

Testimony of Darrell Duffie  
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Subcommittee on Economic Policy

Hearing on

“Building a Stronger Financial System: Opportunities of a Central Bank Digital Currency”

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Chair Warren, Ranking Member Kennedy, and other distinguished members of the subcommittee, thank you for the opportunity to provide input to your analysis of U.S. strategy regarding a central bank digital currency (CBDC).

The United States should begin the development of an effective and secure digital dollar, a direct obligation of the Federal Reserve that could be distributed to the public at large by regulated private-sector payment service providers. While developing a digital dollar, the relevant U.S. agencies should also attempt to trigger major improvements in the conventional U.S. payment system. Perhaps it will ultimately not be necessary for the Fed to deploy a digital dollar. Maintaining cyber security and privacy while controlling illegal payments is a challenging design problem for an effective CBDC-based payment system. Without thoughtful engagement of the private sector, a centralized payment system could also impair innovation. Nevertheless, it seems likely to me that a US digital dollar will ultimately be deployed. A major effort to get the design right should begin now.

The development of an effective and secure digital dollar will require significant resources and time, perhaps more than five years. The development process itself will lead to a much deeper appreciation of the costs and benefits of ultimately deploying a CBDC and could generate large beneficial technology spillovers into other parts of our new digital economy. Further, the development of a viable CBDC may spur firms that currently provide bank-railed payment services to compete more aggressively, in terms of both pricing and technology innovation.

Success will call for unleashing the innovative power of the private sector while increasing the reach and quality of government regulation. This approach can protect the safety and soundness of payments while advancing U.S. productivity with next-generation digital technology.

As noted last month by Federal Reserve Governor Lael Brainard,<sup>1</sup> the United States should also position itself with a seat at the table of international discussions regarding standards for the design and appropriate uses of CBDCs. The ability of the United States to maintain its leadership

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<sup>1</sup> See Brainard (2021).

in global discussions and in international payment-related markets will rest in part on the knowledge and credibility associated with having developed state-of-the-art CBDC technology to a fully deployable level.

The U.S. should also prepare a strategy for deflecting undesirable and invasive types of cryptocurrencies as they gain traction in U.S. payments. A digital dollar can play a role here by providing an attractive and officially supported alternative.

I am guessing that Dr. Narula will update you today about CBDC research progress with “Project Hamilton” work by the MIT Digital Currency Initiative and the Federal Reserve Bank of Boston.<sup>2</sup> This is the “R” part of “R&D.” The transition from research to development implies a significant additional commitment of resources and a plan for building an effective digital dollar. There are many open design options. In particular, who has access to which personal data and who has responsibility for monitoring the legality of payment transactions must be decided in a way that assures Americans of their privacy while protecting them from corrupt payments. Under this constraint, achieving a high degree of efficiency is not a simple matter.

I very much look forward to the release this summer of the Fed’s discussion paper on the benefits and risks of CBDCs (Powell, 2021).

### **Why Can’t Banks Do This?**

U.S. banks are capable of providing an effective low-cost payment system but have not done so. Regulations, network effects that limit entry, and profit incentives have not promoted an open, innovative, and competitive market.

Even centuries ago, Alice could pay Bob by asking her bank to debit her deposit account in favor of Bob’s account at his bank. Today, banks handle the vast majority of payments, whether domestic or cross border, by this straightforward method. U.S. banks take reasonable care to protect the privacy of their customers while monitoring payments for their legality. Commercial bank deposits can be provided in interoperable forms suitable for smart contracting. An advanced interoperable payment system based on bank deposits is feasible but not currently under development, to my knowledge.

Calls for alternatives such as fintech payment firms, private stablecoins like Diem,<sup>3</sup> and CBDCs, have been incited by the low efficiency and high cost of the current bank-railed payment system. Many Americans are wondering, “If China has such an advanced low-cost retail payment system, then why can’t we?”

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<sup>2</sup> See Rosengren (2021).

<sup>3</sup> See Catalini (2021).

It takes too long for U.S. merchants to receive their payments, often more than a day. Based on McKinsey data, moreover, Americans pay about 2.3% of GDP for payment services, far more than Europeans, particularly because of extremely high fees for credit cards, as illustrated in Figure 1. This is not because Americans are getting better quality service. Further, the primary payment instrument of Americans, their bank deposits, is compensated with extremely low interest rates. When wholesale market interest rates rise, consumer bank deposit interest rates remain much lower, typically near zero.<sup>4</sup>

U.S. banks and credit card providers operate what Rochet and Tirole (2003) call a two-sided market. On one side of the market, merchants pay high payment fees. On the other, consumers are offered low direct payment fees, and sometimes rewards. This approach, combined with the positive network effects of a common payment system that is convenient for consumers to use, binds all market participants to the bank-railed system. So far, competitive entry into this market has been difficult.

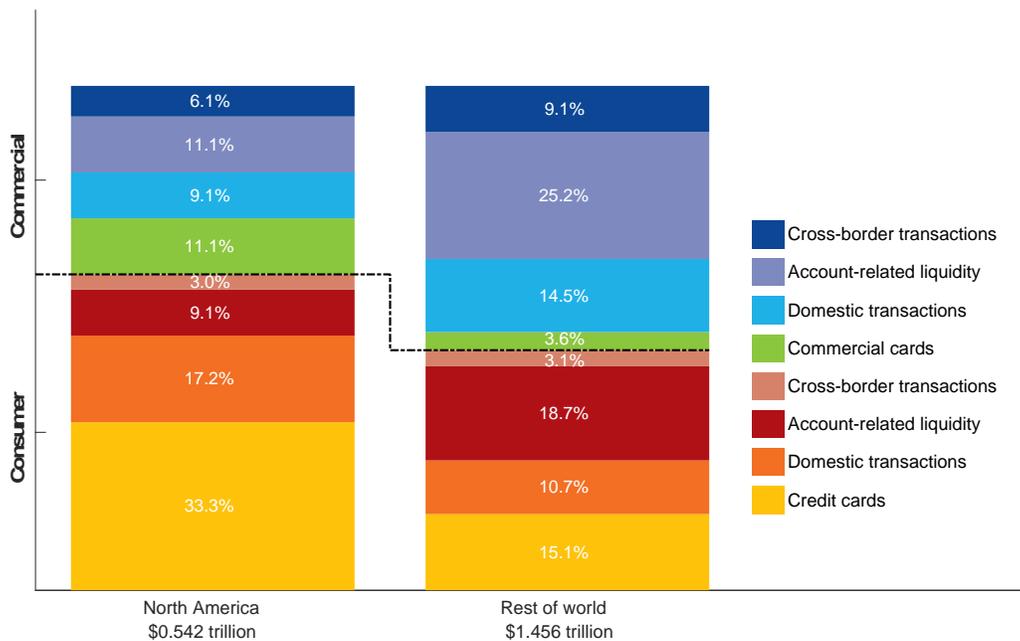


Figure 1. A breakdown of payment revenues by type. Data source: McKinsey (2021).

Ultimately, consumers bear some of the burden of merchants’ payment fees through higher prices for goods and services. In order to make their payments, moreover, many consumers borrow money at high interest rates on their card accounts or store the cash that they will use to make payments in bank accounts that offer woefully low interest rates. It’s not easy for many Americans to shop aggressively for deposit and payment services. Banks have “walled

<sup>4</sup> See, for example, Driscoll and Judson (2013), Drechsler, Savov, and Schnabl (2017), and [FDIC historical data](#).

gardens” – with little to gain by making it simple for their customers to move their cash to the highest bidder.

Banks have also underinvested in payment technologies that would improve the speed, interoperability, and programmability of payments. The Fed has had to step in with the development of its own real-time payment system, FedNow, which will be ready in a few years. FedNow will improve the speed of payments and offer other efficiency gains but brings no assurance of significantly improved competition for payment services. For this reason and for the other reasons that I have outlined, I believe that it is time for Congress to give the Fed the legal power to introduce a digital dollar and to encourage or direct the Fed to develop and field-test an effective digital-dollar technology to the point at which it could be deployed on reasonably short notice. There is no need to decide now to deploy the digital dollar. We will learn a lot more about the associated costs and benefits before digital-dollar technology is ready to use. Moreover, common knowledge that a digital dollar could be deployed might encourage banks to offer Americans a better payment system. Under current regulations and market structure, banks simply do not have sufficient incentives for this.

Congress could also direct the U.S. Treasury to update Congress regularly on the latest developments and its thinking on ways to advance the U.S. payment system, including CBDC technology.

Surely many banks realize that their profitable stewardship of the payment system will eventually be taken away from them unless they offer a better deal to their customers. Low-cost fintech payment firms, especially if given Fed accounts, might grab bank payment franchises. This happened in China, where 94% of mobile payments are now processed by Alipay and WeChatPay, with 90% of residents of China’s largest cities using these services as their primary method of payment.<sup>5</sup> Or, stablecoins like Diem might disintermediate banks. Or, here in Congress, you could ask the Fed to introduce a digital dollar. Banks have not yet aggressively taken up the challenge to offer better and cheaper payment services because the technology upgrade is costly and because the first banks to offer a truly open and competitive service may cede significant profits. Some banks may also believe that Congress will not act aggressively in this arena. Congress can help to correct a market failure by opening a path by which consumers and businesses can get access to better options, such as a CBDC or other new types of fintech payment services. If incumbent banks do not respond, then one or more of these options should be deployed.

A further impetus for a digital dollar is financial inclusion. A 2020 study by the Federal Deposit Insurance Corporation estimates that about 7.1 million U.S. households are unbanked. Many additional households are underbanked. As noted by Treasury Secretary Janet Yellen,<sup>6</sup> a digital

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<sup>5</sup> See Klein (2020) and “[Alipay retains leadership position with 55% market share in China’s mobile payments market.](#)” *Business Today*, July 9, 2020.

<sup>6</sup> In a February 22, 2021 [New York Times DealBook video interview](#) Secretary Yellen said: “Too many Americans don’t have access to easy payments systems and banking accounts, and I think this is something that a digital dollar, a central bank digital currency, could help with.”

dollar could improve the access of unbanked Americans to basic payment services. The use of paper money in U.S. payments declined from 51% in 2010 to an estimated 28% in 2020 (McKinsey, 2020). If the acceptability of paper currency declines sufficiently, those without access to electronic payments would be further isolated from parts of the economy. Ironically, a CBDC could accelerate a decline in the use of paper currency, implying that special attention should be given to unbanked and underbanked Americans, whether or not a digital dollar is deployed.

CBDC technology also offers options for more efficient implementation of fiscal and monetary policy. For example, the Covid-19 pandemic revealed the big difference that a digital dollar could make for the speed of dissemination of government relief payments to millions of Americans.<sup>7</sup> With CBDC, it may also be possible for the Fed to improve the transmission of monetary policy into the macroeconomy by exploiting digital-currency technology, real-time measurement of monetary variables, and perhaps use the option to offer interest on CBDC.

### **Challenges for a CBDC**

There are also challenges for a potential CBDC to overcome.

The greatest challenge for CBDC designers is protecting the privacy of transactions while at the same time effectively monitoring payments for their legality, particularly with respect to money laundering and financing terrorism. If these responsibilities are absorbed by a central regulator, vast data repositories will need to be protected from cyber attacks and undue surveillance. While new cryptographic technologies can address these concerns, centralized databases containing personal information may not be popular in the United States. China has not hesitated to concentrate CBDC payment data in the hands of its central bank, but China is an authoritarian state.

As one possible approach, the designers of a digital dollar could consider including design features that would allow consumers, perhaps at their option, to access the payment system with standardized biometric identities.<sup>8</sup>

The U.S. could opt for a decentralized approach to holding and monitoring CBDC personal identity and payment data at the level of payment service providers such as banks and fintech firms (Digital Dollar Foundation and Accenture, 2021). This includes a risk that the resulting two-tiered market structure might come to resemble the current bank-railed system. To manage against a similarly inefficient outcome, payment service providers should be tightly regulated for open access, service levels, and interoperability<sup>9</sup> standards. One might then ask:

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<sup>7</sup> See Digital Dollar Foundation and Accenture (2020), page 7.

<sup>8</sup> D'Silva, Filková, Packer, and Tiwari (2019) summarize lessons learned from India's UPI interoperable payment interface.

<sup>9</sup> Regarding the critical importance of maintaining interoperability, see Darko, Duffie, and Mathieson (2021).

“Why can’t the existing bank-railed payment system be similarly regulated so as to achieve a roughly similar beneficial effect?” This question has not yet been answered satisfactorily.

Another potential downside of a CBDC is that technology innovation could become more centralized within government agencies. This is not usually a formula for success, especially in consumer-facing businesses. I am optimistic, though, that this concern can be overcome with carefully designed public-private partnerships.

A further worry is that if the Fed were to make an unlucky misstep with its CBDC design or if its CBDC has an operational accident, many millions of Americans could be adversely affected. Because the Fed is ultimately answerable to Congress, this could impinge on the Fed’s independence as a central bank. The digital dollar should not be deployed for broad public use until the technology is “bullet proof,” within the limits of the latest technology. This raises the importance of giving the Fed a green light to begin work now.

I do not expect that the impact of a CBDC on the risk of bank runs will be a major disadvantage of a digital dollar. Bank runs are already a concern without a CBDC. For this reason, banks have substantial regulatory liquidity requirements and are able to pledge their assets to the Fed in exchange for temporary cash loans that can be used to meet deposit redemptions. Access to a CBDC could make it easier to quickly withdraw deposits from a bank. That risk should be carefully analyzed and managed, but I do not expect that it will rule out a CBDC.

The greater mobility of money associated with a CBDC would force banks to compete more aggressively for deposits, driving up deposit interest rates. This would be good for consumers but not for bank shareholders. With this, I do not expect that the amount of credit offered by banks would suffer significantly. Banks do not currently offer unprofitable loans using the irrational justification that they can recoup the associated losses by exploiting their below-market deposit rates. For given macroeconomic conditions, the set of loans that are profitable for banks to offer would probably remain about the same. In any case, the U.S. government should not allow an inefficient payment system to persist so that depositors can subsidize banks.<sup>10</sup>

In short, I don’t believe that the potential for disrupting banks, while real, should be viewed as a major reason for avoiding CBDCs. The banking industry is likely aware that disruption is coming, one way or another, and should prepare to offer Americans a better payment system.

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<sup>10</sup>It should be alerted that I am a member of the board of directors of TNB Inc., which wishes to offer narrow-bank deposits but has been unable to obtain a deposit account at the Fed. TNB’s charter prevents it from offering payment-related products and services. I am not compensated by TNB, whether with equity or otherwise.

## International implications

Much has been written about the potential impact of eCNY, China's new CBDC, on the international dominance of the U.S. dollar. Concerns that the renminbi will rival the dollar in international markets are not warranted at this time, and these concerns are not a good reason to rush out a digital dollar before it is carefully designed. The international dominance of the US dollar rests on the relative lack of U.S. barriers to cross-border capital flows, the depth and liquidity of globally accessible markets for U.S. Treasuries and other U.S. financial instruments, reliance by global financial market participants on the fairness and stability of the U.S. legal system, and the reliability of U.S. monetary and financial policy.<sup>11</sup> The collective effect of these and other strengths of the U.S. system will not be easy for China to replicate within a significant period of time.<sup>12</sup>

That said, China has taken a big lead over the U.S. in retail payment technology. Domestically, China's mobile payment service providers are technically advanced and have extremely deep market penetration. Limiting the dominance of these private payment service providers was one of the key motivations of China for introducing eCNY.

It's already apparent that eCNY will be part of a rich payment ecosystem supporting a wide range of access methods and use cases. Although representatives of the People's Bank of China have emphasized that eCNY is not intended for "yuanization" of the economies of other countries,<sup>13</sup> China is making arrangements<sup>14</sup> for cross-border use of eCNY with other CBDCs, including those of Thailand, Hong Kong, and the United Arab Emirates. There are also potentially important business-to-business cross-border applications of eCNY (Ekberg and Ho, 2021).

eCNY technology will likely open commercial opportunities for China in some emerging-market economies. This will increase China's influence in EM countries, which U.S. foreign policy experts may wish to consider carefully. It may advantage the U.S. to have its own CBDC technology to offer to countries that wish to lower the costs or advance the development time for introducing their own CBDCs. Especially for small open economies, the threat of an invasive digital currency can be mitigated by the early adoption of an effective domestic CBDC. For the same reason, the United States should be cautious about the impact that a digital dollar could have on small open economies through its potential for interference with local monetary policy. The United States should support the development of international agreements that would set

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<sup>11</sup> For these and other sources of support for the dominance of the US dollar, see, among other research Gopinath and Stein (2021), Gourinchas (2019), Jiang, Krishnamurthy, and Lustig (2020), and Maggiori, Neiman, and Schreger (2021).

<sup>13</sup> See Bloomberg News (2021), Zhou (2021), and Sun and Yan (2021), who quote Peoples Bank of China Deputy Governor Li Bo as saying (in an unofficial translation) "The internationalization of the RMB is a natural process. Our goal is not to replace the U.S. dollar or other currencies, but to let the market make choices to further facilitate international trade and investment."

<sup>14</sup> See Hong Kong Monetary Authority (2021).

standards of care for protecting foreign monetary systems from disruption by another country's CBDC.

If the United States becomes an active developer of CBDC technology using public-private partnerships, there would probably be increased opportunities for U.S. firms to benefit commercially in the provision of payment technologies in international markets. U.S. banks have been ceding commercial advantage to Chinese banks in international markets, in part because of U.S. regulations and sanctions. The tradeoffs here should be carefully weighed by the U.S. official sector, case by case.

As I have said, citing Governor Brainard's remarks, the U.S. should prioritize the development of its CBDC technology for reasons that include influence in international forums setting technical standards and intergovernmental agreements for the cross-border use of CBDCs. Such agreements are already coming into G7 discussions.<sup>15</sup>

A majority of the world's central banks are now working on CBDCs (Boar and Wehrli, 2021). While few central banks have specific plans to issue CBDCs, some have moved from research to active development. Active CBDC developers include the Peoples Bank of China, The Central Bank of Sweden (Sveriges Riksbank),<sup>16</sup> the Bank of Canada,<sup>17</sup> the European Central Bank,<sup>18</sup> the Bank of Korea,<sup>19</sup> and the Bank of Japan.<sup>20</sup> Among major economies, only China has committed to deploying a CBDC.

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<sup>15</sup> See the [G7 Finance Ministers and Central Bank Governors Communiqué](#) of June 5, 2021. See also Auer, Haene, and Holden (2021), and Associated Press (2021).

<sup>16</sup> See Sveriges Riksbank (2021).

<sup>17</sup> Bank of Canada (2021) states: "The Bank currently has no plans to launch a CBDC. Rather, as a contingency plan only, the Bank will build the capacity to issue a retail, cash-like CBDC should the need to implement one ever arise. Two scenarios have been identified in which launching a CBDC could enable the Bank of Canada to fulfill its mandate. Either scenario could materialize very quickly, warranting vigilant attention to evolving developments in payments. Because of this and given the time required to create a viable CBDC, the Bank has decided to pursue a contingency strategy designed to create a state of sufficient policy and operational readiness to launch a CBDC relatively quickly should that decision be made."

<sup>18</sup> The European Central Bank (2021) states: "We have not yet decided whether to issue a digital euro. We are currently in a preparation phase: we are developing the concept, conducting practical experimentation, listening to the views of the broader public and engaging with stakeholders. We will decide whether to launch a digital euro project towards the middle of 2021, in order to be prepared for the possible issuance of a digital euro at some point in the future."

<sup>19</sup> See reporting by Cynthia Kim of Reuters, "[South Korea's central bank moves to develop pilot digital currency,](#)" May 23, 2021.

<sup>20</sup> The Bank of Japan (2021) states: "The Bank of Japan has been undertaking preparations to begin experiments on Central Bank Digital Currency (CBDC) in early fiscal year 2021, to test the technical feasibility of the core functions and features required for CBDC. As necessary preparations are now complete, Proof of Concept (PoC) Phase 1 begins today. In PoC Phase 1, the Bank plans to develop a test environment for the CBDC system and conduct experiments on the basic functions that are core to CBDC as a payment instrument such as issuance, distribution, and redemption. This phase will be carried out through March 2022, for a duration of one year."

## Conclusions

The United States should now begin a significant program for the development of a digital dollar. The design should prioritize the efficiency of payments, privacy, interoperability, financial inclusion, and the ability to monitor payments for compliance. Even a well-resourced development program can be expected to take a number of years to achieve a successful design. The final decision to deploy the digital dollar can be delayed until more is learned.

In parallel with the development of a digital dollar, efforts should continue to be made to improve the competitiveness and efficiency of the legacy U.S. payment system. FedNow is an important milestone in that effort. Regulations can be changed to further encourage innovation and competition for payment-related services. The Fed, for example, has recently considered offering accounts to “novel” payment firms under appropriate conditions.<sup>21</sup>

The U.S. should take a leadership position in international official discussions of CBDCs, particularly with respect to the cross-border use of CBDCs.

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<sup>21</sup> See Board of Governors of the Federal Reserve System (2021). In its associated press release, the Board quoted Federal Reserve Governor Lael Brainard, who said “With technology driving rapid change in the payments landscape, the proposed Account Access Guidelines would ensure requests for access to the Federal Reserve payments system from novel institutions are evaluated in a consistent and transparent manner that promotes a safe, efficient, inclusive, and innovative payment system, consumer protection, and the safety and soundness of the banking system.”

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