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Digital Currencies—More than a Passing Fad?

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The evolution of money is best characterized as a sequence of long eras of stasis or imperceptibly gradual change, punctuated by exceptional periods of sharp, discontinuous adjustment. The question is whether, as a result of the digital revolution, we are on the cusp of one of those exceptional periods.

In thinking about digital money, three categories are usefully distinguished. The first might be called plain-vanilla cryptocurrencies. Bitcoin is the best known, though it has many rivals. These cryptocurrencies rely on a distributed ledger verification technology popularly known as blockchain, and their prices fluctuate with supply and demand, sometimes wildly.

The second category is so-called stablecoins. These are cryptocurrencies that run on either a distributed ledger or a centralized system maintained by the issuer, which stands ready to convert them into legal tender, such as the US dollar, at a fixed price on demand. The best known example is Tether, which is “tethered” to the dollar (one Tether is worth one dollar). A couple of years ago, Facebook made a splash by proposing to enter this space with its own stablecoin, initially called Libra, but subsequently rebranded as Diem and hived off to an independent governing association.

The final category is made up of prospective central bank digital currencies (CBDCs). These are digital units with fixed value, analogous to Tether but issued by central banks. They would be made available to consumers as a token, by depositing them into digital wallets, or by allowing individuals to open retail accounts at the central bank. Central banks around the world are actively studying these possibilities. Some, such as the People’s Bank of China, have launched pilot projects that

entail issuing a CBDC on a limited basis (in certain cities or for specified transactions).

What does the history of money tell us about the viability and desirability, from a social standpoint, of these monetary innovations?

THE EVOLUTION OF MONEY

Coins minted out of precious metal were probably first created in Greece around 600 BCE. Banknotes followed in China, 1,300 years later in the period of the Tang Dynasty, when merchants and wholesalers, finding it awkward to settle large-value transactions in bulky copper coin, began making payments using paper receipts issued by a trusted person with whom their coins were deposited. In the tenth century, under the Song Dynasty, the central government began issuing its own notes, promising to redeem them in specie.

In time, such notes, issued by various governments, were supplemented by checks drawn on deposit accounts held with private bankers, first in Persia and then in Europe. These handwritten instruments, instructing the banker to pay a specified amount to a third party, gave way in the eighteenth century to the preprinted forms that we know as checks. With this standardization and growing acceptance of checks as a means of payment, the bank deposit accounts on which checks are drawn came to be regarded, along with currency and coin, as part of the money supply.

Such was the state of affairs until the twentieth century, although precise details differed across countries and over time. In some places, the central government asserted its exclusive right to issue banknotes and assigned that privilege to a financial institution, the central bank, which provided the state with other services in return. In other instances, such as the antebellum United States, where there existed deep and abiding distrust of a powerful financial institution affiliated with the government, all chartered banks were

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permitted to issue notes so long as they committed to redeeming them for specie.

The specie basis of the system differed across countries. In some places it was silver, in others gold, in still others both. As the nineteenth century progressed, a growing number of countries gravitated toward gold as the uniform monetary standard, Britain's early adoption of the gold standard providing a focal point.

To be sure, specie convertibility was never universal or unconditional. Issuing banks might default on the obligation to redeem their notes; dissatisfaction over the operation of so-called Free Banking in the United States centered on this notorious problem. The convertibility of government-issued money might be suspended in wartime and in response to financial crises and other emergencies. Although governments generally sought to resume convertibility at the earlier rate once the emergency passed, some suspensions were associated with spectacular inflations that made resumption impossible.

MORE RECENT INNOVATIONS

The preceding is probably as close as one can come to summarizing two and a half millennia of monetary history in a few short paragraphs. The twentieth century then saw two monetary transformations, one institutional, the other technological. Institutionally, the system shifted from one based on an external anchor, namely a fixed domestic-currency price of gold, to one based on the reputation of its steward, namely the central bank. Central banks were given mandates to maintain price and financial stability—and, increasingly, the independence needed to pursue them. They were judged by their success at achieving their mandated objectives.

In terms of technology, the mid-twentieth century saw the advent of credit cards, first the Diners Club Card in 1950 (accepted initially by 28 restaurants), and then the first general-use card in 1951 (issued by Franklin National Bank). These supplemented bank checks as means of payment and, eventually, bank overdrafts as a source of credit. Debit cards, which deduct funds directly from bank accounts, were next to emerge in the 1970s.

Most recently, with the growth of the Internet and 3G connectivity (which is the minimum standard for linking cellphones to the Internet),

consumers have embraced online and mobile payments. As a result, banks as providers of payment services are increasingly competing—and in some cases partnering—with nonbank digital payment and wallet apps operated by platform companies and telecoms, such as Apple Pay, Google Pay, and Amazon Pay in the United States, M-Pesa in Africa and Asia, and WeChat Pay and Alipay in China.

COVID-19, it is widely said, has had the effect of accelerating ongoing trends. In this context, it accelerated the trend away from using cash and making withdrawals at bank branches and automatic teller machines, in favor of paying bills online and making payments electronically. In some countries, Sweden for example, cash has virtually disappeared.

WHAT DIGITAL CURRENCIES LACK

This transition might be thought to open the door to the widespread use of cryptocurrencies, stablecoins, and central bank digital currencies, since individuals are already using a variety of close digital substitutes for cash. Yet a closer look

suggests that the prospects for these forms of digital money are not clear-cut.

Most obviously, plain-vanilla cryptocurrencies lack the essential attributes of money, namely providing a stable store of value, accepted unit of account, and convenient means of payment. The value of Bitcoin, to take the leading example, is anything but stable, as will be apparent to anyone who has followed its ups and downs. This volatility makes it unattractive as a unit of account in which to price merchandise and set wages. It is inconvenient for payments, requiring the user to possess a degree of technological sophistication, a secure digital wallet, a reliably recalled password, and, not least, a counterparty prepared to accept it. Validating transactions through so-called Proof of Work, in which users of the distributed ledger solve arbitrary mathematical problems, is notoriously intensive in its consumption of energy and computational resources.

Bitcoin's champions argue that it deserves a place in investment portfolios, not unlike gold, because its returns are uncorrelated with those of other asset classes. (The lower the correlation, the greater the diversification benefits of the investment.) But this is different from saying that it will be used as money. Returns on investing in gold are

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similarly uncorrelated with returns on other investments. This doesn't make gold easy or attractive to use in transactions. Just as gold coins no longer have a consequential role in payments, the same is certain to be true of Bitcoin and other cryptocurrencies of its ilk. Bitcoin looks to be more a niche investment product than a widely utilized money.

Stablecoins possess the stable store of value and unit of account features lacked by plain-vanilla cryptocurrencies, since a dollar of Tether or Diem is supposed to always be worth a dollar. But what is true in principle may not also be true in practice. A stablecoin is only as stable as the collateral standing behind it. If an issuer holds a dollar's worth of US cash in reserve for every dollar coin it issues, then there should be no question about its ability to redeem that stablecoin at par on demand. But having to raise a dollar of capital from investors in order to issue a dollar's worth of stablecoin is expensive, unprofitable, and therefore nonviable.

This creates a temptation to cut corners in one of two ways. The stablecoin issuer could decide to hold collateral equal to only a fraction of the value of the coins it issues. That would not be a first. Fractional reserve banks hold capital and reserves equal to only a portion of the loans they extend; they raise additional resources to fund their lending from depositors or on the wholesale interbank market. Similarly, central banks maintaining currency pegs, whether under the classical gold standard or today, have generally held gold and foreign exchange reserves equal to only a fraction of their currency emission.

The one thing these examples have in common is their fragility. If doubts arise, for whatever reason, about the sustainability of a currency peg, investors will dump that unit as a way of avoiding losses; either this will strip the central bank of its reserves and force it to abandon the peg, or the central bank will abandon the peg preemptively in order to preserve at least a portion of its reserves. Similarly, if doubts develop about the solvency of a fractional reserve bank, depositors will rush to withdraw their funds before the cupboard is bare and the convertibility of deposits into currency is suspended.

To avoid the destabilizing consequences of this bank-run problem, governments today insure retail deposits up to a specified ceiling, and central banks act as lenders of last resort to aid embattled financial institutions. In return, they require banks

eligible for assistance to follow regulations designed to limit the incidence of such problems. Presumably, stablecoin issuers, to receive similar protection, would be required to apply for bank charters or their equivalent. From the vantage point of the monetary system, this would not be anything new under the sun.

STABLECOINS AS MONEY MARKET FUNDS

A second way to cut corners is by holding a portion of the collateral backing the stablecoin not in cash, but in interest-earning assets, such as US treasury bills or high-quality private securities known as commercial paper. In this case, the stablecoin issuer would be functioning like a kind of money market mutual fund.

Money market mutual funds pool their customers' share purchases. They use the proceeds to purchase treasury bills and commercial paper, making money on the spread between the interest earned on these investments and that paid to their clients. Like a stablecoin issuer, they promise their customers that shares can be redeemed at par—that a share purchased for a dollar can be redeemed for a dollar. They obtain the funds to finance redemptions by selling off a corresponding quantity of liquid securities.

The problem with this business model became evident in the global financial crisis of 2008, when normally liquid investments abruptly became illiquid. If everyone wants to sell commercial paper and no one wants to buy, or if commercial paper can only be sold at a substantial loss, then the fund won't have the resources to make good on its promise to redeem shares at par. Instead of paying out a hundred cents on the dollar, it will require its shareholders to accept less, as Reserve Primary Fund, one of the oldest and largest money market funds, did in 2008. This practice came to be known, for self-evident reasons, as "breaking the buck."

In that instance, the US government intervened to backstop the money market fund industry. It temporarily insured the holdings of publicly offered funds, quelling the panic, and provided commercial banks with additional resources to purchase securities from money funds. But there was a reluctance to regularize these practices on the grounds that they were likely to encourage additional risk-taking by fund managers. Instead, the US Securities and Exchange Commission instituted rules requiring funds to post floating net asset values rather than maintain a \$1 share price,

as a reminder to investors that money market funds are not free of risk. It also allowed funds to institute redemption gates, under which they can limit withdrawals and charge temporary fees of up to 2 percent.

Revealingly, Diem's latest whitepaper similarly foresees redemption gates and conversion limits to protect the stablecoin against runs. But a stablecoin that is not entirely stable and that can't be redeemed for dollars on demand in unlimited amounts won't be an attractive alternative to Federal Reserve money, in the same way that a share in a money market mutual fund is an imperfect substitute for cash.

LOSING CONTROL

The only viable alternatives to existing central bank-issued money, then, are central bank digital currencies. Nearly every central bank on the planet is contemplating their possible issuance. Gauging the prospects requires one to understand their motives.

A first potential motivation for issuing a CBDC is to avoid losing control of the payments system. In the United States, individuals and businesses make payments using the communications and settlement system known as Fedwire, jointly owned by the 12 US Federal Reserve Banks. Some 6,000 US banks maintain "master accounts" with the Federal Reserve, allowing them to execute money transfers using Fedwire. The person or business paying the funds first instructs his or her bank to transfer funds to the payee's account at the receiving bank. On receiving the instruction (or "wire"), Fedwire debits and credits the relevant master accounts, and the transfer immediately becomes final. The Fed ensures that the payments system operates smoothly, which keeps economic activity humming. In addition, the central bank has a valuable inside source of information on financial flows through the economy.

The worry is that individuals and businesses will no longer pay their bank \$30 or \$40 to send a wire transfer if there is a widely accepted stablecoin that can be transferred at a fraction of the cost. The Fed will have reason to be concerned about the security of that private system. If it is possible to cyberattack Colonial Pipeline (the largest fuel pipeline in the United States, which was forced to shut down for several days in May 2021

when hackers demanded a ransom in Bitcoins), why not Tether or Diem? And what will happen to the economy then?

It is therefore proposed by various CBDC proponents that the Fed (and other central banks in its position) should issue its own digital unit. Unlike private-label stablecoins, there would be no question of whether a Federal Reserve-issued CBDC will remain stable against the dollar, any more than there are questions about whether a commercial bank's dollar deposit in its master account at the Fed is worth a dollar. But the cybersecurity risks would remain. Layering a CBDC on top of the existing payments system makes sense only if that new construct is unquestionably secure.

Moreover, if control of the payments system is the issue, there are other ways of addressing the problem. Digital payment platforms can be required to share information with the central bank. This is what the People's Bank of China recently decreed as part of its crackdown on Alipay and WeChat Pay, China's two leading private payment systems. Private platforms can be strictly

regulated to enhance their stability, and Fedwire can be opened up to participation by nonbank financial firms.

If the concern is that banks charging their retail customers \$30 or \$40 a wire are gouging their customers, then the solution is more competition. More pressure on banks to adopt new technologies brings down costs.

MAKING FINANCE MORE INCLUSIVE

A second argument for contemplating a CBDC, mooted by US Treasury Secretary Janet Yellen among others, is in order to enhance financial inclusion. The Treasury Department had difficulty getting COVID-19 stimulus checks to individuals who hadn't filed a tax return and didn't have a bank account. Although nearly 15 million American adults are unbanked, almost everyone has a smartphone. If they all downloaded a digital wallet that automatically registered with the Federal Reserve, the government could deposit digital dollars into it directly.

This assumes, of course, that everyone eligible to register a digital wallet will do so. In practice, a significant fraction of the unbanked cite privacy concerns as their reason for not having a bank account. And even if greater financial inclusion is an admirable goal, it still needs to be balanced against the potential cyber risks of a CBDC.

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Financial inclusion may be a problem in the United States, but it is even more pervasive in developing countries, where many people lack access to a bank branch or the wherewithal to open an account. However, private payments systems such as M-Pesa have already gone a long way toward solving this problem. Remoteness is no longer an issue when transactions can be undertaken via cellphone and satellite. The minimum balance and documentation requirements of such systems are extremely modest. M-Pesa may charge substantial fees, but these can be regulated. Nor is it clear that the Central Bank of Kenya can operate such a system at lower cost.

Mobile phone-based money transfer services are now branching into the provision of other financial services, such as micro-lending. They use information gleaned from payments to assess the creditworthiness of their customers, enabling them to efficiently price their loans. This kind of micro-lending to individuals is not a suitable business for a central bank. Thus, it can be argued that access to financial services will be superior if retail digital payments are organized by a private provider. And if there are consumer-protection worries, these are best addressed by the appropriate financial regulator and competition authority.

DETHRONING THE DOLLAR

Countries like China see issuing a CBDC as a way to enhance the international attractions of their currencies and diminish the dominance of the dollar. As of mid-2021, fully 40 percent of cross-border payments cleared by the Society for Worldwide Interbank Financial Telecommunication (SWIFT, the international equivalent of Fedwire, which is owned and operated by its member financial institutions) were transfers of dollars. This is despite the fact that the United States accounts for just one-seventh of global GDP in purchasing power parity, or price-adjusted, terms. In contrast, transfers of China's currency, the renminbi, accounted for less than 2 percent of cross-border payments.

The dollar's dominance has been a thorn in the side of policymakers outside the United States ever since Valéry Giscard-d'Estaing, as French finance minister, raised the issue in the 1960s. Recent US efforts to weaponize the dollar have highlighted the problem. In 2018, the Treasury Department adopted legal measures preventing Rusal, a Russian aluminum firm, from accessing the dollar-based financial system, devastating the company. In

2012 the Iranian central bank was disconnected from SWIFT at US insistence, and in 2020 the Treasury Department froze the US assets of 18 Iranian banks as part of its sanctions effort, barring American banks from dealing with them and threatening secondary sanctions against banks of third countries that did so. The costs to Iran were considerable.

Countries like China worry that they might be next, and that their trade with third countries, which expect to collect dollars, will be disrupted. The corresponding solution is to encourage third countries to accept renminbi in payment. Issuance of a Chinese CBDC is intended to make this option more convenient and attractive.

The question is whether this will work. Understanding the answer requires uncovering the sources of the dollar's ubiquity. First, the market in dollar funds is large and liquid. By some measures, the market in US treasury securities is the single largest asset market in the world. This liquidity means that individuals and businesses accepting dollar payments can sell their dollars all but instantaneously, without moving market prices. This is why they opt to transact in the currency. Chinese financial markets, in contrast, are still ringed by capital controls, limiting both their liquidity and the access of foreigners.

In addition, the dollar has a large existing base of users. Individuals and firms hold and use dollars because those with whom they do business similarly hold and use dollars. There is no straightforward mechanism for coordinating their simultaneous shift to a different currency.

International money transfers are notoriously expensive, since they require payment of fees to two banks, in the sending and receiving countries, and the intermediation of SWIFT. So substituting a CBDC might significantly bring down this cost. And the first large-country central bank to issue a digital currency would have a head start in this race.

But would a Chinese CBDC really be an attractive alternative to the dollar and SWIFT? It is not clear that the People's Bank of China (PBOC) will allow nonresidents to hold renminbi tokens or retail accounts at the central bank, or to buy and sell the CBDC freely. Doing so would undermine the operation of its capital controls. Nor is it clear that nonresidents would be comfortable doing so, given privacy concerns. The PBOC has said that it will track only limited information about

transactions using its CBDC. But take-up requires that it be believed—and that no one suspects the existence of a digital back door.

Alternatively, central banks could make their digital currencies interoperable, so that they interact and exchange data with one another. Doing so could allow them to be exchanged on a digital platform or clearinghouse. The feasibility of such arrangements is being studied by, among others, the Bank for International Settlements' Innovation Hub, run jointly by the BIS, the Hong Kong Monetary Authority, and the Bank of Thailand (with the participation of other central banks). But, studies notwithstanding, the actual creation of a network of interoperable CBDCs capable of displacing the dollar as the leading international currency seems aeons away.

Meanwhile, the private sector is actively bringing down the cost of international payments. Ripple, a California-based company, is using blockchain-based technology to facilitate cross-border financial transfers by its bank customers. Fintech firms like Payoneer and Ebury have developed online platforms to complete cross-border business-to-business payments at a fraction of their traditional cost. Western Union is collaborating with the French fintech Linxo to do the same for remittances.

Even SWIFT is updating its platform, using digital technology to provide the pre-validation of essential data, fraud detection, data analytics, and transaction tracking traditionally provided by each financial institution individually. Eliminating

redundancy holds out the possibility of significantly reducing cross-border transaction costs. Again, it is not clear what central banks can do in this space that private financial institutions cannot.

IN SEARCH OF A PROBLEM

To all appearances, the financial sector is currently in one of those periods of exceptionally rapid change that punctuate history. We are seeing the adoption of cloud computing to store and process financial data, artificial intelligence and machine-learning algorithms to analyze it, and blockchain to secure it. The future will surely see additional movement in these directions.

But it is uncertain whether digital currencies will be part of that future. Plain-vanilla cryptocurrencies like Bitcoin lack the essential attributes of money and are likely to remain no more than niche investment products. Stablecoins have more of the attributes of money but are expensive to operate. They are fragile, absent transaction limits that would diminish their “moneyness.”

Central bank digital currencies are more obviously viable, but they are a solution in search of a problem. It's not clear, in other words, what economic and social problems they can solve that can't also be solved by suitably regulated private-sector entities.

History has seen many passing financial fads and fashions. Digital currencies, as distinct from digital technology and the digital revolution more generally, may be little more than another one. ■