CBDCs

Efficiency

Most central banks are only mandated to issue currency in the form of banknotes and coins, so the issuance of CBDC would entail changes to the central bank mandate or monetary law. Given that CBDCs involve new technology for which no legal conventions exist, regulators and policy makers do not currently have enough information to make sound policy choices. While experiments with CBDCs will provide some needed data, it is not clear how CBDCs would interact with existing banking and payment options, or how they might interact with each other if different sovereign entities issue their own CBDCs. It is also unclear what the existence of multiple sovereign CBDCs would do to international trade, or how global regulatory regimes would need to change to accommodate them.[37]

Despite this uncertainty, a potential benefit of CBDCs for central banks is a gain in efficiency, as a well-designed CBDC would reduce the friction in existing wholesale or retail payment systems. This potential benefit is based in the assumption that CBDCs would reduce transaction costs.

But this is not a given, as many of the technological requirements are still in the developmental phase. As noted earlier, as legacy providers such as card networks stake out new positions in the CBDC landscape, they may simply replicate a system with multiple intermediaries and new frictions or fees.[38] Major players such as card networks and commercial banks have an interest in this potential new future and will not easily give up their position. In the case of the US dollar, de facto the world's global currency to which others are pegged or measured against, a CBDC would have implications not just at home but abroad. Thus the question of efficiency is a political and policy question, not strictly an economic one.

Security

Because of their digital form, CBDCs make assets and transactions traceable. This data could be used by policy makers to expand financial products and reduce tax evasion and other illicit activities. Indeed, CBDCs have been touted as a means of preventing and controlling scams and illegal transactions (questions of surveillance and concentration of power in central banks notwithstanding). Proponents assume that tracking transactions would automatically lead to a reduction in fraud and scams. As many of the recent breaches and thefts of Bitcoin have shown, however, this cannot be ensured. In fact, the new technology could potentially lead to new kinds of scams. Criminals are always several steps ahead, while regulatory mechanisms are several steps behind. Central banks need secure infrastructure for authenticating and protecting users as well as maintaining large scale records, particularly since the consequences of vulnerabilities in the design could be particularly costly. The conventional architecture is already vulnerable to hacking attacks, and denial of service or prevention of consensus attacks could paralyze a CBDC distributed ledger system. This is likely one of the main reasons why most central banks have shown an inclination towards wholesale CBDCs, the design of which draws more heavily on established banking practices, rather than retail CBDCs, which raise new legislative and logistical problems.

Central banks need secure infrastructure for authenticating and protecting users as well as maintaining large scale records, particularly since the consequences of vulnerabilities in the design could be particularly costly.

Monetary Policy

As discussed, CBDCs would require changes to monetary policy, but they could also potentially affect interest rates, assets, and control of central banks. The possibility of disintermediation has implications for credit unions and commercial banks and their activities in the creation of money. Internationally, CBDCs could allow nations to circumvent sanctions, or bifurcate global trade along geopolitical lines.

Financial Inclusion

A CBDC that allows the general public to have direct accounts with the Fed might indeed foster financial inclusion, but lingering questions about how this is to be done, through what intermediaries, and for which everyday transactions make the promise of financial inclusion somewhat shaky. Though advocates often focus on the fact that people are not required to have a credit union or bank account to use some types of CBDCs, they neglect other questions of accessibility, such as the need for a connected mobile phone.

Proponents of CBDCs argue that they would be good for financial inclusion. Though it is frequently mentioned, this idea has yet to be seriously explored. A CBDC that allows the general public to have direct accounts with the Fed might indeed foster financial inclusion, but lingering questions about how this is to be done, through what intermediaries, and for which everyday transactions make the promise of financial inclusion somewhat shaky. Though advocates often focus on the fact that people are not required to have a credit union or bank account to use some types of CBDCs, they neglect other questions of accessibility, such as the need for a connected mobile phone. Additionally, there is no clear consensus on the way that CBDC accounts would be insured. In the US, the National Credit Union Share Insurance Fund and the Federal Deposit Insurance Corporation guarantee customer deposits up to $250,000 per depositor, per insured credit union or bank, for each ownership category.[39] This means that for the great majority of US consumers, deposits are insured in case of emergency. The failed Banking for All Act, discussed above, proposed FedAccounts that would be administered through the Postal Service. While the post office has national reach and is already an effective distribution network for other financial services such as money orders, it is unclear whether unbanked users would feel comfortable going to a post office representative—often behind bullet proof barriers in some regions—to handle their money, or whether postal banking would mitigate or alternately actually promote existing racialized barriers in access to services.

As we have noted, CBDCs can take many forms, and the effect of a proposed CBDC on everything from financial inclusion to central bank authority to credit union intermediation depends greatly on the form of that CBDC. In this section, we consider the implications of account-based and token-based retail CBDCs on efficiency, security, policy, and inclusion.

Design Choice: Is there a real difference between account-based or token-based CBDCs?

Presently, proposed designs for a retail CBDC have involved the choice between an account-based or a token-based model, the latter of which is sometimes referred to as cash equivalent. In an account-based CBDC, all agents in an economy would have access to an account at the central bank. Funds in the account would be denominated in CBDC, and claims, along with reference to identity of the account-holder, would be recorded in a database. A retail CBDC in this form would be the legal and accounting equivalent of cash in the sense of being a liability of a central bank and could be used like electronic money by consumers for daily transactions. But it would not be the functional equivalent of cash in that it could not be used offline.

In the token-based model, which is the closest to cash as it could be used offline, the CBDC would be some kind of digital token whose validity could be verified by a digital device or signature tied to the token itself. In theory, this would allow for transactions between agents without having to go through the central bank, i.e., from device to device, much as cash is transferred from hand to hand. A model for such a token-based CBDC has been proposed by Visa in the form of offline point-to-point payments using Bluetooth and Near Field Communication (NFC) between devices that would be able to directly download digital money.[40] It remains to be seen how the required infrastructure—a mobile device with an active connection—could be ensured for everyone.

More recent analysis has cast doubt on the technical feasibility of maintaining the conceptual difference between token-based and account-based CBDCs, since the token would have to be tied in some way to a digital account for online settlement at some point, i.e., when a user sends CBDCs received from another party to their account at the central bank.[41] While token-based CBDCs could function more like cash in not necessarily requiring a verification of the payer's identity, it is important to remember that all digital accounts can be monitored (even cryptocurrencies, since the ledgers on which they are recorded

are usually public, even if the identities of transacting parties are difficult to trace).[42] Cash does not require any fees for use and no digital variant of money could provide the anonymity and independence from other technical infrastructures for transfer that cash affords.[43] Cash is an anonymous, non-accounts-based, push payment in physical form. Value transfer legally takes place when it is passed from hand to hand. There is no proposed "token" CBDC that replicates these qualities.

Whether the model is account-based or token-based, allowing consumers access to a currency in digital form directly accounted for at the central bank raises four immediate concerns: first, the surveillance of transactions by the central bank, second, the ability of the central back to manipulate the money supply more directly, third, the need to manage logistical and social concerns related to CBDC use, and fourth, the attendant concentration of power in the central bank. The first concern remains largely unaddressed; it is unclear what provisions might be made in the design of a CBDC that would afford it the same anonymity and functionality as cash. Indeed, central banks might not be interested in pursuing policies that preserve privacy.[44] The second concern stems from the fact that if consumer accounts are held at the central bank, it can more easily push interest rates into negative territory by deducting directly from consumers' accounts. On the flip side, of course, CBDCs also enable more straightforward relief payments or so-called helicopter drops of funds from the government directly to consumers. But both of these scenarios represent a significant expansion of central bank control over the economy and power in people's lives. The third concern is that direct CBDCs will require central banks to wade into the muddy waters of adjudicating disputes and determining proper and improper use of funds. Like credit unions and banks, they would need to establish extensive infrastructure and policies to handle disputed transactions and other conflicts, as well as policies for CBDC use by controversial or illegal organizations.[45] The fourth concern, of course, is that potential surveillance and disintermediation of credit unions and commercial banks would concentrate even more power in the central bank and could require greater government involvement in central bank activities through regulation or even democratic participation. Either of these options, however, risks giving up central bank independence.

FIGURE 5: Features of Account-based and Token-based Retail CBDCs

	ACCOUNT-BASED	TOKEN-BASED
STRUCTURE	Similar to risk-free central bank book money. Digital balances in cash current accounts in the books of central bank.	Supposedly functions like cash; tokens are transferred directly between payer and payee.
FUNCTION	Identity of the account holder allows them access to the funds.	In theory, digital tokens are not connected to an account, but this may not be possible in practice. Requires possession of a private key or password linked to the token, not the user.

Possible Design Solutions for Financial Instability & Bank Runs

In all of the above retail CBDC scenarios, central banks have to ensure against the risk of potential credit union and commercial bank disintermediation and financial instability due to bank runs. The Chinese CBDC experiment, which began testing in 2019, seeks to prevent this situation through a zero percent interest rate on the digital yuan, which gives customers no incentive to convert money in their commercial bank accounts with the CBDC. Despite this protection for commercial banks, the Chinese experiment appears to be geared towards replacing fiat currency and commercial bank money altogether and intensifying the power and access of the central bank to all transaction data within the economy. It also appears designed to check the growing power of WeChat Pay and Alipay, China's hugely popular digital payment and two-in-one online and offline and shopping service delivery platforms.

A foundational Bank of England report of 2018 discusses four core features to ensure that CBDCs do not have any adverse effect on private credit and will prevent bank runs.[46] First, it would require an adjustable interest rate to prevent oversupply and balance sheet adjustments. Second, it would need an organizational structure that is distinct from reserves. If reserves and CBDCs are distinct and not convertible to each other, depositors will be prevented from switching to the CBDC, which could lead to a bank run at a scale and speed faster than would be possible by literally cashing out. Third, on-demand conversions of bank deposits

to the CBDC should not be guaranteed, as such a guarantee could too easily lead to bank runs. Fourth, CBDCs should only be issued against eligible securities defined by the central bank. These possible solutions show that CBDCs bring up a unique mix of technological and legal issues that should be carefully deliberated upon prior to deployment.

Many questions remain about the structure, regulation, and effects of retail CBDCs. Should CBDCs be backed by some asset such as gold, or another currency like the US dollar? As a central bank liability, should CBDC supply be regulated by interest rate or by price policy? Should CBDCs be interest bearing, or in parity with cash? How can central banks prevent potential bank runs if customers decide to swap other assets and currency for a CBDC? The Fed report concludes on the need for broad public commentary. As pilots and technical platforms are developed, we will be able to monitor how they settle—or leave unresolved—such questions.

FIGURE 6: CBDCs & Financial Instability

	LIMITED/ WHOLESALE CBDC	RETAIL/DIRECT CBDC	INDIRECT CBDC
ACCESS	Limited to financial institutions and non-bank financial institutions (NBFIs)	General access to credit unions, commercial banks, households, and firms	Indirect access through independent CBDC providers (iCBDCP)
FUNCTION/USE	New safe liquid asset for NBFIs and additional channels for interbank payments	Credit unions, commercial banks, and NBFIs can exchange CBDCs with government bonds Consumers have to exchange via credit unions or banks	Credit unions, banks, and NBFIs can provide households and firms with assets directly backed by CBDC
RISKS?	None	Real if CBDCs are convertible to reserves	Real if CBDCs are convertible to reserves
SOLUTIONS?	-	Separate reserve account and CBDC account	Consumers cannot exchange CBDCs directly with the central bank

Which Form Will Take Hold?

The recent uptick initiatives to pilot CBDCs, along with the efforts of existing financial infrastructure companies, foreshadow a future in which CBDCs are one digital currency option among many others (such as existing e-money, cryptocurrencies, and stablecoins). The experiments in different countries vary considerably, and it is unlikely that there will be a standard form. A whole set of agreements and regulatory frameworks needs to be developed for designing and issuing CBDCs and for setting up transactional infrastructures, pathways, and, importantly, fees. For example, the Bank of International Settlements is exploring the idea of mCBDC, which is a synthetic bundle of stablecoins that would be pegged to fiat currencies and be used to settle cross border trades and reduce the transaction costs. It is thus unlikely that the CBDC will replace anything entirely, either in the realm of currency as it exists, or in the realm of cryptoassets.

We believe that CBDCs should be designed in a way that enables credit unions and banks to remain competitive and to provide the public function of facilitating everyday economic activity, while serving the goal of non-predatory financial inclusion. Loss of privacy and information security failures are a real threat, and since surveillance is seen as one of the potential benefits of such a system, it will be hard to balance the need for data to be available for some purposes while protecting the privacy and agency of the users.[47]

Design implications for CBDCs should start from these first principles:

- **Privacy and Consumer Protection:** A successful CBDC will in some way need to address an innate tension between privacy and transparency, protecting user data from abuse while selectively permitting data access for end-user services, policymakers, and law enforcement.

- **Identity-verification and Know-Your-Customer (KYC) Requirements:** Cash does not require any third-party validation for use, and for CBDC to be as accessible, KYC requirements have to be designed not to exclude certain marginalized groups. For example, they should have procedures to validate migrants who do not have access to specific legal documents or identification, recently incarcerated people who do not yet have valid state-issued IDs, and unhoused people or others without a stable address. The Federal Reserve's initial analysis suggests that the identity of users would require verification and the process would be similar to those required by financial institutions for opening bank accounts

(2022, 14, fn 20). As it stands, however, this process is often difficult or impossible for some people, including those in the groups mentioned above.

- **Cost of use:** For CBDC transactions to be preferred to or on par with the use of cash, transactions costs would have to be zero.
- **Access to required base infrastructures:** Unlike cash, digital wallet applications are predicated on the ownership of mobile devices which raises concerns about lack of access to such essential infrastructures. Even though most CBDC projects employ designs that allow for use with non-smart phones and off-line transactions, difficulties of access could still arise if people do not have regular access to mobile devices.

PART 5: CBDCs IN PRACTICE: EXPERIMENTS AT HOME & ABROAD

Are any of these CBDC models likely to be implemented any time soon? How are central banks addressing the challenges that come with each design options? This section breaks down current CBDC experiments around the world, considers the possibility of a CBDC in the United States, and examines the recent Federal Reserve report on the benefits and risks of a CBDC.

Status of Select CBDC Experiments

As mentioned earlier, no central bank has formally adopted a CBDC that is directly available to the public. However, several are in the midst of CBDC experiments, namely China's digital yuan or e-CNY (2020),[48] the Bahamas' sand dollar (2020),[49] Swedish ekrona (2020-2026)[50], Eastern Caribbean Common Marker Dcash (2022)[51], and Nigeria's eNaira(2021).[52] Each of these has emerged from distinct structural and policy contexts. The Bahamas' sand dollar, which is pegged to the USD, is not meant for cross-border transactions but for purposes of digital financial inclusion, retail payments among the nation's many small islands, and to mitigate money laundering.[53] In the case of Sweden, motivation for a CBDC stemmed from declining consumer preference for cash in retail transactions.[54] China's trial case has gained prominence not only due to the country's role in the global economy but also because of the design of its CBDC, which is supported by monetary laws to be adapted for retail, inter-bank, and cross-border transactions.[55] It is too early to tell whether any of these experiments will emerge as a model for other countries. If anything, they indicate that CBDCs are likely to take many different forms depending on the needs and priorities of the countries that issue them.[56]

FIGURE 7: Characteristics of Select CBDC Experiments

CHINA

E-CNY (Digital Currency Electronic Payment or Virtual Yuan) — Status: 2020–Ongoing

BACKGROUND	CONTEXT	GOALS
Wholesale and retail CBDC	Already functioning expensive digital retail payment system (Alipay and Wechat Pay)	Decrease use of cash and expand digitized transactions
Zero interest rate	Involves commercial banks and telecom companies	Expand cross border trade with CBDCs and local currencies
Requires only a working mobile phone to download the app	Central bank has mandated all merchants to accept DCEP	Build an independent payment system that could preempt US financial sanctions
Based on a controlled ledger and a two-tier system where commercial banks act as disbursing agents who keep track of transactions and monitor accounts	Intermediation will be avoided by making banks CBDC agents and not providing interest on CBDC	Limit commercial bank creation of money
		Idea of "controllable anonymity" where the parties of a transaction could have some level of privacy that the government could effectively override

BAHAMAS

SAND DOLLAR — Status: 2020–Ongoing

BACKGROUND	CONTEXT	GOALS
Wholesale and Retail CBDC	Island archipelago	Limited to domestic use
Available "offline functionality" and a two-tier system which would not be dependent on use of internet	Existence of money laundering	Access to banking services of a deposit account
Banks and CU involved in assessing customer due diligence	Large unbanked population	Increasing digitization
		Reducing the legitimate informal sector
		Reducing money laundering

EASTERN CARIBBEAN COMMON MARKET

DCASH (EC$) — Status: 2019–Ongoing

CONTEXT	GOALS
High cost of transactions for individuals and small businesses	Financial inclusion and competitiveness
Large unbanked population	
Lack of infrastructures	
Does not require bank accounts. Transactions within ECCM and no transfer fees during the pilot phase	
Focus on small business and retail transactions	

SWEDEN

E-KRONA — Status: 2020–Ongoing extended to 2022

BACKGROUND	CONTEXT	GOALS
Distributed ledger based on RIX, the central bank's existing network	Declining use of cash	Desire to provide central bank currency for citizens

NIGERIA

ENAIRA — Status: 2021–Ongoing

BACKGROUND	CONTEXT	GOALS
Distributed ledger based on RIX, the central bank's existing network	Large unbanked population	Financial inclusion
	Can be accessed without bank accounts but has a limit	Diaspora remittances
		Cross border transactions

CBDC in the United States

In the United States, the assessment of a suitable CBDC is ongoing. The discussion has been prompted by advocates for financial inclusion, who have largely focused on calls for the Fed to offer no-fee, no-minimum public bank accounts (FedAccounts), a measure that has been considered by Congress's Task Force on Financial Technology.[57] Others have argued that development of a CBDC is necessary to ensure the provision of secure and equitable financial services.[58] Both Senator Sherrod Brown and Congresswoman Rashida Tlaib have proposed bills for the creation of a CBDC on these grounds, noting that it would also allow for the streamlined distribution of federal stimulus payments and other benefits.[59] Opponents argue that the introduction of a CBDC would be destabilizing, could create a run on private accounts, and would require the Fed to maintain a much larger balance sheet.[60] The Fed's 2022 report, discussed in more detail below, reflects these deliberations and emphasizes the need to solicit public interest. In addition to this, the Boston Fed and MIT DCI released their first findings from Project Hamilton, a multi-year exploratory research project exploring possible CBDC design for US on February 3, 2020. The main goal of the project is "to design a core transaction processor that meets the robust speed, throughput, and fault tolerance requirements of a large retail payment system. Our secondary goal was to create a flexible platform for collaboration, data gathering, comparison with multiple architectures, and another future research. With this intent, we are releasing all software from our research publicly under the MIT open-source license."[61]

Like many other central banks, the Federal Reserve has given increasing attention to CBDCs over the past two years. In 2020, the Boston Fed announced a partnership with Massachusetts Institute of Technology to explore the technology and use cases for CBDCs.[62] This partnership is ongoing and has published the results of its first phase of research (Federal Reserve Bank of Boston and MIT, 2022). However, this partnership exists to explore the potential technological underpinnings of a CBDC, not to propose or institute a CBDC for the United States or resolve some of the legal or monetary policy questions CBDCs raise. Some Fed officials, like Randal K. Quarles, have taken a cautionary tone, emphasizing the need to avoid adverse effects on the existing monetary system and to formulate regulatory mechanisms for "stablecoins."[63] Others, like Lael Brainard, have been keener to examine the possible benefits of CBDCs for international trade and financial inclusion.[64]

In January 2022, the Fed released a much-anticipated (and much-delayed) report on CBDCs. The report was presented as a first step towards garnering public comment and was "not meant to advance any specific policy outcome, nor decision about the appropriateness" of CBDC. Nonetheless, it offers a window on the Fed's position and its priorities for a potential future CBDC. The report is clear that a US CBDC would need to complement, not compete with, the existing financial system. The report lists financial inclusion as a priority for CBDC design but forecloses measures that would allow a CBDC to compete with credit union or commercial bank accounts, such as a direct retail CBDC or an interest-bearing retail CBDC. The report also focuses on the role of a CBDC in streamlining the payment system, particularly cross-border payments, likely because the existing infrastructures are familiar, and networks can be expanded. It is also concerned with maintaining the hegemony of the US dollar internationally. As stablecoins are becoming more popular in transactions, the Fed and other central banks are working on finalizing regulations around stablecoins. A CBDC could compete with increasingly popular alternatives such as crypto and stablecoins (and, potentially, foreign CBDCS), and thus reinforce the Fed's efforts to maintain the global dominance of the US dollar.

The implications of a CBDC for credit unions will depend greatly on the question of intermediation. The January 2022 report makes the following points clear:

1. Any future CBDC is not going to be a Fed-only enterprise. The ambit will likely include credit unions, commercial banks, and non-bank financial intermediaries, along with additional private players.
2. Absent legislative changes to the Federal Reserve Act, individuals will not have direct CBDC accounts with the Fed. Instead, existing financial institutions will provide intermediary services.
3. Instituting CBDC would involve specific legislative changes and authorizing law from Congress and the executive branch.
4. The specific role of intermediaries will depend on both design and policy.

FIGURE 8: Take-Aways & Remaining Questions

LIABILITY

TAKE-AWAYS	QUESTIONS
The digital cash will be a liability of the Fed and would not require any deposit insurance.	How would it relate to other assets? Would it be interest-bearing?

INTERMEDIATION

TAKE-AWAYS	QUESTIONS
There will be no individual accounts with the Fed (Federal Reserve Act does not authorize it), ensuring the role of credit unions, commercial banks, and others in providing retail services. The CBDC will "complement rather than replace current forms of money and methods for providing financial services" (p. 1).	What would be the features of intermediation?

BANK RUN

TAKE-AWAYS	QUESTIONS
Credit unions, commercial banks, and other financial institutions would have access through open market, but aspects of bank run, etc., are potentially being regarded as design dependent.	Would it be interest bearing, and what would be its relationship with other assets and currency?

CREDIT/LIQUIDITY RISK/DENOMINATION AND CONVERTIBILITY

TAKE-AWAYS	QUESTIONS
At the moment, credit union, commercial bank, and nonbank money are denominated in the same unit as central bank money and intended as convertible.	How would this change with digital cash?

REMITTANCES AND CROSS-BORDER TRANSFERS

TAKE-AWAYS	QUESTIONS
Emphasis on real-time, less expensive transfers through CBDC.	How would CBDC overcome existing barriers?

PRIVACY PROTECTION AND IDENTITY VERIFICATION

TAKE-AWAYS	QUESTIONS
"A CBDC intermediary would need to verify the identity of a person accessing CBDC, just as financial institutions currently verify the identities of their customers" (p. 14).	How would this be ensured? What safeguards would there be? What about non-documented, refugee, elderly, and immigrant populations? Is there a role for credit unions in identity verification?

TRANSFERABLE

TAKE-AWAYS	QUESTIONS
Readily transferable between consumers of different intermediaries.	What technology and infrastructural requirements would be required for it to be readily transferable? Is there room for offline functions given the Fed's position on identity verification?

The introduction of a CBDC presents both opportunities and challenges for credit unions. As credit unions strategize about the introduction of a CBDC, the 2022 Fed report is a good place to start. Even if a CBDC is never developed in the US, conducting table exercises by considering the questions they raise will support credit unions' broader digital and access strategies. Taken as a heuristic, CBDCs sit squarely at the center of the question of how to manage a digital transformation in money with equitable benefit for all.

Many of the CBDC benefits that the Fed's report lists dovetail with the mission of credit unions and serve to bolster credit unions' role as essential intermediaries. A credit union can use CBDC to:

1. **Safely meet future needs and demands for payment services.** A CBDC could provide credit unions with a platform for fast, safe, and reliable digital payment services, reducing possible loss of market share to other platforms and services. It could simplify or even eliminate partnerships with third parties that credit unions often have to contract with to provide such services.

2. **Improve cross-border payments.** While there are many regulatory, legal, and infrastructural hurdles, the Fed's report is clear that improving cross-border payments is one of its priorities for CBDC design. Credit unions, especially those whose members frequently send remittance payments, stand to benefit from any such developments.

3. **Promote financial inclusion.** A CBDC could serve as the easiest and fastest way to pay taxes and receive tax refunds, as well as other Government-to-Person payments. As the intermediary for such transactions, a credit union could increase outreach to potential members, particularly those who are un- or under-banked, in order to ensure that they receive payments to which they are entitled.

The effect of a CBDC on credit unions will depend on the design of the CBDC, and many designs would either have little effect or are quite unlikely to materialize. The adoption of a wholesale CBDC, which is not accessible to regular customers, would not affect the existing relationship between credit unions, other financial intermediaries, and the central bank.

On the other hand, a direct retail CBDC, in which the Fed holds individual customer accounts, could represent a significant change for credit unions and commercial banks. While concerns about disintermediation are front and center in discussions of direct retail models, this type of CBDC is unlikely given the large-scale changes to the Fed's function and record-maintaining capacities that it would require.[65] As we noted in the previous section, this was the position taken in the Fed's recent report.

Indirect CBDCs, however, are more probable and would create potential opportunities for credit unions. An indirect retail CBDC would likely involve a two-tier system in which credit unions and commercial banks, or a narrow CBDC institution, would serve as intermediaries between the Fed and consumers. For example, Visa's proposal for a two-tier system basically leaves the role of banks and other intermediaries intact and suggests that "all ecosystem participants," such as the central bank and regulators, fintech and consumer platforms, merchants, financial institutions, networks, and consumers, will have a role in adopting CBDCs.[66]

This could potentially be beneficial for credit unions; some have predicted that more digital transactions (of any kind) mean less cash, and also therefore more debit or debit-like transactions from digital wallets. If credit unions provide those digital wallets, then there is an opportunity to drive revenue.[67] However, we know that more digital transaction does not always lead to less cash. Indeed, if CBDCs follow the historical patten of new money technologies, they are likely to be additive, not substitutive. While the idea that a CBDC could be introduced without much disruption to the current financial system is appealing from the perspective of systemic stability, such a situation would not necessarily do much for the public good, except potentially provide a new kind of bare-bones account for currently unbank ed consumers. In such a case, credit unions should strive to offer lower fees and better terms. They could also use CBDC transactions as an alternative data source to assess underwriting risk among members with limited or no credit history.[68]

Credit unions could leverage their status as community-serving organizations that actively pursue financial inclusion to shape the CBDC agenda and play a key role as intermediaries.

The Fed's report underscored identity verification as a key stumbling block for the deployment of a CBDC for the un- and underbanked or other marginalized populations. Absent the relaxation of KYC requirements for any accounts-based payment system (through, for instance, transaction limits or daily thresholds, perhaps set to the level of the highest non-KYC payment instrument in

the US, the $100 bill), solving the digital identity problem will need to be front and center of technical and legal considerations for a CBDC. Credit unions know their customers in much more robust ways than almost any other financial institution, however. Could they collaborate to creatively design access to products, with tiered value thresholds and pooled risk management, to, say, undocumented friends of credit union members? Through co-signatory relationships between members and non-members, either known to them or whom they agree to sponsor? Or through sponsorship of community organizations serving such populations? Could there be a creative deployment of data through mechanisms such as trusts to better manage members' digital identity and provide options for non-members? This is highly speculative and shows the terrain yet to be mapped, inspired by the prospect of a CBDC.

Credit unions are also well-positioned to play a complementary role in the effort to create a CBDC that has a larger public impact. In the US, proposals such as FedAccounts and the Banking for All Act have focused on improving everyday financial experiences (including accessing government payments) and fostering financial inclusion. If these proposals gain traction and are eventually instituted, credit unions could leverage their status as community-serving organizations that actively pursue financial inclusion to shape the CBDC agenda and play a key role as intermediaries. Indeed, the potential public benefits of a CBDC are in many ways identical to the services that differentiate credit unions from other financial services providers. Even if postal banking emerges as a competitor, credit unions are highly trusted, community-embedded institutions with a long history of providing affordable and accessible financial services. The challenge will be creatively and effectively communicating the value added in banking with a credit union instead of a post office, something that credit unions already do to compete with both banks and alternative financial services.

THANK YOU

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ENDNOTES

[1] Status of CBDC projects can be found at CBDC Tracker, 2021. https://cbdctracker.org/.

For a visual representation of the CBDC initiatives see Central Bank Digital Currency Tracker. Geoeconomics Tracker, Atlanta Council: https://www.atlanticcouncil.org/cbdctracker/ .

[2] Boar, Codruta and Andreas Wehrli. "Ready, Steady, Go? Results of the Third BIS Survey on Central Bank Digital Currency." Monetary and Economic Department, Bank for International Settlements. 2021. https://www.bis.org/publ/bppdf/bispap114.pdf.

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[4] See Part 5 and Table 6 of this report for discussion on characteristics of select CBDC experiments and their structural and policy contexts.

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[7] "Central Bank Digital Currencies: Financial Stability Implications." Bank for International Settlements Report. No. 4. September 2021. https://www.bis.org/publ/othp42_fin_stab.pdf.

[8] Basic definitions on money and currency in this section are drawn from reports and working papers from the Federal Reserve, Bank of England (BoE), Bank for International Settlements (BIS), and International Monetary Fund (IMF).

[9] In the US and most other countries, coins are technically assets of the central bank; the central bank purchases them at face value from the minting authority and releases them to the public. For US specific definitions see Federal Reserve https://www.federalreserve.gov/publications/january-2022-cbdc.htm.

[10] Commonly currency status is reserved to banknotes and coins issued by the central bank and is denominated in the official monetary unit.

[11] These are provisions under the Federal Deposit Insurance Corporation. Established in 1934, the FDIC provides standard insurance of $250,000 per depositor for each deposit account in a bank. The insurance does not cover investments like securities, mutual funds, etc. https://www.fdic.gov/about/what-we-do/.

[12] Monetary laws vary across countries. While it would be possible for banking laws to be amended to include digital currency, it is largely recognized that the choice of architecture and design of CBDCs would remain a policy matter as discussed in Part 4 of this report. See "Legal Aspects of Central Bank Digital Currency: Central Bank and Monetary Law Considerations" by Bossu, Wouter and Itatani, Masaru and Margulis, Catalina and Rossi, Arthur and Weenink, Hans and Yoshinaga, Akihiro. International Monetary Fundk Working Paper No (20/254). November 2020. Available at SSRN: https://ssrn.com/abstract=3758088.

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