

Developing a U.S. Central Bank Digital Currency: Summary of the Policy Debate

February 17, 2022

For much of the past century, consumers and commercial end users could access the [Federal Reserve's balance sheet](#) directly in only one way—by holding physical currency or coin issued or distributed by a Federal Reserve Bank. A major drawback, however, is that Federal Reserve Bank notes and coins are bearer instruments that must be physically held and transferred in order to effect transactions. Although the United States also offers digital money in the form of deposit balances at Federal Reserve Banks, only commercial banks are directly eligible to access this money through Federal Reserve Bank master accounts.

Due to a variety of factors, including [declining cash use](#), competitive pressure from [outside the regulatory perimeter](#), technological innovation and increasing consumer demand for [innovative payment methods following the COVID-19 pandemic](#), central banks, including the Federal Reserve System, are exploring a digital central bank money that could be made widely available to the general public (a “CBDC”).

As of early February, [around 100 of the world's 195 countries](#) have been exploring a CBDC at [various stages](#). While the vast majority of jurisdictions are still in early stages of research or in the process of developing proofs-of-concept, some jurisdictions have launched high-profile pilot programs.¹ In April 2020, China became the first major economy to pilot a digital currency that it hoped would be widely adopted by the 2022 Beijing Winter Olympics. As of February, the digital renminbi (called e-CNY) had over a hundred million individual users and billions of yuan in transactions.

The Federal Reserve has been investigating a U.S. CBDC for years, though development is still exploratory, with no immediate plans for a pilot program. In a long-awaited [discussion paper](#) published in January 2022 (the “Discussion Paper”), the Federal Reserve Board (the “FRB”) examines the pros and cons of a potential U.S. CBDC. Although the FRB is careful to disclaim that the paper “is not intended to advance any specific policy outcome” and is not “intended to signal that the Federal Reserve will

¹ A paper published by the International Monetary Fund in early February summarized insights, emerging trends, and policy lessons from six countries that have deployed CBDCs at various stages of development.

make any imminent decisions about the appropriateness of issuing a U.S. CBDC,” it offers insight into what the FRB sees as potential benefits and risks of a U.S. CBDC as well as must-have features that may inform its eventual design.

Shortly after, the Federal Reserve Bank of Boston issued a [paper](#) on Feb. 3, 2022 (the “Project Hamilton White Paper”) in partnership with the MIT Digital Currency Initiative that provided results of initial design and technical research for a potential U.S. CBDC. Congress has also [held numerous hearings](#) on the values and opportunities of a CBDC for the United States.

Below, we summarize key features of the U.S. CBDC policy debate and the current state-of-progress, focusing on the Discussion Paper. We also review the factors that may impact the potential design of a U.S. CBDC and preview upcoming developments.

The FRB has requested comments on its paper by May 20, 2022 (120 days from the date of publication). *We’ll be updating this post with additional details. Check back for more updates.*

Discussion Paper

As mentioned above, although the FRB does not purport to advocate for a particular policy outcome or CBDC design, the Discussion Paper asserts that any U.S. CBDC must be “privacy-protected, intermediated, widely transferable and identity-verified.”

- **Privacy-protected** refers to the need for the U.S. CBDC to strike a balance between privacy rights of consumers and the transparency needed to deter criminal activity.
- Due to FRB concerns regarding its authority under the Federal Reserve Act to authorize Federal Reserve accounts for individuals, any U.S. CBDC may need to be **intermediated**, *i.e.*, offered through accounts or digital wallets provided by private sector entities (including, potentially, “commercial banks and regulated nonbank financial service providers”) with Federal Reserve accounts.
- In order for a potential U.S. CBDC to be useful as a means of payment, the paper recommends that it be readily **transferable** (as distinct from the broader concept of interoperability) between customers of different intermediaries.
- Any U.S. CBDC would need to be designed to comply with anti-money laundering and terrorist financing laws, which would require the CBDC to be **identity-verified**, *i.e.*, CBDC intermediaries must be able to verify the identity of holders.

The Discussion Paper also states that the FRB does not intend to proceed with issuing a CBDC without “clear support” from the executive branch and from Congress, “ideally in the form of a specific authorizing law.”

Advantages of a U.S. CBDC

The Discussion Paper contends that a U.S. CBDC could:

- offer the general public access to digital money that is free from credit and liquidity risk;
- offer a safer deposit substitute to other products being developed by banks and other actors, including stablecoins;
- level the playing field in payment innovation for private-sector firms of all sizes;
- generate new capabilities to meet the evolving demands of the digital economy;
- improve cross-border payments;
- preserve the dominant international role of the U.S. dollar;
- promote financial inclusion by facilitating access to digital payments, enabling rapid and cost-effective payment of taxes and delivery of federal payments (including wages and tax refunds), providing a secure way for people to save and promoting access to credit; and
- extend public access to central bank money (currently only available directly to the public via Federal Reserve Notes, *i.e.*, paper money).

Potential Risks of a U.S. CBDC

The Discussion Paper also identifies several potential risks but notes that these could be addressed by design choices, *e.g.*, by ensuring that a U.S. CBDC is not interest-bearing, or limiting the amount of CBDC an end user could hold or the rate at which they could accumulate tokens. In particular, a U.S. CBDC:

- could fundamentally change the structure of the U.S. financial system, *e.g.*, an interest-bearing CBDC that functions as a substitute for commercial bank (or other

private) money could reduce the aggregate amount of deposits in the banking system, increase bank funding costs and reduce credit availability;

- could impact the safety and stability of the financial system, *e.g.*, the ability to freely convert assets into CBDC would make runs on financial firms more severe;
- could affect how the FRB effects monetary policy, *e.g.*, demand for a U.S. CBDC could place downward pressure on reserves, which in turn would make it difficult for the FRB to implement its “ample reserves” monetary policy regime in which it exercises control over short-term interest rates through the setting of administered rates (interests on reserves and overnight repurchase agreement facility offering rates) rather than actively managing the supply of bank reserves;
- would need to strike an appropriate balance privacy and transparency; and
- would need to be resilient to operational disruptions and cybersecurity risks, which may be difficult because a CBDC network could potentially have more entry points than existing payment services.

Observations

Token-Based and Account-Based Systems

- A U.S. CBDC could be [account-based, token-based or a hybrid](#).² A token-based system is one that is focused primarily on ensuring the integrity of the object used as money, whereas an account-based system is focused on characteristics of the owner. The canonical token-based system is physical currency—if you pay for goods or services with Federal Reserve notes, the merchant cares primarily about whether the bills are real or fake, and not about the identity of the payer. An example of an account-based system is a bank deposit, where there is some external record of ownership attributable to a specific owner. Some countries are exploring an account-based system (*e.g.*, e-CNY), whereas others are exploring a token-based system (*e.g.*, Nigeria’s e-Naira).
- Although the Discussion Paper does not advocate for a particular system, both the alternatives that the Project Hamilton White Paper explored were token-based systems. In order to implement an account-based system, the Federal Reserve [could](#)

² Although the Project Hamilton White Paper asserts that this crude characterization is “lacking and insufficient to surface the complexity of choices in access, intermediation, institutional roles, and data retention in CBDC design,” these distinctions have been adopted [elsewhere](#) and serve as a useful pedagogical framework.

[extend](#) existing or planned real-time gross settlement systems (e.g., FedNow) to include nonbank participants.

- One of the advantages of a token-based system over a more traditional account-based system raised by the Discussion Paper and the Project Hamilton White Paper is that a token-based CBDC could be designed to allow for programmability such as smart contracts and enable automated execution of operations, e.g., automatic payment of interest, routing of tax payments or electricity fees, etc.
- Interestingly, the Project Hamilton Paper notes that a token-based system need not be based on blockchain or distributed ledger technology. Although aspects of cryptography, distributed systems and blockchain technology can be leveraged, the paper concluded that adopting a blockchain-based system in its entirety was not a “good match” for its requirements due to issues with performance and the lack of a need to foster trust among a set of distrusting participants.

Monetary and Financial Stability Policy by Design

- Among the policy concerns that the Discussion Paper raises are the potential impacts that design choices might have on deposit and lending markets, and on the transmission of monetary policy.
- The Discussion Paper warns that a widely available CBDC that serves as a close or near-perfect substitute for commercial bank money, e.g., an interest-bearing CBDC, could reduce the aggregate amount of deposits in the banking system, which could increase bank funding costs and reduce credit availability (or raise credit costs). [Academic research](#) also suggests that a sufficiently high CBDC interest rate could reduce the market share of small banks in both deposit and lending markets (although such effects might be less pronounced the more convenient the CBDC is for consumers, as the CBDC chips away at the purported “convenience advantage” of larger banks).
- The Discussion Paper also notes that “a CBDC’s design would influence how it might affect monetary policy.” Specifically, the paper comments on the potential for an interest bearing CBDC to impact the efficacy of Federal Reserve monetary policy transmission, particularly in our current “ample reserves” regime. (A non-interest bearing CBDC would not apply pressure on reserves because consumers would view the CBDC as a vehicle for sending and receiving money, and not a replacement for interest-bearing assets like deposits). As the Discussion Paper notes, however, this issue is complex. Some researchers have [noted](#) that actual causal relationships—especially in an era of ample reserves—may vary depending on liquidity properties, interest rates and reserve requirements of the CBDC, and convenience value and

market power of intermediary banks, among other factors. For example, [a recent academic model](#) found that while a higher level of CBDC convenience would weaken the transmission of monetary policy, a sufficiently high level of convenience could enhance monetary policy transmission.

- Other design choices, like access rights for existing commercial banks or levels of buildout by the Federal Reserve, availability of a mobile app, etc., may also have significant policy implications.

Role of Intermediaries

- The Discussion Paper concludes that because the Federal Reserve Act does not authorize direct accounts at the FRB for individuals, a U.S. CBDC would have to be offered through intermediaries. This form of access architecture in which end users have direct claims on a central bank, but responsibility for payments and transactions are delegated to financial intermediaries, [has been referred to as a “hybrid model.”](#)
- Other forms of CBDC architecture include a “direct model,” in which end users have direct claims against a central bank that maintains a record of all balances (e.g., Central Bank of Iceland), and a “hybrid” or “synthetic” model in which end users have claims on intermediaries that are fully backed by wholesale accounts that the intermediaries maintain with the central bank.
- CBDC architecture is an important operational design choice that impacts the legal nature of customers’ claims on the central bank. For example, in a hybrid model, if the intermediary fails, holdings of the CBDC would have to be excluded from the intermediary’s estate available to creditors.
- From the Discussion Paper, the FRB seems focused on designing a hybrid CBDC that encourages greater engagement of private sector intermediaries, grants the FRB access to convenient and already developed systems, and relieves the FRB of know-your-customer, dispute resolution, due diligence and other compliance-related responsibilities. On the other hand, the FRB surrenders any record of individual claims and accounts and is impacted by the financial stress and information-sharing capabilities of intermediaries.

Partnerships with Academia

- The Project Hamilton White Paper, which details a partnership with MIT’s Digital Currency Initiative, seems to indicate that the Federal Reserve is open to active collaboration with academia.

- This type of collaboration is not new. In fact, both the Federal Reserve and industry participants have often partnered with academia on FinTech-related projects. The Stanford Research Institute [partnered](#) with Bank of America in the early 1950s to develop the first computerized check-clearing machines and magnetic ink character recognition (“MICR”) technology. The Atlanta Federal Reserve Bank and Georgia Tech [partnered](#) in the 1960s to develop a predecessor to the Automatic Clearing House (“ACH”) system.

Other Use Cases for CBDC

- Although the Discussion Paper defines a CBDC as central bank money that is “widely available to the general public,” and in multiple places mentions the possibility of capping balances available to end users, a CBDC could be designed to accommodate more limited use cases (e.g., in wholesale payments and inter-bank settlements).
- Central banks could develop a CBDC solely for retail (e.g., Nigeria’s e-Naira) or wholesale payments (e.g., Bank Negara Malaysia).

Critics of the Payment System

- [Critics](#) of current payment infrastructure have long noted that upgrading the U.S. banking and payment system to enhance for interoperability and open banking standards would require major upgrades to the existing technology stack. Legacy payment systems, including ACH, electronic fund transfer and other interbank transfer networks, have not been updated in decades.
- Insufficiencies were highlighted by COVID-19; the existing legacy payment system prevented banks from delivering welfare aid efficiently, especially to under- and unbanked Americans. Delays in payments caused consumers to draw down on empty accounts, triggering overdraft fees. An efficient, real-time, blockchain-based CBDC could be an alternative solution that resolves time delays and prevents fees.
- While the FRB has been developing its own real-time interbank clearing and settlement rail called FedNow, a CBDC may [render the innovation obsolete](#) as a CBDC could allow users to access tokens without a bank account and also take advantage of certain innovations like [smart contract programming](#). The target release date for FedNow is 2023. However the potential for a CBDC to overshadow or replace FedNow depends on regulator appetite for a CBDC, availability of a CBDC for retail vs. wholesale payments and the risks of a CBDC product.

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