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Central Bank Digital Currencies: Policy Issues

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SUMMARY

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Central Bank Digital Currencies: Policy Issues

The recent proliferation of private digital currencies or cryptocurrencies, such as Bitcoin, and a proposal by Facebook to create a cryptocurrency for use on its platform has led to questions of whether the Federal Reserve (Fed) should create a central bank digital currency (CBDC)—a digital dollar that would share some of the features of these private digital currencies.

In addition, several countries are moving forward with plans to create CBDCs, and this has increased calls for the Fed to act. According to a survey from the Bank for International Settlements, more than 85% of central banks worldwide are researching, piloting, or in advanced stages of development of CBDCs. For example, China has completed several digital currency trials in major cities across the country, as well as cross-border trials with Hong Kong; the European Central Bank hopes to launch a digital euro by 2025; the Eastern Caribbean is piloting its digital currency (DCash) in four countries; and the Bank of Japan has announced a "phase one" of testing a digital yen. The proliferation of CBDCs around the world has raised questions about whether the United States is falling behind in the future of the financial system, and whether that could affect its "reserve currency" status.

Digital payments and account access are already widespread in the United States. As a result, the Fed has not yet determined that there is a "compelling demonstrated need" for a CBDC that merits its creation. A key question from an end user (e.g., consumer or merchant) perspective is: would a CBDC be faster and less expensive than the current system? A CBDC would presumably allow for real-time settlement of payments—a feature that is not currently ubiquitous in the U.S. payments system, but may become so after the Fed rolls out FedNow, its planned real-time settlement system. Creating a CBDC could take several years, whereas FedNow is expected to be operational in 2023. Whether payments using a CBDC would be less expensive than the status quo remains unknowable until detailed proposals have been made. (Cross-border payments have been identified as offering greater potential gains in cost and speed.)

From an end-user perspective, CBDC proposals range from a system similar to the current status quo to one that is fundamentally different. The Fed and private sector already operate bank-to-bank digital wholesale payments systems, some of which are settled in real time, so a CBDC only accessible to banks may differ slightly from the current system. In contrast, proposals for consumers to be able to hold CBDCs in accounts at the Fed would fundamentally change the role of the Fed and its relationship with consumers and banks. Thus, depending on its attributes, a domestic CBDC could potentially compete with private digital currencies, foreign CBDCs, private payment platforms, or banks. CBDC proponents differ as to which of these they would like a domestic CBDC to compete with. CBDCs are more likely to compete with private digital currencies as a payment means for legal commerce than to function in their other current uses (e.g., as speculative investments or as payment means for illicit activities).

Depending on its features and how much it differed from the status quo, a U.S. CBDC would have an ambiguous but potentially significant effect on financial inclusion, financial stability, cybersecurity, Federal Reserve independence, seigniorage, and the effectiveness of monetary policy. If the CBDC mainly crowded out cash and cryptocurrency use, it could make illicit activity more difficult, possibly at some expense of individual privacy. If used to deliver government payments, the CBDCs' ability to improve their speed and efficiency would depend on the extent of its adoption by those not already receiving payments by direct deposit, which might be low unless mandatory.

To date, the Fed has not committed to creating a CBDC or expressed an opinion on whether or not doing so would be desirable. It has signaled that it is open to input from stakeholders and Congress on whether it should move forward with a CBDC and, if so, what form it should take. It is unclear whether legislative changes would be necessary to create a CBDC, in part because CBDC proposals vary widely. Regardless, Congress might choose to legislate in order to either explicitly authorize or mandate the Fed create a CBDC and shape its features and uses, or to prevent one from being introduced.

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Introduction

Over the country's history, the U.S. monetary system has undergone several fundamental transformations, resulting in significant changes in how the financial system operates. Both commercial banks and the U.S. Treasury issued their own paper currency until the 20th century, and until 1864, there was no federal regulation of private bank-issued currency.[1] The Federal Reserve (Fed), currently the exclusive issuer of currency, was not established until 1914.[2] For most periods until 1933, the value of the dollar was fixed to precious metals; it has not been convertible to gold or silver since. These changes were controversial at the time, creating winners and losers, but are now taken for granted.

In recent years, digital currencies, such as Bitcoin, have been privately issued, and many countries have begun developing central bank digital currencies (CBDCs). This has led to a debate in the United States about whether the Fed should also issue a CBDC. It is an open question whether the introduction of a CBDC would also lead to fundamental changes in the financial system, or whether it would be more comparable to the introduction of electronic clearing of paper checks—a technological change in back office operation that is largely unnoticeable to consumers.

Congress has participated in the debate over whether the United States should have a CBDC and, if so, the features it should have and whether legislation is needed to enable or expedite that process.[3] The current chairs of the Senate Committee on Banking, Housing, and Urban Affairs (S. 3571, sponsored by Senator Brown) and House Financial Services Committee (Section 101 of H.R. 6321, sponsored by Representative Waters) both introduced legislation in the 116th Congress that would have created CBDC and digital wallets at the Fed that any individual could hold CBDC in. In addition, both bills would have allowed federal Coronavirus Disease 2019 (COVID-19) stimulus payments to be delivered through those wallets. In the 117th Congress, legislation related to CBDCs includes H.R. 2211 (sponsored by Representative Foster) and H.R. 3506 (sponsored by Representative Hill).

This report explains what CBDCs are and how they would alter the current financial landscape, what steps the rest of the world is taking to develop CBDCs, the range of potential design features for a CBDC, and what policy issues are raised by CBDCs. It starts with a brief description of current payments systems and digital currencies.

Digital Payments and Private Digital Currencies Today

The U.S. financial system includes private digital currencies that currently have only a niche role in payments. It also features widely available private digital retail payment systems based on the

[1] For more information, see CRS Report R41887, *Brief History of the Gold Standard in the United States*, by Craig K. Elwell; and Franklin Noll, "A Brief History of U.S. Government Currency, 1861-Present: Part 1," *Treasury Notes*, 8/25/2014, at https://www.treasury.gov/connect/blog/Pages/US-Currency-Brief-History-Part-1.aspx.

[2] Currency ("Federal Reserve notes") is a liability of the Federal Reserve, but physically created at the Fed's behest by the Bureau of Engraving. Coins are issued by the U.S. Mint and are a liability of the Treasury Department.

[3] U.S. Congress, Senate Committee on Banking, Housing, and Urban Affairs, Subcommittee on Economic Policy, *Building A Stronger Financial System: Opportunities of a Central Bank Digital Currency*, 117th Cong., 1st sess., June 9, 2021; U.S. Congress, House Committee on Financial Services, Task Force on Financial Technology, *Digitizing the Dollar: Investigating the Technological Infrastructure, Privacy, and Financial Inclusion Implications of Central Bank Digital Currencies*, 117th Cong., 1st sess., June 15, 2021.

dollar and underpinned by digital interbank wholesale payment systems run by the Fed and the private sector. Currently, the Federal Reserve issues two liabilities that facilitate payments, paper currency for retail payments and reserves that banks hold in accounts at the Fed for wholesale payments. The latter are accessed digitally, as are balances held by consumers in bank accounts.

In traditional electronic payment systems, which predominate today, participants hold *fiat* money (i.e., serves as legal tender by government decree) in an account at a private commercial bank or other financial intermediary that maintains accurate private ledgers of how much money each customer has available. To make a payment, the payer instructs (using a physical check or an electronic message) the intermediary to transfer money to the recipient's account. If the recipient holds an account at a different intermediary, those intermediaries will send messages to each other via electronic messaging networks—even if the payment is made by paper check—instructing each to make the necessary changes to their ledgers. The intermediaries validate the transaction, ensure the payer has sufficient funds for the payment, deduct the appropriate amount from the payer's account, and add that amount to the payee's account.[4] When the intermediaries in these payments systems are banks, they are closely regulated to ensure safety and soundness, consumer protection, and financial stability. In addition, the value of the money is generally maintained by a public central bank that aims to circulate a supply of money large enough to facilitate economic activity, but not so large as to destabilize the value of money.

While these systems generally offer relatively fast, convenient, and safe payment options, they involve significant costs and physical infrastructure to ensure the systems' integrity, performance, and availability. For example, payment system providers operate and maintain vast electronic networks to connect retail locations with banks, and the Federal Reserve operates and maintains networks to connect banks to itself and each other.[5] In addition, although the traditional payment system may be sufficiently fast and convenient to complete many transactions, some transactions can involve brief delays. One such delay can be a lag time between when a payment (such as a paycheck) is deposited at a bank and when the full amount of the funds can be used by the individual.[6]

In recent years, thousands of privately issued *digital currencies* have been developed and captured public attention.[7] Bitcoin, Ethereum, Dogecoin, and Litecoin are prominent examples. Instead of transferring money by making changes to private, centralized ledgers of intermediaries such as banks, these alternative systems generally make changes to public or *distributed*, decentralized ledgers. These ledgers are typically protected from manipulation or unauthorized

[4] Richard J. Sullivan, "The Federal Reserve's Reduced Role in Retail Payments: Implications for Efficiency and Risk," *Federal Reserve Bank of Kansas City Economic Review* (third quarter 2012), pp. 80-87.

[5] Sullivan, "Federal Reserve's Reduced Role."

[6] Regulation CC governs how long banks can take to make funds available to depositors. Aaron Klein, *How the Fed Can Help Families Living Paycheck to Paycheck*, The Brookings Institution, November 22, 2017, at https://www.brookings.edu/research/how-the-fed-can-help-families-living-paycheck-to-paycheck/. Currently, the Federal Reserve settles payments on a same-day or next-business day basis. Federal Reserve, "Potential Modifications to the Federal Reserve Banks' National Settlement Service and Fedwire® Funds Service To Support Enhancements to the Same-Day ACH Service," 84 *Federal Register* 221223, May 16, 2019, at https://www.federalregister.gov/documents/2019/05/16/2019-09949/potential-modifications-to-the-federal-reserve-banks-national-settlement-service-and-fedwire-funds.

[7] For a more detailed analysis of these issues, see CRS Report R45427, *Cryptocurrency: The Economics of Money and Selected Policy Issues*, by David W. Perkins.

transfers with blockchain technology and cryptography (hence, many of them are referred to as *cryptocurrencies*).[8]

Although portrayed as an alternative form of money, private digital currencies have not achieved the defining characteristics of money—they are not a medium of exchange (i.e., widely accepted for payment), a store of value (i.e., retains much of its value over time), and a unit of account (i.e., an easily understood measure of the value of things). For example, because cryptocurrencies are not legal tender—i.e., there is no legal requirement for parties to use them to settle debts—and they cannot be used to pay taxes, they may not function well as a medium of exchange. Thus far, no cryptocurrency has succeeded in settling payments rapidly on a large scale. In addition, the values of cryptocurrencies have been volatile, arguably making them poor stores of value and ineffective units of account.[9] Because the supply of cryptocurrency is typically determined by a computer protocol and not a centralized authority like a central bank, it is not clear how or when their values would stabilize.

Some developers have attempted to create cryptocurrencies with stable values, often called *stablecoins*. One prominent example is Tether. Stablecoins may share some of the technological features of cryptocurrency, but the issuer of the coin pegs the coin's value to a stable currency or basket of stable currencies (or to some other asset or commodity). In principle, this could make stablecoins more attractive as a medium of exchange and store of value than the cryptocurrencies that experience large and rapid changes in value. A Facebook-led proposal to develop a stablecoin to be used for payments on the Facebook platform—initially to be called *Libra,* and later rebranded as *Diem*—has generated much attention.[10]

In most cases, private digital currencies' decentralized nature and lack of centralized authority is at the root of many of the challenges and risks they pose (discussed below). This has led some observers to suggest that central banks could use the technologies underlying cryptocurrencies or otherwise replicate certain features of the currencies to issue their own *central bank digital currencies* (CBDCs). The aim of CBDCs would be to realize the touted benefits of private digital currencies in a way that would be "safe, robust, and convenient."[11] The prospect of a private stablecoin, such as Diem, becoming widely used led to increased calls for central banks to consider issuing CBDCs to maintain public money's central economic role.[12]

What Is a CBDC?

There is no consensus definition for what a CBDC would comprise—the term is used to refer to a number of concepts.[13] If defined simply as a central bank liability that is digital, the term could be misleading in the sense that central banks already make their fiat money available digitally to commercial banks for inter-bank payments and as a store of value through their central bank

[8] For more information, see CRS Report R45116, *Blockchain: Background and Policy Issues*, by Chris Jaikaran.

[9] David Yemack, *Is Bitcoin a Real Currency? An Economic Appraisal*, National Bureau of Economic Research, Working Paper no. 19747, December 2013, pp. 2-3, at https://www.nber.org/papers/w19747.

[10] For more information, see CRS Insight IN11183, *Libra: A Facebook-led Cryptocurrency Initiative*, by Rebecca M. Nelson and David W. Perkins.

[11] Bank for International Settlements (BIS), Committee on Payments and Market Infrastructures, *Central Bank Digital Currencies*, March 12, 2018, pp. 1-2, at https://www.bis.org/cpmi/publ/d174.htm; hereinafter BIS, *Central Bank Digital Currencies*.

[12] Markus K. Brunnermeier, Harold James, and Jean-Pierre Landau, *The Digitization of Money*, Princeton University working paper, August 2019, at https://scholar.princeton.edu/sites/default/files/markus/files/02c_digitalmoney.pdf.

[13] BIS, *Central Bank Digital Currencies*, pp. 3-4.

reserve accounts.[14] Abroad, if imprecise, definition of CBDC provided by the Bank of International Settlements (BIS) is a "digital form of central bank money that is different from balances in traditional reserve or settlement accounts."[15] Federal Reserve Governor Lael Brainard has said that the ability to hold the currency without the involvement of a commercial bank intermediary is a defining characteristic.[16] Rather than providing a definition, this report will highlight where differences in definitions lead to differences in outcomes for users or policy. However, there is no consensus on the exact form that a CBDC might take, since such currencies could vary widely in their features and characteristics.[17] As discussed below, the mandates, authorities, and goals of different countries' central banks vary, and so their motivation and ability to issue a CBDC—and in what form—differ.[18]

Federal Reserve Statements on a U.S. CBDC

The Fed's most substantial statement of its position on CBDCs to date was articulated in a 2019 letter to Representative French Hill. The Federal Reserve stated that it is "not currently developing a [CBDC]," and has only committed to "continue to analyze the potential benefits and costs" in the future. Its rationale was that "it is not yet clear what additional value a general purpose CBDC could provide in the U.S." compared to the existing payment system. According to the Fed, the concept "raise(s) important legal, monetary policy, payments policy, financial stability, supervision and operational questions" that would have to be resolved before moving forward.[19]

More recent statements by Federal Reserve Chair Jerome Powell indicate that the Fed views the deployment of a CBDC as a long-term possibility, but only if the technology were to fulfill some want or need, and that preferably would be deployed after Congress granted specified authority to the Fed to do so in new legislation. In January 2021, Chair Powell reportedly stated that, if the Fed decided to move forward, the introduction of a CBDC was years, not months, away.[20] In March 2021, Powell was quoted as saying, "We don't need to rush this project, and we don't need to be first to market … . The real threshold question for us is does the public want or need a new digital form of central bank money to complement what is already a highly efficient, reliable and

[14] Federal Reserve Governor Lael Brainard, "Digital Currencies, Stablecoins, and the Evolving Payments Landscape," speech at The Future of Money in the Digital Age conference, Washington, DC, February 05, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20191016a.htm. See also, Lael Brainard, "An Update on Digital Currencies," speech, August 13, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20200813a.htm.

[15] This definition rules out proposals for "synthetic CBDC" that is issued by private entities but fully backed by reserves held in accounts at the Fed. The Bank for International Settlements (BIS) is an international financial institution founded in 1930 and composed of 62 central banks, including the U.S. Federal Reserve; quotation from BIS, *Central Bank Digital Currencies*, pp. 3-4. See also Agustín Carstens, "Digital Currencies And The Future Of The Monetary System," Bank for International Settlements, January 27, 2021, at https://www.bis.org/speeches/sp210127.pdf.

[16] Federal Reserve Governor Lael Brainard, "Digital Currencies, Stablecoins, and the Evolving Payments Landscape."

[17] BIS, *Central Bank Digital Currencies*, pp. 3-7.

[18] Codruta Boar, Henry Holden, and Amber Wadsworth, *Impending Arrival – A Sequel to the Survey on Central Bank Digital Currency*, BIS, BIS Paper No. 107, January 2020, at https://www.bis.org/publ/bppdf/bispap107.pdf.

[19] Federal Reserve Chair Jerome Powell, *Letter to the Honorable French Hill*, November 19, 2019.

[20] "Fed's Powell: CBDC Will Be Years, Not Months," Away, PYMNTS, January 14, 2021, at https://www.pymnts.com/news/payment-methods/2021/fed-powell-cbdc-years-not-months-away/.

innovative payments arena and system." He indicated that the Fed planned to increase its engagement with the public and Congress in 2021.[21]

Chair Powell was also quoted as saying, "we would need buy-in from Congress, from the Administration, from broad elements of the public … we would not proceed with this without support from Congress, and I think that would ideally come in the form of an authorizing law, rather than us trying to interpret our law to enable this."[22] The Fed has highlighted legal uncertainty about whether all of the actions that would be needed to successfully implement a CBDC could be taken under its existing authority. These include whether a CBDC would be legal tender, whether the Fed can offer accounts or digital wallets to the public, and what legal rights, obligations, and protections CBDC users would have.[23]

The Fed reports that it has nevertheless been actively researching the issue:

> Given the dollar's important role, it is essential that we remain on the frontier of research and policy development regarding CBDC. Like other central banks, we are conducting research and experimentation related to distributed ledger technologies and their potential use case for digital currencies, including the potential for a CBDC. We are collaborating with other central banks as we advance our understanding of central bank digital currencies.[24]

Specifically, the Federal Reserve Bank of Boston and Massachusetts Institute of Technology have been conducting research since 2020 to lay the technical groundwork for the potential creation of a CBDC. The first phase of the project "will involve jointly building and testing a hypothetical central bank digital currency for wide-scale, general purpose use."[25] The Boston Federal Reserve Bank official in charge of the project reportedly stated that the first phase, including computer code, will be made public in the third quarter of 2021.[26]

U.S. CBDC Design Options

Any concrete proposal for introducing a CBDC in the United States needs to specify a number of still-undecided design elements that would have implications for how it would work and be used, and what advantages, disadvantages, and risks it would pose.[27] These include the following:

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[21] CQ Transcripts, *House Financial Services Committee Holds Hearing on Monetary Policy and the State of the Economy*, February 24, 2021.

[22] Michael S. Derby, "Powell Says Congressional Support Likely Needed to Adopt Fully Digital Dollar," *WSJ Pro Central Banking*, March 22, 2021. See also Jess Cheng, Angela N Lawson, and Paul Wong, "Preconditions For A General-Purpose Central Bank Digital Currency," Federal Reserve, *FEDS Notes*, February 24, 2021, at https://www.federalreserve.gov/econres/notes/feds-notes/preconditions-for-a-general-purpose-central-bank-digital-currency-20210224.htm.

[23] Federal Reserve Chair Jerome Powell, *Letter to the Honorable French Hill*, November 19, 2019. See also Paige Paridon, *Legal Authority to Issue a U.S. Central Bank Digital Currency*, Bank Policy Institute, June 9, 2021, https://bpi.com/legal-authority-to-issue-a-u-s-central-bank-digital-currency/.

[24] Federal Reserve Governor Lael Brainard, "The Digitalization of Payments and Currency: Some Issues for Consideration," speech at Stanford, California, February 5, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20200205a.htm.

[25] Federal Reserve Bank of Boston, "The Federal Reserve Bank of Boston Announces Collaboration With MIT To Research Digital Currency," press release August 13, 2020, at https://www.bostonfed.org/news-and-events/press-releases/2020/the-federal-reserve-bank-of-boston-announces-collaboration-with-mit-to-research-digital-currency.aspx.

[26] Michael S. Derby, "Boston Fed Staffers Offer Road Map in Digital-Dollar Research Effort," *WSJ Pro Central Banking*, March 31, 2021.

[27] Federal Reserve Chair Jerome Powell, *Letter to the Honorable French Hill*, November 19, 2019; BIS, "Central Bank

- How would the Fed regulate the supply of CBDC? The overall money supply plays a role in determining inflation, and most central banks, including the Fed, are tasked with maintaining low and stable inflation.
- Should the Fed pay CBDC holders interest? Currently, most central banks pay interest on bank reserves held at the central bank, but do not pay interest on physical currency.
- Who would be able to use CBDC—banks, financial firms, or the general public?
- Who would be able to access and hold CBDC directly with the central bank? For example, would any member of the U.S. public have direct access through "*FedAccounts*" or only approved intermediaries? If the latter, what types of intermediaries should be allowed to exchange and store CBDC on behalf of the public—banks, existing nonbank financial firms, or a new type of financial firm?
- Should Treasury have any role in the issuance, production, or backing of CBDC?
- Would CBDC be legal tender to pay debts? Would it be allowed to pay taxes and receive government payments? Would banks and merchants be required to accept them for payment? All of these considerations would affect how widely and quickly the CBDC was adopted.
- Should CBDC transactions be anonymous or traceable by the Fed?
- Should CBDC payments and exchange flow through the Fed's existing payment and settlement systems, private systems, or should a new system be created?
- Should CBDC use the technology underpinning private cryptocurrencies (e.g., blockchain, distributed ledgers, cryptography)? Or would these technologies be extraneous or counterproductive in the presence of a trusted central administrator?
- How would the Fed's CBDC interface with other countries' CBDCs in cross-border payments?

How Would a CBDC Differ From the Current System?

Two key features of a CBDC is that it can be used digitally and can be transferred between parties with negligible delay. Digital payments are already ubiquitous in the U.S. financial system for those who choose to use them, however. Real-time payments (i.e., instantaneous settlement) are currently available,[28] but not widespread, but may eventually become ubiquitous after the Fed introduces *FedNow*, its real-time settlement system, which is currently planned for 2023.[29] Since planning for a CBDC has not yet started, ubiquitous real-time payments of dollars will likely already be the status quo if and when a CBDC were to become available. Likewise, a CBDC

Digital Currencies: Foundational Principles And Core Features," Report No. 1, 2020, at https://www.bis.org/publ/othp33.pdf; Davis Polk, *Digital Dollars/Central Bank Digital Currencies*, March 17, 2021, at https://alerts.davispolk.com/10/5625/uploads/digital-dollars-central-bank-digital-currencies.pdf; Sarah Allen et al., "Design choices for Central Bank Digital Currency: Policy and technical considerations," Brookings working paper 140, July 2020, at https://www.brookings.edu/wp-content/uploads/2020/07/Design-Choices-for-CBDC_Final-for-web.pdf.

[28] The Clearing House Payments Company L.L.C. (PayCo) currently offers its members a private real-time payment settlement service.

[29] See CRS Report R45927, *U.S. Payment System Policy Issues: Faster Payments and Innovation*, by Cheryl R. Cooper, Marc Labonte, and David W. Perkins.

could reduce counterparty risk currently involved in settlement, but real-time settlement would also reduce that risk. This raises questions about how a CBDC might differ from the current system or the system that will be in place once FedNow is fully implemented, and has led some observers to wonder whether CBDC is a proverbial "solution in search of a problem."[30]

The technology underpinning many private digital currencies is structurally different from the current payment system. Proposals vary as to the extent that a CBDC would or would not use these technologies. Regardless of the technological underpinnings, a CBDC could differ very little or very significantly from the current system from an end user's (e.g., a consumer's or retail business's) perspective, depending on its features. A CBDC that differed only on cost effectiveness from an end user perspective would be justifiable enough to some. However, CBDC plans are not detailed enough to speculate whether these differences would reduce costs to users.

Broadly, a CBDC could be compared to the current system under three scenarios based on types of users—banks, financial firms (such as nonbank payment firms), or consumers/merchants directly.[31] A CBDC used only by banks would be the most similar to the current system from an end user perspective. Banks (and a limited number of other financial institutions) already clear and settle wholesale payments digitally through interest-earning digital accounts held at the Fed.[32] Depending on the design, a CBDC could nevertheless have new features, such as a blockchain-based ledger[33] accessible to users or "tokenization" allowing it to be held or transferred outside of the Fed's payment network.[34] Nevertheless, if access is limited to banks, it is possible a CBDC would not lead to the availability of any new financial products or features for consumers.

Allowing other types of financial firms to hold and exchange CBDC could potentially lead to innovations in payments that are difficult to anticipate without any details about what the CBDC's features would be. A key difference could be that nonbank payment providers would no longer need to route payments between different providers through banks.[35] Still, the Fed's role as the central administrator and regulator of wholesale payment systems would not change, although the underpinning technology would. Again, from an end user's perspective, these innovations may or may not be noticeable, depending on the CBDC's other features. For example, nonbank

[30] Marcelo M. Prates, "Central Banks Had to Up Their Money Game This Year – And They Did," *Coindesk*, December 21, 2020, at https://www.coindesk.com/money-game-central-banks-cbdc. Vice Chair for Supervision Randal K. Quarles, "Parachute Pants and Central Bank Money," Speech, June 28, 2021, at https://www.federalreserve.gov/newsevents/speech/quarles20210628a.htm.

[31] John Kiff et al, *A Survey of Research on Retail Central Bank Digital Currency*, International Monetary Fund working paper WP/20/104, June 2020, at https://www.imf.org/en/Publications/WP/Issues/2020/06/26/A-Survey-of-Research-on-Retail-Central-Bank-Digital-Currency-49517; Martin Chorzempa, *How Are Central Bank Digital Currencies Different From Other Payment Methods?* Peterson Institute for International Economics, April 21, 2021, at https://www.piie.com/research/piie-charts/how-are-central-bank-digital-currencies-different-other-payment-methods.

[32] These payments can be settled through settlement systems run by the Fed or private-sector settlement systems that operate through accounts at the Fed.

[33] For more information, see CRS Report R45116, *Blockchain: Background and Policy Issues*, by Chris Jaikaran.

[34] Note that there is disagreement over whether CBDC would be token-based or account-based, and over how those terms are defined. Alexander Lee, Brendan Malone, and Paul Wong, "Tokens And Accounts In The Context Of Digital Currencies," Federal Reserve, *FEDS Notes*, December 23, 2020, at https://www.federalreserve.gov/econres/notes/feds-notes/tokens-and-accounts-in-the-context-of-digital-currencies-122320.htm. Rod Garratt, Michael Lee, Brendan Malone, and Antoine Martin, "Token- or Account-Based? A Digital Currency Can Be Both," *Liberty Street Economics*, Federal Reserve Bank of New York, August 12, 2020, at https://libertystreeteconomics.newyorkfed.org/2020/08/token-or-account-based-a-digital-currency-can-be-both.html.

[35] Instead of creating a CBDC, this could also be accomplished by giving nonbank payment providers reserve accounts at the Fed. Policymakers have recently debated the merits of granting fintech payment firms a bank charter that could result in them being granted reserve accounts at the Fed.

retail payment systems are already prevalent, but end users might no longer need to link retail payment accounts to bank accounts.[36]

A CBDC that individuals hold and use directly could potentially differ more fundamentally from the current system. In thinking about those differences, a key question is where individuals would be permitted to store and access CBDC—at a bank, nonbank financial institution, or directly at the Fed (popularly known as "FedAccounts")? For end users, CBDC held in an account or wallet at a bank might look similar to a bank account, perhaps with additional features and capabilities.[37] But instead of being a liability of the bank, which is government insured up to the deposit limit, the CBDC would be a risk-free liability of the Fed. FedAccounts would differ most fundamentally from the current financial system, in which the Fed does not offer any retail services to consumers. In this scenario, depending on design features, retail payments, direct deposits, and government payments could potentially flow between individuals without involving banks or any other existing payment intermediaries.

One characteristic of a CBDC that sets it apart from any private digital currency—and could potentially justify its creation—is that "central bank money … represents a safe settlement asset, allowing users to exchange central bank liabilities with confidence in their acceptance and reliability."[38] According to proponents, "[At present,] cash is also the only liquid asset for saving outside of the private financial system … We believe there is great demand for a virtual asset issued by a trusted party [such as CBDCs] that can be used to save outside of the private financial system."[39] If CBDC were held only by banks, this would not differ from reserve accounts banks hold at the Fed in the current system. But if held by consumers, this would expose them to no credit risk, unlike a private digital currency and uninsured balances held at a bank or in certain payment systems—although it would arguably be as safe as federally insured balances held in a bank account.[40]

Approaches to CBDCs around the World

Since 2017, interest in CBDCs has evolved from a fringe policy initiative to an area of active policy development for most countries around the world. In the mid- to late-2010s, only a handful of countries expressed public interest in CBDCs. China's central bank launched research on CBDCs in 2014 as part of its broader efforts to internationalize the renminbi (RMB), maintain control over its financial system as private cryptocurrencies proliferate, and gain greater surveillance over individuals' transactions. For other countries, notably Iran, Russia, and Venezuela, early interest in CBDCs (around 2016-2018) was driven by a desire to evade U.S. sanctions. Venezuela—in the midst of a severe economic crisis and subject to U.S. financial

[36] In the current financial system, if the two parties to a payment are not members of the same payment system, the payment must flow through the banking system and the Fed.

[37] A key feature that would determine comparability is whether the CBDC would pay interest. For purposes of this report, whether CBDC were stored in accounts or wallets arguably does not raise meaningful policy differences.

[38] Federal Reserve Governor Lael Brainard, "The Digitalization of Payments and Currency: Some Issues for Consideration," speech at Stanford, California, February 5, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20200205a.htm.

[39] Aleksander Berentsen and Fabian Schar, "The Case for Central Bank Electronic Money and the Non-case for Central Bank Cryptocurrencies," *Federal Reserve Bank of St. Louis Review*, vol. 100, no. 2 (Second Quarter 2018), at https://research.stlouisfed.org/publications/review/2018/02/13/the-case-for-central-bank-electronic-money-and-the-non-case-for-central-bank-cryptocurrencies/.

[40] Martin Chorzempa, *Testimony before the US-China Economic and Security Review Commission*, April 15, 2021, https://www.uscc.gov/sites/default/files/2021-04/Martin_Chorzempa_Testimony.pdf.

sanctions—launched a blockchain-based CBDC, the *petro*, in 2018, that was ultimately unsuccessful.

Central bank officials in most advanced economies argued against the benefits of CBDCs and/or announced that they did not intend to adopt a CBDC in the late 2010s.[41] To varying degrees, they questioned the need for CBDCs and cautioned that CBDCs could be prone to hacking and undermine financial stability. Sweden was an outlier among advanced economies, launching a CBDC (the e-krona) project in 2017 in response to the declining use of cash and increasing reliance on private payment processors. Two international financial institutions, the Bank for International Settlements (BIS) and the International Monetary Fund (IMF), published early conceptual, exploratory research on CBDCs.[42] Both institutions stressed the uncertainty surrounding the benefits and risks of CBDCs.

The announcement that Facebook, along with a consortium of a couple dozen other companies, intended to create a cryptocurrency (the Libra) for use on a global scale changed the assessments of the potential importance of digital currencies at many central banks. Until then, cryptocurrencies remained a small, niche, and volatile market that did not challenge the utility or prevalence of fiat money in any meaningful way. Regulators around the world raised a number of concerns about the Libra project, including consumer protections and privacy, global financial stability, and monetary sovereignty. Many central banks accelerated their work on CBDCs in response to the Libra project.[43]

Over the following years, CBDC policy initiatives have proliferated around the globe, with IMF Managing Director Kristalina Georgieva arguing in April 2021, "the field is on the cusp of major changes that have the potential to reshape cross-border payments and remittances."[44] According

[41] For example, see Lael Brainard (U.S. Federal Reserve Board of Governors), "Cryptocurrencies, Digital Currencies, and Distributed Ledger Technologies: What are We Learning?," speech, San Francisco, May 15, 2018, https://www.federalreserve.gov/newsevents/speech/brainard20180515a.htm; Francesco Canepa, "ECB Has No Plan to Issue Digital Currency: Draghi," Reuters, September 14, 2018; Michael Kumhof and Clare Noone, "Central Bank Digital Currencies: Design Principles and Balance Sheet Implications," Bank of England Staff Working Paper No. 725, May 2018, https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2018/central-bank-digital-currencies-design-principles-and-balance-sheet-implications; Tony Richards (Head of Payments Policy Department at the Reserve Bank of Australia), "Cryptocurrencies and Distributed Ledger Technology," speech at Austrian Business Economists Briefing, Sydney, June 26, 2018, https://www.rba.gov.au/speeches/2018/sp-so-2018-06-26.html; "The Bank of Israel Published a Summary of the Work of the Team to Examine Central Bank Digital Currency," June 11, 2018, https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/6-11-18.aspx; Geoff Bascand (Governor of the Reserve Bank of New Zealand), "In Search of Gold: Exploring Central Bank Digital Currency," speech, June 26, 2018, Auckland, https://www.rbnz.govt.nz/research-and-publications/speeches/2018/speech2018-06-25.

[42] The BIS is an international financial institution owned by central banks (including the Fed) that fosters international monetary and financial cooperation. The International Monetary Fund (IMF) is an international financial organization that promotes international monetary stability. Morten Linnemann Bech and Rodney Garratt, "Central Bank Cryptocurrencies," BIS, Quarterly Review, September 17, 2017; "Central Bank Digital Currencies," Committee on Payments and Market Infrastructures, Bank for International Settlements, March 2018; and Tommaso Mancini-Griffoli, Maria Soledad Martinez Peria, Itai Agur et al., "Casting Light on Central Bank Digital Currency," IMF Staff Discussion Note, November 2018.

[43] For example, see Stephen Perrenod, "Currency Wars: Libra Accelerates the Battle of the Central Banks," Medium, September 4, 2019; and U.S. Congress, House Committee on Financial Services, *Monetary Policy and the State of the Economy*, 116th Cong., 2nd sess., February 11, 2020. The Libra project, since re-branded Diem, has struggled to gain regulatory approvals and was opposed by G-7 finance ministers, among other government officials and policy analysts. In May 2021, the Diem project withdrew its application for a banking license in Switzerland and announced that it is moving its headquarters to the United States.

[44] Kristalina Georgieva (IMF Managing Director), "Leveraging Digital Money to Facilitate Remittances," Opening Remarks at iLab Spring Meetings Virtual Workshop, April 14, 2021.

to a BIS survey of 65 central banks, conducted in late 2020 with results published in 2021, the vast majority of surveyed central banks—86%—are actively engaged in some sort of CBDC work, although only 14% are in advanced stages of development (such as CBDC pilots).[45] Central banks not engaged in any CBDC work are generally from smaller jurisdictions. According to the survey, central banks collectively representing a fifth of the world's population are likely to issue a CBDC in the next three years. An additional 21% of surveyed central banks consider it a possibility.

Additionally, the BIS survey highlights the fact that many central banks are progressing from research to conceptual development of CBDCs; most central banks are working on CBDCs that would be directly available to consumers; and interest in CBDCs is stronger among emerging-market and developing economies than in advanced economies. Emerging-markets are generally viewed as having stronger motivations for launching CBDCs; increasing financial inclusion is one of their top priorities for CBDC development. The survey also finds that most emerging-market and developing economies are mostly focused on CBDCs for domestic payments, but some larger jurisdictions with ongoing pilots (likely a reference to China) also consider cross-border payments efficiency as important. The survey highlights a major outstanding issue: the compatibility of CBDCs with legal frameworks. About half of surveyed central banks are uncertain as to whether they have the legal authority to issue a CBDC.

Variation in CBDC Initiatives across Countries

Within these broad trends highlighted by the BIS survey, countries' experiences with CBDCs to date are quite varied (**Table 1**). Some central banks—including in Canada and the United Kingdom—are researching CBDCs but have not yet made a final determination about whether they will ultimately create a digital currency. Meanwhile, the Bahamas has already launched its digital currency, the Sand Dollar, and some countries are in advanced stages of development. For example, China has completed pilots in several major cities, and the Eastern Caribbean Central Bank (ECCB) is piloting its digital currency—called *DCash*—in four countries. At the same time, some CBDC initiatives have faded or proved unsuccessful. A new government in the Marshall Islands is backing away from the previous government's efforts to launch a digital currency, called the *SOV*, a policy initiative about which the IMF expressed serious concerns.[46] Venezuela's petro currency is not in circulation and is largely considered a scam.[47]

Central banks also have various timeframes for testing, development, and launch, and these timelines are frequently evolving. For example, in March 2021, the European Central Bank (ECB) announced a four-year timeframe for creating a digital euro, and in July 2021, announced a 24-month investigation into the design and function of a potential digital euro. Similarly, Brazil had been hoping to launch a digital currency by 2022, although it recently pushed back its timeframe by two to three years. Turkey's central bank first announced its interest in a digital currency in January 2021, and intends to launch a pilot in six months. Sweden, in contrast, researched digital currencies for three years before moving to testing. There is a lot of speculation

[45] For the most recent survey, see Codruta Boar and Andreas Wehrli, *Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency*, BIS Paper No. 114, January 2021. Sixty-five central banks, representing 72% of the world's population and 91% of the world's economic output, responded to the most recent survey. The respondents included 21 advanced economies and 44 emerging-market and developing economies.

[46] "Republic of the Marshall Islands: Selected Issues," International Monetary Fund, August 10, 2018.

[47] Brian Ellsworth, "Special Report: In Venezuela, New Cryptocurrency is Nowhere to Be Found," Reuters, August 30, 2018; Katia Moskvitch, "Inside the Bluster and Lies of Petro, Venezuela's Cryptocurrency Scam," *Wired*, August 22, 2018.

about when China, on the forefront of CBDC development among major economies, will fully and formally launch its digital currency.

Additionally, central banks are looking at different design choices for their digital currencies. For example, the Bahamas' Sand Dollar and the ECCU's DCash are only for domestic use, while China is looking to expand its testing for cross-border transactions with entities in Hong Kong to include Thailand and the United Arab Emirates (UAE). France and Switzerland's central banks are also testing cross-border CBDC transactions. While most digital currencies under consideration would be or are directly available to consumers, Saudi Arabia and the UAE are exploring a digital currency specifically for bank-to-bank transactions (wholesale use).

Table 1. CBDC Initiatives Worldwide: Selected Examples

Jurisdiction	CBDC Initiatives
Advanced Economies	
Canada	The Bank of Canada has undertaken various "proof-of-concept" experiments with private-sector partners but would require more testing before settling on a model for a CBDC. It is also still considering whether there is a compelling argument for a digital version of the Canadian dollar.
European Central Bank (ECB)[a]	In 2021, the ECB announced that it would create a digital euro and investigate its application for 24 months. The investigation is to focus on the design of the digital currency and assess the potential impact on the banking industry, financial stability, and monetary policy. The investigation does not presuppose a final determination to issue a digital euro. If a digital euro is issued at a later date, it would complement, rather than substitute for, physical banknotes and coins. The ECB and the European Parliament are to hold a discussion on the functions and policy objectives of a digital euro by the end of 2021. Earlier public consultations on a digital euro yielded 8,000 comments, many focused on privacy concerns.
Japan	In April 2021, the Bank of Japan launched experiments, to continue until March 2022, to study the feasibility of issuing its own digital currency. The experiments focus on the technical feasibility of issuing, distributing, and redeeming a central bank digital currency.
Norway	After four years of research, in April 2021 Norway's central bank—Norges Bank—announced that it plans to start testing technical solutions for a CBDC over the next two years.
Sweden	Sweden's central bank, the Riksbank, began researching the potential creation of an "e-krona" in 2017. The Riksbank launched a pilot in 2020, focused on simulations within the Riksbank. The second phase of the pilot, launched in 2021, also expands to include transactions with parties outside the central bank, including commercial banks.
Switzerland	The central bank of Switzerland (the Swiss National Bank) has successfully tested a digital version of the Swiss franc to perform instant transactions on the country's main stock exchange. In June 2021, the Swiss National Bank and the Bank of France launched a trial for cross-border central bank digital currency payments. The experiment focuses on bank-to-bank (wholesale) transactions, rather than everyday public transactions.
United Kingdom	In April 2021, the Bank of England and the HM Treasury announced the joint creation of a Central Bank Digital Currency (CBDC) Taskforce to coordinate the exploration of a potential UK CBDC. The UK government and the Bank of England have not yet made a determination on whether to introduce a CBDC in the UK.
United States	The U.S. Federal Reserve (Fed) does not have a position on introducing a CBDC. However, the Fed has been conducting research since 2020 with the Massachusetts Institute of Technology to lay the technical groundwork for the potential creation of a CBDC.

Jurisdiction	CBDC Initiatives
Emerging-Market and Developing Economies	
Bahamas	The Bahamas launched the "Sand Dollar" for its residents in October 2020. The Sand Dollar is a digital version of the Bahamian dollar (B$), and issued by the Central Bank of the Bahamas through authorized financial institutions. Residents can use the digital currency through mobile phone applications or using a physical payment card to access a digital wallet. The Sand Dollar is backed by the central bank's foreign reserves and restricted to domestic use.
Brazil	In 2020, the Central Bank of Brazil announced plans to launch a digital currency by 2022. In 2021, the central bank announced a two- to three-year delay in the launch.
China	China's central bank—the People's Bank of China (PBoC)—has been on the forefront of CBDC development. In 2014, it created a dedicated research team on a digital version of the yuan. The PBoC has since filed dozens of patents related to its digital currency, and launched pilots in multiple cities and economic regions. China's digital currency project is to be initially domestically focused, but the PBoC is testing cross-border transactions with Hong Kong. China is also working on expanding cross-border trials with the central banks of Thailand and the United Arab Emirates (UAE).
Eastern Caribbean Central Bank (ECCB)[b]	The Eastern Caribbean Central Bank (EECB) launched a pilot of DCash in March 2021. DCash is issued by the EECB and distributed by licensed bank and nonbank financial institutions in four pilot countries (Saint Christopher (St. Kitts) and Nevis, Antigua and Barbuda, Grenada, and Saint Lucia.). Consumers and businesses can use an application on smart devices to make financial transactions. DCash cannot be used for transactions outside the Eastern Caribbean Currency Union (ECCU).
Marshall Islands	The Marshall Islands' legislature passed legislation in 2018 making a new blockchain-based digital currency, called the Marshallese sovereign or SOV, legal tender. A new government formed in January 2020 is taking a more cautious approach to the SOV, and the Parliament is considering repealing the 2018 SOV Act. However, the SOV website is still allowing interested investors to pre-register for the first public issuance of the SOV (no date provided on planned issuance).
Turkey	In January 2021, the Central Bank of Turkey announced that it plans to begin trials of a digital currency in the second half of 2021.
Russia	The Central Bank of Russia published a consultation paper on a digital ruble in October 2020 and aims to have a prototype ready by the end of 2021. It plans to start pilots and trials in 2022.
Saudi Arabia and the United Arab Emirates (UAE)	The central banks of Saudi Arabia and the United Arab Emirates are collaborating on a joint digital currency, aber, for interbank money transfer. The central banks are continuing to research and refine the currency, having completed a pilot in late 2020.
Ukraine	The National Bank of Ukraine piloted a digital currency—the e-hryvnia—in December 2018 with about 5,500 tokens. The project included a test on distributed ledgers, formulating a provisional framework and regulations, establishing a temporary accounting model, and study various impact. The central bank is considering how to technically advance a nationwide launch.
Venezuela	Venezuela launched a digital currency—the petro—in 2018, which is purportedly backed by oil, natural gas, and mineral reserves and administered using blockchain technology. The petro has not been adopted for general use, and there is little evidence that it is a functional or operational digital currency.

Sources: CRS analysis of central bank press releases and news reporting.

a. The ECB is the monetary authority for the 19 European countries that use a common currency, the euro.

b. The ECCB is the monetary authority for the eight island Caribbean economies that use a common currency, the Caribbean dollar.

Policy Issues

As the introduction of a "digital dollar" or U.S. CBDC has potentially significant implications for the financial landscape, proposals have raised a wide variety of policy issues. As discussed above, CBDC proposals vary greatly in their specifics (and some are not very specific), and the balance between costs and benefits for many of these issues depends on the proposal's details. The sections below highlight areas where costs and benefits are sensitive to differences in proposals.

What Would a CBDC Compete With? Would a CBDC Crowd Out Private Financial Services?

Introduction of a CBDC would be unlikely to leave the current financial landscape unchanged. Given the potential substitutability between CBDC and the following, there is the possibility that CBDC could, to some degree, crowd out

- cash;
- private digital currencies, such as Bitcoin or Facebook's proposed Diem;
- foreign CBDCs, such as the one planned by China;
- existing private payment systems; or
- the existing commercial banking system.

In the eyes of many proponents, crowding out is the point of introducing a CBDC, as they view existing or planned competitors (besides cash) as posing risks to or placing undesirable costs on the United States. CBDC proponents do not agree on which of these competitors they view as problematic, however. Thus, the desirable design features of a CBDC would depend greatly on which competitor(s) pose concern. For example, CBDC proponents may have conflicting views on whether a CBDC should be designed so that consumers could hold it in an account at the Federal Reserve. As will be discussed below, some proponents perceive problems with the banking system that they assert could be addressed by FedAccounts offered directly to consumers. Other CBDC proponents, including those concerned primarily with the potential dominance of private digital currencies or foreign CBDC, might oppose FedAccounts on the grounds that they would be undesirably disruptive to the existing banking system.

The potential implications of introducing CBDC that compete with or replace cryptocurrencies, nonbank payment providers, and banks are discussed next. The implications for foreign CBDC are discussed in the section below entitled "How Could the U.S. Dollar be Affected by Other Countries' CBDCs?"

Cryptocurrencies

Developers and proponents of private digital currencies, such as cryptocurrencies, assert that these systems could be used for more efficient, less costly, and faster payments, to the benefit of consumers and merchants.[48] As discussed above, they have not realized that promise to date. CBDC might possess the technological advantages of private digital currencies without the shortcomings that to date have prevented them from effectively serving the economic functions of money. If successful, CBDCs might make private digital currencies less attractive or viable,

[48] Paul Schrodt, "Cryptocurrency Will Replace National Currencies By 2030 According to This Futurist," *Time.com*, March 1, 2018, at http://time.com/money/5178814/the-future-of-cryptocurrency/.

although introduction of a CBDC alone is unlikely to entirely displace them given that some of their appeal, such as anonymity and decentralized control, might not apply to CBDCs. If introducing a CBDC forestalled the widespread use of private digital currencies, it would prevent—for better or worse—some of the broader policy implications associated with them.[49]

Many private digital currencies feature a certain degree of pseudonymity (i.e., identifying information for participants' real-world identity is not disclosed on the ledger) that offers greater financial privacy than when payments are routed through banks, which generally record and store information on individuals' transactions.[50] Greater privacy may appeal to individuals who mistrust that their money and private information is safe at traditional financial institutions. However, pseudonymity has facilitated money laundering and other crimes, including ransomware attacks where the attacker demanded payment in cryptocurrency, raising the issue of whether existing regulations appropriately and effectively guard against this possibility.[51]

There are also concerns that cryptocurrencies expose consumers and the financial system to significant risks. Many consumers may lack familiarity with cryptocurrencies and how they work and derive value, and thus may be exposed to risks that they are not aware of when they hold them. In addition, although at present cryptocurrency ledgers appear safe from manipulation, individuals, cryptocurrency exchanges, and other companies that offer services to cryptocurrency holders have been hacked or targeted in scams. Accordingly, critics of cryptocurrencies have raised concerns that existing laws and regulations do not adequately protect consumers dealing in these currencies. In addition, if cryptocurrencies become a widely used form of money, it could pose systemic risk and adversely affect the ability of the Federal Reserve and other central banks to implement and transmit monetary policy.[52] For example, stablecoins that are not backed exclusively by currency holdings and insured bank deposits could be susceptible to runs.[53]

Within the universe of cryptocurrencies, critics differ in which types they view as problematic. At one end of the cryptocurrency spectrum, some, such as Bitcoin, are not centrally issued or controlled. This poses regulatory and law enforcement challenges, but also limits the systemic importance of the issuer. On the other end of the spectrum, were the Facebook-led Diem to be introduced and become a dominant vehicle for payments and financial services more broadly, that would create implications for economic and political concentration, as Facebook is already one of the largest companies in the United States. Users are more likely to substitute CBDC for private digital currencies in areas where the two share common uses (e.g., legal payments) than where they do not overlap (e.g., private digital currencies held as speculative investments or as payment for illicit activity). Thus, CBDC may be a more effective competitor with stablecoins than with other types of cryptocurrencies.

[49] See CRS Report R45427, *Cryptocurrency: The Economics of Money and Selected Policy Issues*, by David W. Perkins.

[50] Leonid Bershidsky, "Bitcoin and the Value of Financial Freedom," *Bloomberg*, December 20, 2017, at https://www.bloomberg.com/view/articles/2017-12-20/bitcoin-and-the-value-of-financial-freedom.

[51] Report Of The Attorney General's Cyber Digital Task Force, *Cryptocurrency Enforcement Framework*, U.S. Department of Justice, October 2020, at https://www.justice.gov/archives/ag/page/file/1326061/download.

[52] For a more detailed analysis of these issues, see CRS Report R45427, *Cryptocurrency: The Economics of Money and Selected Policy Issues*, by David W. Perkins.

[53] Joe Light, "Crypto Lode of $100 Billion Stirs U.S. Worry Over Hidden Danger," *Bloomberg*, June 16, 2021, https://www.bloomberg.com/news/articles/2021-06-16/crypto-lode-of-100-billion-stirs-u-s-worry-over-hidden-danger.

Private Payment Systems

Among the CBDC design features not yet settled is whether the Fed would provide only money for use in private payment systems or also the payment system itself over which CBDC would be exchanged. Thus, introducing a CBDC for use in retail payments would have an uncertain effect on competition among payments providers. It could enhance competition by reducing the natural monopoly a private payment provider might enjoy from network effects, potentially lowering costs to users. Alternatively, it could drive private competitors out of the marketplace.[54]

If nonbank payment providers could hold and exchange CBDC directly and provide CBDC services to merchants and consumers, it might increase their role—and decrease banks' role—in the financial system. Alternatively, if a CBDC were easy and inexpensive for individuals to exchange on a Fed-provided network, it could crowd out both traditional and new payments platforms. Although some view these platforms as too expensive for merchants and consumers, supplanting them would not necessarily benefit consumers in the long run. There has been rapid innovation in digital retail payments in recent years that has brought down some costs. Once CBDCs were in place, the Fed might struggle to provide the same degree of technological innovation as the private sector.

Commercial Banks

If a CBDC could be held inexpensively by consumers outside of banks and especially if it took the form of individual direct accounts at the central bank, a portion of consumers likely would shift their deposits away from private banks and toward CBDC, which would be a safe, government-backed liquid asset. Bank accounts are only insured by the Federal Deposit Insurance Corporation for bank failure up to a dollar limit, whereas all CBDC would be backed by the Fed. (CBDCs would be more likely to crowd out banking services if they paid interest to holders.[55]) This shift would reduce the role of commercial banks in payments and financial intermediation more broadly, and potentially expand the Fed's role. Commercial banks would need to find a new source of funding to replace deposits that would be more expensive or less reliable, and this could result in them reducing their lending.[56] Critics assert that if CBDCs were to displace private bank deposits, the Fed would have to increase its asset holdings, support lending markets (directly or by lending to banks), and otherwise provide a number of credit intermediation activities that private institutions currently perform in response to market conditions to avoid a reduction in credit availability.[57] Critics argue that taking on such a direct and influential role in private financial markets is an inappropriately expansive role for a central bank, and political considerations would be inevitable, which could reduce its independence. The Fed raises

[54] See BIS et al, *Central Bank Digital Currencies: Foundational Principles and Core Features*; Davis Polk, *Digital Dollars/Central Bank Digital Currencies*; and Tobias Adrian and Tommaso Mancini-Griffoli, *Central Bank Digital Currencies: 4 Questions and Answers*, IMF Blog, December 12, 2019, at https://blogs.imf.org/2019/12/12/central-bank-digital-currencies-4-questions-and-answers.

[55] Tobias Adrian and Tommaso Mancini-Griffoli, *Central Bank Digital Currencies: 4 Questions and Answers*.

[56] Banks could seek alternative funding sources, but these would likely be more expensive after adjusting for risk, which would reduce which loans are profitable at the margins. Alternatively, in today's financial system characterized by abundant bank reserves, banks could respond by reducing reserves instead of loans, if accommodated by the Fed.

[57] BIS et al, *Central Bank Digital Currencies: Foundational Principles And Core Features*, pp. 9-14. Alternatively, asset holdings and lending decisions could be shifted from the Fed to the federal government, but this would raise another set of policy issues (e.g., greater potential political interference in credit markets), in addition to those discussed above. For more on financial inclusion, see CRS Report R45979, *Financial Inclusion and Credit Access Policy Issues*, by Cheryl R. Cooper.

concerns about crowding out private activity in its letter to Representative French Hill as arguments against introducing a CBDC.[58]

Would CBDCs Be Less Costly and More Efficient Than the Current System?

Proponents of CBDCs generally argue that CBDCs could provide efficiency gains over traditional legacy systems and contend that central banks could use the technologies underlying digital currencies to deploy a faster, less costly payment system.[59] For this to be the case, lower operating costs when the system was up and running would have to offset the upfront infrastructure costs of creating a new system (or modifying the existing system). With no concrete, detailed proposal to introduce a CBDC in the United States, the claim cannot be evaluated.

A CBDC cost advantage could potentially derive from efficiency gains or an implicit subsidy. Critics fear that when the Fed competes with the private sector, its services would inevitably be provided below market price because the Fed does not finance its capital expenditures in private financial markets. If true, a CBDC could undercut private competitors. The Monetary Control Act (12 U.S.C. 248a) attempts to prevent this by requiring the Fed to charge market prices for its services, including "the return on capital that would have been provided had the services been furnished by a private business firm," but that concept is nebulous in this context. For example, the Fed does not charge consumers for the service provided by currency (although it benefits financially from their use, as it would from CBDC).[60]

One of the main arguments critics—including various central bank officials—make against CBDCs is that, in Fed Governor Lael Brainard's words, there is no "compelling demonstrated need" for such a currency, because central banks and private banks already operate trusted electronic payment systems that generally offer fast, easy, and inexpensive transfers of value.[61] Retail digital payment options that operate through the traditional payments system are widely available and improving rapidly. According to Governor Brainard, one question that would need to be answered in the affirmative to justify introducing a CBDC is whether it would "reduce complexity in payments, improve end-to-end processing, or simplify recordkeeping."[62]

In its letter to Representative French Hill,[63] the Fed notes the advantages of the current system that limit the potential benefits of a CBDC—the robust use of physical cash, high confidence in the dollar as the reserve currency, a robust banking system that meets the public's needs, and, in the words of Governor Brainard, the "widely available and expanding variety of digital payment

[58] Federal Reserve Chair Jerome Powell, *Letter to the Honorable French Hill*, November 19, 2019.

[59] Eswar Prasad, *Central Banking in a Digital Age: Stock-Taking and Preliminary Thoughts*, Hutchins Center on Fiscal and Monetary Policy at Brookings, April 2018, p. 14, at https://www.brookings.edu/wp-content/uploads/2018/04/es_20180416_digitalcurrencies.pdf.

[60] See the section below entitled "Would CBDCs Generate More Government Seigniorage Than the Current System?"

[61] Federal Reserve Governor Lael Brainard, *Cryptocurrencies, Digital Currencies, and Distributed Ledger Technologies: What Are We Learning?* Board of Governors of the Federal Reserve System, May 15, 2018, at https://www.federalreserve.gov/newsevents/speech/files/brainard20180515a.pdf.

[62] Federal Reserve Governor Lael Brainard, "The Digitalization of Payments and Currency: Some Issues for Consideration," speech at Stanford, California, February 5, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20200205a.htm.

[63] Federal Reserve Chair Jerome Powell, *Letter to the Honorable French Hill*, November 19, 2019.

options that build on the existing institutional framework and the applicable safeguards."[64] Were the use of cash to continue to decline in the future, that could strengthen the case for a CBDC.

The Fed has also noted that ongoing improvements to the existing system could potentially yield many of the benefits of a CBDC without the risks. Notably, the Fed is in the process of implementing FedNow, which would allow real-time electronic settlement of payments.[65] In April 2021, Chair Powell questioned whether there would be a role for a CBDC once FedNow was operational.[66]

The Fed has highlighted cross-border payments as an area ripe for reforms that could yield cost savings and efficiency gains, as discussed in the next section.

Would International Coordination on CBDC Improve the Efficiency of Cross-Border Transactions?

Although U.S. domestic payments are already relatively inexpensive and rapid (and scheduled to become instantaneous soon), cross-border payments generally are not. Some commentators have raised the possibility that larger efficiency gains are possible if cross-border payments could be made with a CBDC. To the extent a CBDC competes with bank and credit union accounts, it may be worth noting that a type of cross-border payment known as remittances is largely carried out by nonbank financial institutions, such as money transmitters.[67] While banks and credit unions do provide cross-border payment services, these transactions tend to involve several thousand dollars, whereas many remittances are smaller, around a few hundred dollars.[68] Cross-border payments and remittances must often be completed through correspondent banks in order to link banks in different countries, which can add cost, time, and complexity.[69] Cross-border remittances and payments can both have relatively high transaction costs.[70]

Without knowing the design features of a CBDC, it is unclear whether the use of CBDCs could reduce cross-border costs and increase speed.[71] For example, communities that depend on money transmitters due to the proximity of branches overseas may find that CBDCs, although potentially faster, are not as convenient if they do not possess the technology to convert the CBDC remittance into a usable currency in their economy. If a U.S. CBDC proved to be more efficient, it might help bolster the dollar's role as the world's dominant reserve currency.[72]

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[64] Federal Reserve Governor Lael Brainard, "Digital Currencies, Stablecoins, and the Evolving Payments Landscape," speech delivered Washington DC, October 16, 2019, at https://www.federalreserve.gov/newsevents/speech/brainard20191016a.htm.

[65] See CRS Report R45927, *U.S. Payment System Policy Issues: Faster Payments and Innovation*, by Cheryl R. Cooper, Marc Labonte, and David W. Perkins.

[66] Federal Reserve, *Transcript of Chair Powell's Press Conference*, April 28, 2021, at https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20210428.pdf.

[67] For background, see CRS Report R43217, *Remittances: Background and Issues for Congress*, by Martin A. Weiss.

[68] Board of Governors of the Federal Reserve System, *Report to the Congress on the Use of the ACH System and Other Payment Mechanisms for Remittance Transfers to Foreign Countries*, May 2015, at https://www.federalreserve.gov/publications/otherreports/files/ACH_report_201505.pdf.

[69] See CRS In Focus IF10873, *Overview of Correspondent Banking and "De-Risking" Issues*, by Rena S. Miller.

[70] The World Bank keeps track of transaction costs associated with remittances. For more detail, see, World Bank, "Remittance Prices Worldwide," at https://remittanceprices.worldbank.org/en.

[71] BIS et al., *Central Bank Digital Currencies: Foundational Principles and Core Features*, Box 2.

[72] "Reserve currency" refers to the high international demand for dollars and dollar-denominated assets due to international demand for safe, liquid assets and the dollar's dominance in international trade and financial transactions.

Beyond a handful of bilateral cross-border testing arrangements, there has been relatively little international coordination among countries in their CBDC efforts in comparison to other international financial issues, such as financial regulatory reform after the 2008-2009 global financial crisis. Variation in national approaches allows for experimentation and innovation, but if each central bank adopts varying technologies and standards, it may be difficult to create interconnections between these systems to facilitate cross-border payments. A fragmented system of CBDCs could make it more complicated and expensive for U.S. consumers and businesses to complete cross-border transactions.

Central banks in advanced economies may be considering closer coordination on digital currencies, but efforts are still in the early stages. In October 2020, several central banks in advanced economies published a joint report on CBDC.[73] The report sets out common, and general, foundational principles and core features of a CBDC, particularly stressing that authorities need to be confident that issuing a CBDC would not compromise monetary or financial stability, and that a CBDC could coexist and complement existing forms of money. Additionally, the Financial Stability Board (FSB), whose membership includes monetary and fiscal authorities from 24 countries, is examining ways to enhance cross-border payments, including through CBDCs.[74] (The FSB is currently chaired by the vice chair of the Fed.) The G-7 finance ministers also pledged in June 2021 to "ensure that CBDCs are grounded in long-standing public sector commitments to transparency, the rule of law, and sound economic governance."[75]

Would CBDC Promote Financial Inclusion?

Some CBDC proponents argue that it would promote financial inclusion. CBDC proposals featuring FedAccounts available to the public have the greatest implications for financial inclusion.[76] Alternatively, a CBDC used only by financial institutions might have few implications for inclusion.

Policymakers are concerned about the 5.4% of households who are "unbanked" (i.e., do not have an account at an insured depository institution), as well as other households who are "underbanked" (i.e., have an account but obtain nonbank alternative financial services).[77] Some observers believe that more Americans could be brought into the banking system if lower-cost, more convenient banking services were available.[78] If this were the primary factor for why some

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See CRS In Focus IF11707, *The U.S. Dollar as the World's Dominant Reserve Currency*, coordinated by Rebecca M. Nelson.

[73] BIS, Bank of Canada, European Central Bank, Bank of Japan, Sveriges Riksbank, Swiss National Bank, Bank of England, and Board of Governors of the Federal Reserve, *Central Bank Digital Currencies: Foundational Principles and Core Features*, October 9, 2020, https://www.bis.org/publ/othp33.htm.

[74] Stephanie Segal and Pearl Risberg, "Central Bank Digital Currencies, Design Choices, and Impacts on Currency Internationalization," December 18, 2020; FSB, *Enhancing Cross-Border Payments: Stage 3 Roadmap*, October 12, 2020.

[75] G-7 Finance Ministers & Central Bank Governors Communiqué, London, June 5, 2021, https://home.treasury.gov/news/press-releases/jy0215.

[76] Morgan Ricks et al., *Central Banking for All: A Public Option for Bank Accounts*, The Greater Democracy Initiative, June 2018, at https://greatdemocracyinitiative.org/wp-content/uploads/2018/06/FedAccountsGDI.pdf; Tobias Adrian and Tommaso Mancini-Griffoli, *Central Bank Digital Currencies: 4 Questions and Answers*, IMF Blog.

[77] Federal Deposit Insurance Corporation (FDIC), *How America Banks: Household Use of Banking and Financial Services, 2019 FDIC Survey*, October 2020, at https://www.fdic.gov/analysis/household-survey/2019report.pdf.

[78] For a more detailed examination of financial inclusion issues, see CRS Report R45979, *Financial Inclusion and Credit Access Policy Issues*, by Cheryl R. Cooper.

households are unbanked or underbanked, some argue the creation of CBDC and individual accounts at the Fed to hold CBDC could reduce the number of unbanked or underbanked. (However, an FDIC survey casts doubt on the premise that cost is the primary reason why some households are unbanked.[79]) The extent to which this policy goal was achieved would depend on what services the Fed offered to CBDC account holders. To reduce the number of unbanked, a FedAccount would need to provide the services of a checking account, allowing an account holder to be able to readily convert a CBDC into cash and make retail payments from the account. For a CBDC to reduce the number of underbanked, a FedAccount would have to provide other banking services, such as loans.

On the other hand, the introduction of a CBDC could accelerate the declining use of physical cash, which could have negative implications for financial inclusion.[80] Using a CBDC requires a basic level of technological proficiency and access that could be prohibitive for some people. Opponents also question whether a CBDC would be more affordable than private banking services. Although this is unknowable in the absence of concrete proposals, under the Monetary Control Act, services provided by the Fed must reflect the costs of provision. If costs are calculated accurately—and the Monetary Control Act provides a detailed description of what costs should include—it does not necessarily follow that the Fed could provide retail banking services that were less expensive than those already provided by at least some private-sector firms.

Independent of the question of cost is the issue discussed in the previous section—beyond the basics of a CBDC, is there an economic rationale for the Fed to provide bank-like services to the public? Proponents might argue that FedAccounts would improve economic efficiency by pointing to the negative externalities to society as a whole that some households are unbanked or underbanked. But opponents might counter that costs and benefits are sufficiently internalized by the unbanked and underbanked to undermine any economic case for public provision, and that other potential losses to economic efficiency (e.g., associated with monopoly provision by the Fed) might outweigh any efficiency gains.

Would a CBDC Enable Faster and More Efficient Government Payments?

Challenges in rapidly delivering Economic Impact Payments ("stimulus checks") and accurately identifying recipients during the pandemic[81] led some to argue that such payments, and potentially any other government payments to individuals, could be more effectively and expeditiously made using a CBDC linked to FedAccounts.[82] While households who received their economic stimulus payment by direct deposit would likely receive their payments at most one business day faster with a FedAccount, other recipients potentially would receive payments significantly faster. (Once FedNow is operational, government payments made via direct deposit for customers of participating banks could be delivered in real time in their regular bank accounts without the need for a FedAccount.) The main lag, however, involves the government making

[79] This point is debatable. In the FDIC's unbanked survey, the top three reasons given are not related to convenience and fees and are unlikely to be solved by a CBDC. They are (1) "do not have enough money to keep in account," (2) "don't trust banks," (3) "avoiding banks gives more privacy." Four of the remaining six reasons given relate to cost or convenience.

[80] See CRS Report R45716, *The Potential Decline of Cash Usage and Related Implications*, by David W. Perkins.

[81] See CRS Insight IN11393, *Delivery of Economic Impact Payments (EIPs)*, by Gary Guenther.

[82] U.S. Congress, House Committee on Financial Services, *Inclusive Banking During a Pandemic: Using FedAccounts and Digital Tools to Improve Delivery of Stimulus Payments*, 116th Cong., 2nd sess., June 11, 2020.

payments—e.g., the time it takes agencies to obligate and outlay the funding and identify eligible individuals and the correct payment details—not the delivery of payments once initiated. The former would presumably be unaffected by the introduction of FedAccounts, absent other changes in government administration.

Further, accurately identifying eligible individuals and the information needed to deliver federal payments to them is hampered by the lack of a centralized federal government database with comprehensive personal and financial information of U.S. residents. There are many policy reasons beyond the scope of this report why policymakers have chosen not to create such a database. But in order to facilitate more digital federal payments, FedAccounts might end up replicating such a database—only with the database controlled by the Fed instead of some other Federal agency.

If the underlying policy goal is to get government payments to significantly more individuals more quickly than the status quo, then a key determinant of whether that would be accomplished would be whether individuals—or at least those who were not already using direct deposit—were required to receive payments through FedAccounts. If individuals could choose whether to create an account with the Fed or continue receiving payments through their current method, it is unclear whether a significant number of individuals who are not currently receiving government payments by direct deposit would create a FedAccount. Without details on the costs and terms that would be offered, it is difficult to speculate how attractive a FedAccount would be to the unbanked. The top reasons offered for why individuals do not have bank accounts could also make FedAccounts unattractive, depending on the terms offered.[83] Assuming FedAccounts would have to be accessed digitally, they could also be unattractive to some without access to or comfort with the required technologies.

If FedAccounts were required for an individual to receive government payments, then the immediate policy goal (faster receipt of payments) would be more effectively accomplished. However, the debate about the general costs and benefits of FedAccounts (as discussed above) would also become more salient. Financial inclusion and faster payments would increase if the system were universal, but concerns such as privacy, creating a *de facto* national database of personal information, cybersecurity risk, and crowding out of private business activity would be amplified.

How Would a CBDC Affect Privacy and Illicit Activity?

Cash and some cryptocurrencies provide users with the ability to anonymously or pseudonymously make transactions and store wealth. This has advantages (e.g., providing users with privacy) and disadvantages (e.g., facilitating illicit activity). A decision would need to be made about what level of user privacy should be provided, bearing in mind that a CBDC could potentially substitute for cash, cryptocurrency, and digital payments.

Were individuals allowed to have unfettered access to CBDC, total anonymity (as offered by cash) would be unlikely, and privacy would be harder to maintain under FedAccounts. In April 2021, Chair Powell stated that a CBDC similar to that planned in China—the aims of which

[83] In the FDIC's most recent survey of the unbanked, the top four reasons offered for not using banking services are "Do not have enough money to keep in account," "Don't trust banks," "Avoiding bank gives more privacy," and "Account fees too high." See FDIC, *How America Banks: Household Use of Banking and Financial Services, 2019 FDIC Survey*, October 2020, at https://www.fdic.gov/analysis/household-survey/2019report.pdf.

include increasing the government's control of the economy and ability to monitor transactions—would not work in the United States because of privacy concerns.[84]

But total anonymity is not a feature of traditional payment systems either—banks and other electronic payments providers must comply with anti-money laundering and bank secrecy laws. Complete CBDC privacy would be inconsistent with the enforcement of those laws. According to Governor Brainard, "If (a CBDC) is designed to be financially transparent and provide safeguards against illicit activity, a central bank digital currency for consumer use could conceivably require the central bank to keep a running record of all payment data using the digital currency."[85] This would far exceed the data on private spending that the government routinely has access to currently, for better or worse. For example, it could provide useful information to law enforcement in the pursuit of financial crimes, but would also have "big brother" implications for government monitoring of private activity. Steps could be taken to increase privacy, such as holding and exchanging CBDC on an outside distributed ledger using cryptography, but preventing illicit activity would require suspicious transactions to be able to be scrutinized by the relevant authorities.

What Effect Would a CBDC Have on Systemic Stability?

Introducing a CBDC could potentially increase or decrease systemic risk. Advocates argue that a CBDC available to any individual could increase systemic stability by imposing additional market discipline on commercial banks and other providers of money-like assets, including stablecoins. If consumers could make unlimited safe deposits directly with the central bank, commercial banks likely would have to offer interest rates and limit risks at levels necessary to attract deposits above the deposit insurance limit.[86] Proponents argue that

> The disciplining effect on commercial banks will be reinforced by the fact that, in the event of a loss of confidence, customers' money can be quickly transferred to central bank electronic money accounts. In order to avoid this, the banks must make their business models more secure by, for example, taking fewer risks or by holding more reserves and capital, or they must offer higher interest rates.[87]

This "disciplining effect" is the same argument that skeptics of CBDCs argue would create a less stable system, by making it more prone to runs. These critics argue that at the first signs of distress at an individual bank, depositors would transfer their funds (or at least their uninsured funds) to this alternative liquid, government-backed asset with a "simple swipe."[88] The Fed echoes this reasoning in its letter to Representative French Hill:

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[84] Federal Reserve, *Transcript of Chair Powell's Press Conference*, April 28, 2021, at https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20210428.pdf.

[85] Federal Reserve Governor Lael Brainard, "Digital Currencies, Stablecoins, and the Evolving Payments Landscape," speech delivered Washington DC, October 16, 2019, at https://www.federalreserve.gov/newsevents/speech/brainard20191016a.htm.

[86] Aleksander Berentsen and Fabian Schar, "The Case for Central Bank Electronic Money and the Non-case for Central Bank Cryptocurrencies," *Federal Reserve Bank of St. Louis Review*, vol. 100, no. 2 (second quarter 2018), at https://research.stlouisfed.org/publications/review/2018/02/13/the-case-for-central-bank-electronic-money-and-the-non-case-for-central-bank-cryptocurrencies/.

[87] Aleksander Berentsen and Fabian Schar, "The Case for Central Bank Electronic Money and the Non-case for Central Bank Cryptocurrencies," *Federal Reserve Bank of St. Louis Review*.

[88] Federal Reserve Governor Lael Brainard, "The Digitalization of Payments and Currency: Some Issues for Consideration," speech at Stanford, California, February 5, 2020, at https://www.federalreserve.gov/newsevents/speech/brainard20200205a.htm; BIS, *Central Bank Digital Currencies*, p. 16.

> In terms of financial stability, offering an option for the public to quickly, and at a relatively low cost, reallocate liquidity from the private sector to the Federal Reserve in potentially unlimited size entails the risk of exacerbating runs from private markets when these markets experience a stress episode.

This scenario could also have implications for taxpayers if runs on the banking or broader financial system require a sudden ramp up of Fed lending to support illiquid firms.[89]

Would a CBDC Increase or Decrease Cybersecurity Risk?

The Fed notes cybersecurity risks as one of its main considerations in determining whether to introduce a CBDC. A CBDC would impose new cybersecurity risks on the Fed, but to the extent that a CBDC substitutes for private services, it could reduce cybersecurity risk for the private sector. In other words, all electronic payments and financial transactions face cybersecurity risk—the main issue is whether the Fed or the private sector can cope with them better.[90] The Fed has a generally successful cybersecurity track record—unlike some private actors—in operating its existing payment systems, but might be less nimble or innovative in addressing future cyber threats. Depending on its characteristics, a CBDC would likely introduce new vulnerabilities that are not inherent in the Fed's current systems, which can only be accessed by a limited number of highly regulated entities (mainly banks). In some CBDC proposals, CBDC services would be offered to customers by financial intermediaries, which might introduce new cybersecurity vulnerabilities. Also, if a CBDC were to become a dominant payment method, there is the issue of whether systemic risk from cybersecurity risk is greater because there would be a single provider. For example, a single dominant provider would offer users fewer alternatives if it became disabled, which would increase the systemic impact of a breach.

What Other Risks Does a CBDC Pose to the Fed?

The Fed faces operational risk in providing a new and, in some ways, untested technology that could become central to the financial system. Some aspects of a CBDC might be built using existing Fed infrastructure, but others would take the Fed into areas where it has not previously developed or tested technology or expertise. According to Governor Brainard,

> A myriad of other operational challenges would need to be addressed, including electronic counterfeiting and cyber risks. It is worth noting that the technologies used currently for private-sector digital currencies do not provide the same level of information technology reliability, integrity, and scalability as central bank systems in use today. Many of these technologies do not provide for clear, predictable, and final settlement, which is a core tenet of payment systems.[91]

As with any innovation, technical "hiccups" in a CBDC's rollout, implementation, or functioning could cause financial disruption or, at the extreme, financial instability. If there were technical problems with CBDC, it could harm public confidence in the Fed's overall competence. This is referred to as a "reputational risk," and could harm the Fed's independence.

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[89] Tobias Adrian and Tommaso Mancini-Griffoli, *Central Bank Digital Currencies: 4 Questions and Answers*, IMF Blog, December 12, 2019, at https://blogs.imf.org/2019/12/12/central-bank-digital-currencies-4-questions-and-answers.

[90] To some extent, this argument depends on whether CBDC is supplanting or supplementing existing private sector activity.

[91] Federal Reserve Governor Lael Brainard, "Digital Currencies, Stablecoins, and the Evolving Payments Landscape," speech delivered at Washington DC, October 16, 2019, at https://www.federalreserve.gov/newsevents/speech/brainard20191016a.htm.

The Fed has more independence from Congress and the Administration than most government agencies. Economists generally believe that for monetary policy to be effective, the public must have a high degree of confidence in a central bank's expertise and political independence. The theoretical case for independence is stronger for monetary policy than for the Fed's other functions, particularly the business-like services it provides. Arguably, the Fed's response to the 2007-2009 financial crisis demonstrates that when it moves into new policy areas, public and political consensus in favor of its independence weakens. If this is generally true, offering services directly to the public could weaken the Fed's independence. Decisions about pricing of services and availability surrounding CBDCs would arguably be subject to political pressure. A shift to CBDCs from bank deposits that required the Fed to provide funding to the banking system could also be subject to political pressure.

The Fed was designed as a "banks' bank" that does not provide services directly to the public. Depending on how a CBDC was designed, it could require the Fed to start providing services directly to the public—particularly if individuals could hold accounts or digital wallets at the Fed. According to the Fed, the number of CBDC accounts could number in the hundreds of millions. The Fed has not developed expertise or staffing in areas required to serve the general public, such as customer service.

Would New Regulation Be Needed?

Banks are already highly regulated and supervised for consumer protection and safety and soundness by the Fed and other federal regulators. Regulatory oversight includes their participation in payments systems. Nonbank payment providers, private payment systems, and private digital currencies, by contrast, face limited federal regulation.[92] If nonbank payment providers were able to use CBDC and provide CBDC services to consumers, it raises the question of whether new regulation would be required to address the policy issues detailed above related to law enforcement, consumer protection, systemic risk, and cybersecurity risks. If so, would new statutory authority be required or could new regulation be implemented under existing authority?[93] One view would be that the relevant policy issues relate to payments regardless of the form they take, and so there would be no need to change regulatory policy—which is currently limited—based on a change in the form of payment alone. An alternative view would be that CBDC would create a new direct relationship between the Fed and payment providers, subjecting the Fed to a direct exposure to the firms that would warrant regulatory scrutiny.

Would CBDCs Make Monetary Policy More Effective?

A CBDC would be unlikely to have a first order effect on the conduct of monetary policy, as the Fed already controls the supply of currency and bank reserves, and the money supply is largely already transmitted digitally. According to the Fed letter to Representative French Hill, "To date,

[92] See CRS Report R46486, *Telegraphs, Steamships, and Virtual Currency: An Analysis of Money Transmitter Regulation*, by Andrew P. Scott. The Fed's role in operating payment systems and regulating banks gives it some influence over private payment systems. The Fed has authority to subject payments systems designated as systemically important to heightened prudential standards, but it is unlikely that this authority could be extended to any payment provider using CBDC.

[93] For example, a current debate is whether fintech payment providers should be allowed to operate under a special purpose banking charter issued by the Office of the Comptroller of the Currency (OCC). A condition of granting the charter could be compliance with regulatory requirements.

we have not identified potential material benefits of general purpose CBDC to the implementation of monetary policy relative to our existing tools."

Nevertheless, observers also disagree over whether CBDCs would have a desirable effect on the Fed's ability to carry out monetary policy at the margins. A CBDC would have a greater influence on overall financial conditions—thereby increasing the effectiveness of monetary policy—if the Fed was allowed to pay interest on it. Proponents argue that, if individuals held a CBDC on which the central bank set interest rates, the central bank could directly transmit a policy rate to the macroeconomy, rather than achieving transmission through the rates the central bank charges banks, which has an indirect influence on interest rates offered to consumers and businesses.[94]

Some have argued that introducing a CBDC is necessary to prevent the Fed from losing some control over monetary policy in a scenario where a private digital currency becomes a dominant payment method and the use of cash wanes. As noted above, no private digital currency has become widespread, let alone dominant, in payments thus far. And private digital currency would not end the Fed's monopoly over the supply of bank reserves and the interest rate on bank reserves, which is how the Fed typically conducts monetary policy.[95]

In addition, if holding cash (which in effect has a 0% interest rate) were no longer an option for consumers, central banks potentially would be less constrained by the *zero lower bound*.[96] The zero lower bound is the idea that the ability of individuals and businesses to hold cash and thus avoid negative interest rates limits central banks' ability to transmit negative interest rates to the economy. Negative interest rates raise of host of other policy issues that bear consideration, however, including effects on savers and bank profitability.[97]

Would CBDCs Generate More Government Seigniorage Than the Current System?

CBDCs could increase government revenue through a seigniorage-like mechanism. An expansive definition of seigniorage is that it is the income the government obtains from having government (including central bank) liabilities act as money. Physical money—because it is liquid and low-risk—earns no interest rate and carries a cost to produce. Money—both physical and electronic (i.e., bank reserves) in the traditional system—is also a balance sheet liability to the issuing authority, such as the Fed or other central banks.[98] Money earns the government seigniorage because its costs to produce are lower than the yield on securities that the Fed invests in. (The Fed pays interest on bank reserves, but typically at a lower rate than the yield on its securities holdings.)

[94] BIS et al., *Central Bank Digital Currencies: Foundational Principles And Core Features*, pp. 11-12.

[95] John Kiff et al., *A Survey of Research on Retail Central Bank Digital Currency*, International Monetary Fund working paper WP/20/104, June 2020, at https://www.imf.org/en/Publications/WP/Issues/2020/06/26/A-Survey-of-Research-on-Retail-Central-Bank-Digital-Currency-49517.

[96] Eswar Prasad, *Central Banking in a Digital Age: Stock-Taking and Preliminary Thoughts*, Hutchins Center on Fiscal and Monetary Policy at Brookings, April 2018, pp. 19-20, at https://www.brookings.edu/wp-content/uploads/2018/04/es_20180416_digitalcurrencies.pdf.

[97] See CRS Insight IN10481, *Negative Interest Rates*, by Marc Labonte. (out of print; available to congressional clients upon request from the author).

[98] Federal Reserve Chairman Alan Greenspan, "Regulation of Electronic Payment Systems," remarks at the U.S. Treasury Conference on Electronic Money and Banking: The Role of Government, Washington, DC, September 19, 1996, at https://www.federalreserve.gov/boarddocs/speeches/1996/19960919.htm.

If the Fed allowed individuals to hold a CBDC, the Fed would issue low- or no-interest liabilities to individuals (as electronic entries in a ledger produced at lower marginal cost than physical currency).[99] Then, as happens now, the Fed would use those liabilities to fund purchases of securities that earn a higher interest rate than what the Fed pays on its liabilities.[100] This would produce income, perhaps greater income than is earned through traditional seigniorage. Seigniorage would be greater if CBDC holdings earned no interest.[101]

The amount of seigniorage the government earns is dependent in part on the amount of government liabilities issued, which demands on both domestic and foreign demand for the dollar. Much of the foreign demand for the dollar stems from its role as a reserve currency, discussed in the next section.

How Could the U.S. Dollar be Affected by Other Countries' CBDCs?

As central banks around the world launch, or work towards launching, digital currencies, there could be implications for the role of the U.S. dollar in the global economy.[102] Since World War II, the U.S. dollar has functioned as the world's dominant reserve currency. A reserve currency is a currency held by central banks in significant quantities.[103] It is widely used to conduct international trade and financial transactions, eliminating the costs of settling transactions involving different currencies. Today, central banks hold about 60% of their foreign exchange reserves in dollars, about half of international trade is invoiced in dollars, and about half of all international loans and global debt securities are denominated in dollars.[104] In foreign exchange markets, where currencies are traded, dollars are involved in nearly 90% of all transactions.[105] The U.S. economy generally benefits from the dollar's status as the world's dominant reserve currency, including by lowering borrowing costs for the U.S. government.

Some policymakers have expressed concerns that if another central bank succeeds in developing a broadly adopted digital currency before the United States does so, the use of U.S. dollars in the global economy could decline. For example, in a 2019 letter to Fed Chair Jerome Powell, Representatives French Hill and Bill Foster wrote, "We are concerned that the primacy of the U.S. Dollar could be in long-term jeopardy from a wide adoption of digital fiat currencies."[106] To

[99] For simplicity, this discussion abstracts from the upfront costs of creating a CBDC and to what extent and how long it would take the Fed to recoup those costs. As discussed above, current statute requires the Fed to recoup costs from users.

[100] While the Fed has always earned positive income using this strategy, it is possible for the Fed to lose income if the interest on its liabilities exceeds the interest on its securities holdings. In particular, this could occur when the yield curve is inverted (i.e., when long-term interest rates are lower than short-term rates).

[101] If CBDC paid interest and only substituted for physical currency, seigniorage would decline.

[102] See CRS In Focus IF11707, *The U.S. Dollar as the World's Dominant Reserve Currency*, coordinated by Rebecca M. Nelson.

[103] Other reserve currencies include the euro, the yen, the British pound, the renminbi (RMB), the Canadian dollar, the Swiss franc, and the Australian dollar.

[104] IMF, Currency Composition of Official Foreign Exchange Reserves (COFER) Database, updated March 31, 2021; Economist, "America's Aggressive Use of Sanctions Endangers the Dollar's Reign," January 18, 2020; BIS, *US Dollar Funding: An International Perspective*, Committee on the Global Financial System Papers No. 65, June 18, 2020.

[105] BIS, *Triennial Central Bank Survey of Foreign Exchange and Over-the-Counter (OTC) Derivatives Markets in 2019*, September 16, 2019.

[106] Letter from Rep. French Hill and Rep. Bill Foster to the Honorable Jerome H. Powell, Chairman of the Board of Governors of the Federal Reserve System, September 30, 2019.

date, there is little evidence of a pivot away from the U.S. dollar towards other currencies, although no major economy has yet launched a digital currency. It is also worth noting that some central banks are specifically motivated to create digital currencies to boost international usage of their currency. Most notably, China's government is pursuing a digital currency to boost the use of the RMB for trade, lending, borrowing, and investing internationally. The European Commission has also made it a goal to boost the euro's use outside the Euro area, and the ECB has stressed that a digital euro could increase the currency's appeal.[107]

The Role of Congress

As CBDC proposals, pilots, and initiatives take shape around the world, it is unclear whether the Fed plans to introduce a CBDC under its existing authority and, if it did so, what characteristics it would have. Before that happens, Congress could decide to legislate to require or block the creation of a CBDC. Depending on its policy objectives, Congress could consider legislation stipulating to the Fed the timeframe and features for developing a U.S. CBDC. Alternatively, Congress may choose to defer to the Fed on CBDC policy matters. The Fed has not yet conducted a legal analysis on whether it would need any additional statutory authority to introduce a CBDC. In part, the necessary authority would depend on what form the CBDC took, and CBDC proposals vary widely. Congress could require the Fed to report to Congress on the legal changes that might be needed and the policy implications of introducing a CBDC. Congress could also pass legislation requiring the Administration to analyze and report on the implications of other countries' CBDC efforts.

As Congress considers its policy approach to CBDCs, it faces a range of policy issues. Congress may want to consider whether there are specific policy problems that could be addressed by a digital dollar and, if so, how that should inform the design of a digital currency. Congress may also consider how to weigh all the various benefits, costs, and uncertainties surrounding a digital dollar, and how it could build consumer trust in a digital currency, particularly relating to privacy and cybersecurity. Congress may also consider how the cost of developing a new digital currency should be defrayed.

In light of other countries' efforts, Congress may consider whether there is a first-mover advantage to creating a CBDC in terms of usage and standard-setting, or whether there are advantages from taking a wait-and-see or lessons-learned approach. Congress may also consider how the United States should respond to other countries' CBDC initiatives, and whether the United States should take a leadership role in international coordination and collaboration on CBDCs by directing the Administration to lead international efforts through various international forums, such as the G-7, the G-20, the IMF, and the BIS, among others.

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[107] "Digital Euro Could Boost Single Currency's International Use, ECB Says," Reuters, June 2, 2021.

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